

Datum	van	aan	Soort	Onderwerp	Status				Weigeringsgrond					
					A	B	C	D	10.2.a	10.2.e	10.2.g	11.		
1	23-aug-11	Shell	lenM	email			x							
2	25-aug-11	UK	lenM	emailwisseling+										
4				document			x							
3				uitnodiging			x							
4	31-aug-11	lenM	UK gov	email+										
5				document										
6				document			x							
7				document			x							
8				document			x							
9	12-sep-11	lenM	Shell	email+										
10				document										
11				document			x							
12				document			x							
13				document			x							
14	14-sep-11	Shell	lenM	email+										
15				document										
16	15-sep-11	UK gov	lenM	mail+										
17				document										
18	16-sep-11	UK gov	lenM	email										
19	28-sep-11	UK gov	lenM	email+										
20				document			x							





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**Van:** :@shell.com  
**Verzonden:** dinsdag 23 augustus 2011 13:56  
**Aan:**  
**Onderwerp:** FQD presentatie a.s. donderdag bij EL&I

Hallo

Ik hoorde net van je secretariaat dat je veel en route bent vandaag, van daar nu een mail bericht.

We zullen elkaar a.s. donderdag treffen bij EL&I en ik wilde vragen of jij in kader van onze presentatie ook iets zou kunnen zeggen over de laatste stand van zaken rondom de FQD en de discussie in Nederland. Ik zou je graag aan het begin van de bijeenkomst het woord willen geven om e.e.a. nog eens te belichten zodat de aanwezigen weer helemaal up to date zijn.

Is dit in orde wat jou betreft? Ik zou je niet ter plekke willen 'overvallen' !

tot gauw,

Met vriendelijke groet,  
Yours sincerely,

drs.

Shell Nederland B.V.  
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Please note :

**Van:** [redacted] @dft.gsi.gov.uk  
**Verzonden:** donderdag 25 augustus 2011 18:35  
**Aan:** [redacted] @developpement-durable.gouv.fr  
**Onderwerp:** RE: UPCOMING POLICY BRIEFING ON THE LIFE CYCLE ASESSMENT OF EUROPEAN CRUDE OILS (SEPT 14 - 0830 hrs)

Dear [redacted]

Thanks for letting me know and I hope you enjoy your vacation.

If someone does attend from Germany, it would be to have a discussion regarding the FQD.

Best regards,

Low Carbon Fuels  
 Greener Transport & International Directorate – Department for Transport  
 Zone 1/32, Great Minster House, 76 Marsham Street, London SW1P 4DR  
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---

**From:** [redacted] [mailto:[redacted]] @bmu.bund.de]  
**Sent:** 25 August 2011 17:19  
**To:** [redacted] @developpement-durable.gouv.fr  
**Subject:** AW: UPCOMING POLICY BRIEFING ON THE LIFE CYCLE ASESSMENT OF EUROPEAN CRUDE OILS (SEPT 14 - 0830 hrs)

Dear [redacted]

many thanks for arranging for an informal meeting in that matter. Unfortunately I won't be able to travel to Brussels mid-September (will be on vacation). In case a colleague will take part I will let you know.

Best regards

Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit  
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 [redacted] Bonn  
 Postfach [redacted] / D 53148 Bonn  
 Telefon: +49-228-349-3300  
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**Von:** [redacted] [mailto:[redacted]] @dft.gsi.gov.uk  
**Gesendet:** Donnerstag, 25. August 2011 11:38  
**An:** [redacted] @developpement-durable.gouv.fr  
**Betreff:** Fw: UPCOMING POLICY BRIEFING ON THE LIFE CYCLE ASESSMENT OF EUROPEAN CRUDE OILS (SEPT 14 - 0830 hrs)

Attached is (1) an invitation to a policy briefing on September 14, 2011 in Brussels about the ongoing study by Jacobs Consultancy looking at EU crude pathways, and (2) the associated technical scope of work for this study. The study team will be in Brussels that week for a meeting with the study Stakeholder Group, and it was suggested that you may find an overview briefing of value.

We look forward to your participation.

*Resource Development Policy Division  
Alberta Enerav, Edmonton AB  
Tel: 780.  
BB: 780  
gov.ab.ca*

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**Van:** woensdag 31 augustus 2011 15:03  
**Verzonden:** @ec.europa.eu'  
**Aan:** NL implementation FQD  
**Onderwerp:** 112505.BJZ2011044006 - REGELING hernieuwbare energie -  
**Bijlagen:** stcrt-2011-8235.EN.DOCX; BJZ2011041732 Besluit brandstofkwaliteit-gepubliceerd 27 april 2011\_EN.DOCX; BJZ2011043268 Regeling brandstofkwaliteit - gepubliceerd 29 april 2011\_EN.DOCX; 112505.BJZ2011041737 - BESLUIT hernieuwbare energie vervoer - stb-2011-197\_EN.DOCX

Dear [redacted] and [redacted],  
Please find attached the courtesy translations of our national implementation of both RED and FQD.  
Regards,



**EU Pathway Study:  
Life Cycle Assessment of Crude  
Oils in a European Context  
Technical Scope of Work**



**Prepared For**

**Alberta Petroleum Marketing  
Commission**

**June 2011**

**JACOBS** Consultancy



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**EU Pathway Study: Life Cycle Assessment of  
Crude Oils in a European Context  
Technical Scope of Work**

**Prepared For**

**Alberta Petroleum Marketing Commission**

**June 2011**

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## Table of Contents

Section	Page
<b>1</b>	<b>Introduction .....1</b>
	Background .....2
	Current Life Cycle Studies Related to EU Pathways.....7
	Improvements in Bitumen Production .....9
	Limitations of Prior LCA Studies.....11
	Primary Study Objectives .....12
	Key Study Issues.....14
<b>2</b>	<b>Scope of Work .....15</b>
	Crudes to be Considered .....16
	Refining Configurations .....17
	Improvements in Bitumen Production .....18
	Identification of Data Sources .....18
	Uncertainty Measurements .....19
	Carbon Intensity of Canadian Crude Basket.....19
	Life Cycle Assessment .....19
<b>3</b>	<b>Schedule and Public Meetings.....20</b>
	Schedule .....21
	Public Meetings .....21
<b>4</b>	<b>Deliverables .....22</b>
<b>5</b>	<b>References .....24</b>

## Section 1.



## Introduction

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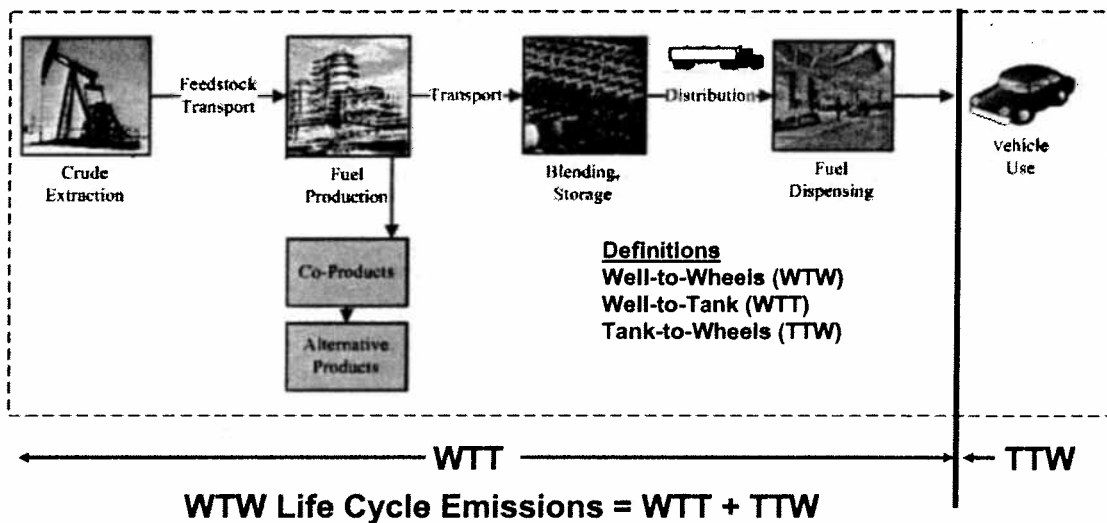
The Alberta Petroleum Marketing Commission (“APMC”) has contracted Jacobs Consultancy Canada Inc. (“Jacobs Consultancy”) to carry out an EU Pathway Study – Life Cycle Assessment of Crude Oils in a European Context (the “Study”). This document presents the background and technical scope of work for the Study.

## Background

California has introduced a Low Carbon Fuel Standard (LCFS)<sup>1</sup> with the stated objective of reducing the carbon intensity of its transportation fuels by 10% by 2020. The European Union has followed suit with its Fuels Quality Directive of 2009, which calls for a 6% reduction in carbon emissions for transportation fuels between 2010 and 2020.<sup>2</sup>

Carbon emissions are based on a well-to-wheels assessment of greenhouse gas emissions from crude oil production through consumption of transportation fuels in the vehicle. The steps in a well-to-wheels life cycle assessment (“WTW LCA”) of greenhouse gases (“GHG”) are shown in Figure 1-1.

**Figure 1-1.**  
**Simple Crude Oil Life Cycle Schematic**



A significant challenge in a WTW LCA of crude oils is determining the emissions from crude oil production. As there are thousands of reservoirs producing crude oil around the world, determining the GHG from producing each crude is an immense challenge. In its initial regulations, the California Air Resources Board (“CARB”) used a shortcut and treated all bitumen and thermally-derived crude oils as high carbon intensity crude oils (“HCICO”) and the

rest of the crude oils as non-HCICO. Refiners processing non-HCICO will use a look-up table to determine the WTW life cycle carbon intensity of gasoline and diesel. However, when processing crudes determined to be HCICO, they would have to determine the actual WTW life cycle GHG of gasoline and diesel from each HCICO. In other words, all gasoline and diesel from non-HCICO is assumed to have the same WTW GHG emissions, but gasoline and diesel from HCICO have carbon intensities that are specific to the crude and are determined by a WTW LCA and not from a look-up table.

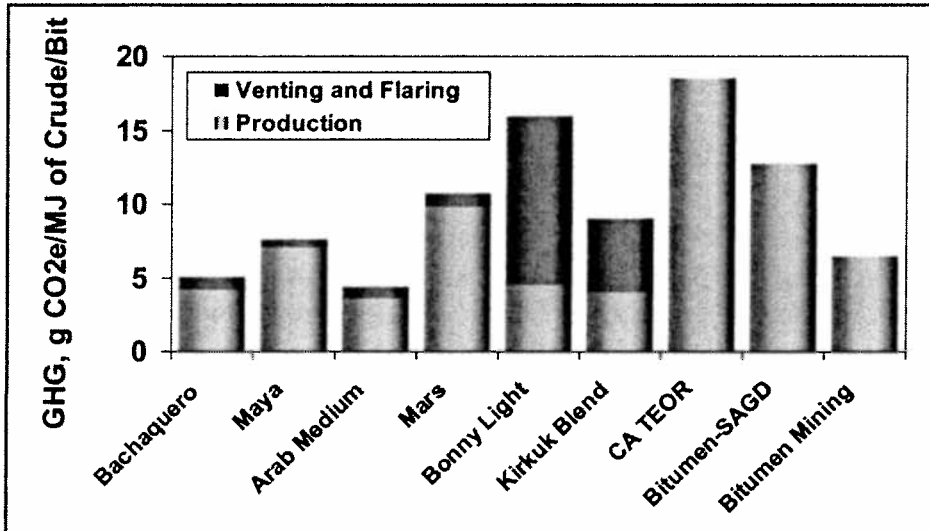
The EU is considering a similar approach: Separate default carbon intensity values are defined for gasoline and diesel produced from conventional crude oils and a range of higher values is used for fuels produced from unconventional sources with differentiated values for fuels produced from oil sands, oil shales, gas- to-liquids, and coal-to-liquids. This approach treats all conventional, non-thermally-derived crude oils as low in carbon intensity, which is an oversimplification.

In 2008, Alberta Energy Research Institute (“AERI”)—now called Alberta Innovates – Energy and Environment Solutions (“AI-EES”)—asked Jacobs Consultancy to evaluate the WTW life cycle GHG emissions for gasoline and diesel from bitumen and synthetic crude oil vs. gasoline and diesel from a handful of North American and imported crude oils (the “AERI Study”).<sup>3</sup>

Results from the AERI Study showed that the actual carbon intensity of crude oil production was highly dependent on reservoir parameters such as gas to oil ratio, water to oil ratio, reservoir depth and pressure, produced gas composition, and especially the extent of venting and gas flaring. In fact, results from the Study showed that several of the crudes that are considered to be conventional crude oils had GHG emissions from production that were as high or higher than emissions from bitumen production. In addition, heavy crude oil produced in California by thermal means was shown to have a carbon intensity higher than bitumen.

Figure 1-2 shows the GHG emissions from the crudes evaluated in the AERI Study. Note that the values in Figure 1-2 have been updated subsequent to issue of the final AERI Study report.

**Figure 1-2.**  
**GHG Emissions from Crude Oil Production – Including Flaring**

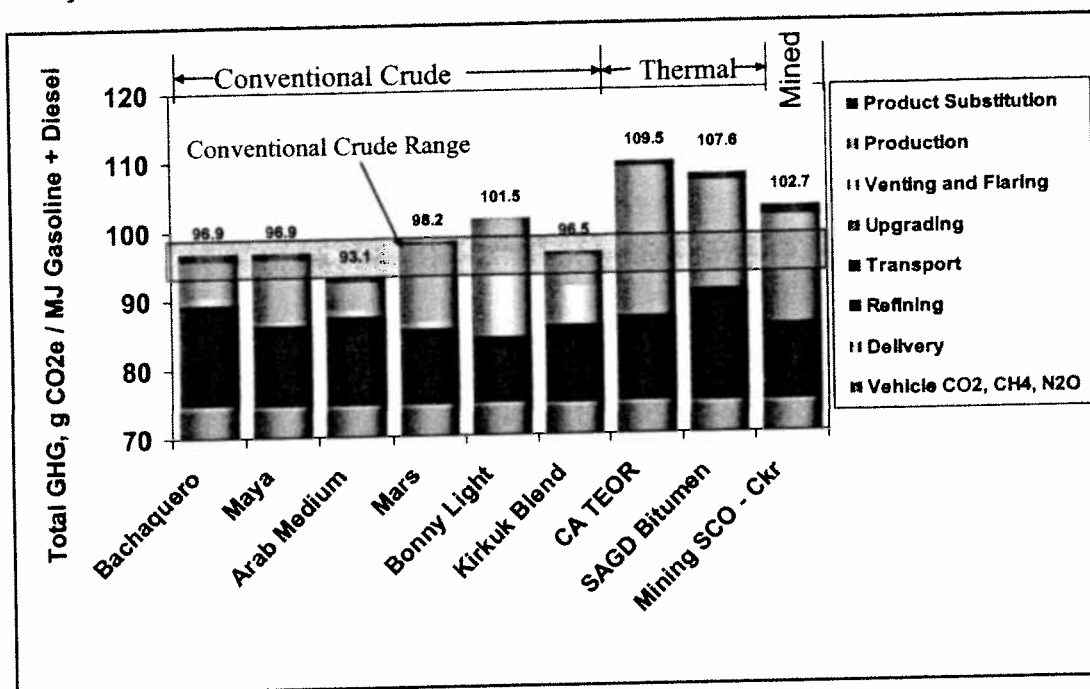


The crudes in Figure 1-2 are defined as follows:

- Bachaquero, a heavy crude oil from Venezuela
- Maya, a heavy crude oil from Mexico
- Arab Medium from Saudi Arabia
- Mars from deepwater US Gulf Coast
- Bonny Light from Nigeria
- Kirkuk from Iraq
- CA TEOR, a heavy California crude oil produced via thermal enhanced oil recovery
- Bitumen-SAGD, a bitumen produced via steam assisted gravity drainage (“SAGD”)
- Bitumen Mining, a bitumen from mining.

Life cycle WTW GHG emissions for gasoline and diesel produced from the crudes evaluated in the AERI Study are summarized in Figure 1-3. The results show that carbon intensities of gasoline and diesel from bitumen and heavy California crude oils are within 10% - 12% of carbon intensities of gasoline and diesel from conventional crude oils. Note that the values in Figure 1-3 have been updated subsequent to issue of the final AERI Study report.

Figure 1-3.  
Life Cycle WTW GHG Emissions for Gasoline and Diesel – AERI Study



CARB modified its criteria for determining which crude oils are HCICO and which are not partly as a result of the AERI Study. In the new regulations non-HCICO is identified as:

- Crude oil produced using recovery techniques other than thermal enhanced oil recovery (steam/hot water injection or in-situ combustion) or crude bitumen mining.
- Crude oil produced from a country with an average flaring rate of less than 10 standard m<sup>3</sup>/bbl as determined by the most recent NOAA/NGDC gas flaring rate data together with annual oil production data.<sup>4</sup>

In the new rendition of the regulations, CARB HCICO will use a default value of 20 g CO<sub>2</sub>e/MJ for production and transport until shown to have a different value. If an HCICO can be shown to have a carbon intensity from production and transport that is less than 15 g CO<sub>2</sub>e/MJ, the non-HCICO look-up table can be used to determine the carbon intensity values for gasoline and diesel.

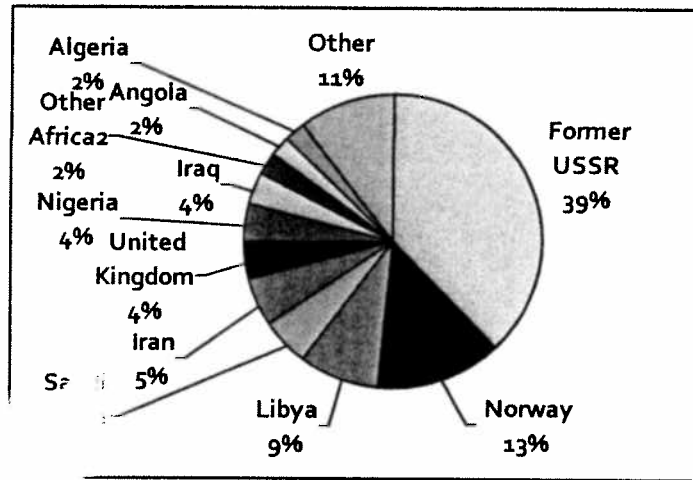
The EU thus far is not differentiating crudes by this method; instead, it is proposing that oil sands are a specific category of unconventional sources. Crude produced using thermal methods but not from oil sand deposits would be considered as conventional and not attract the



penalty/differentiation. These thermally-produced crudes and all other crude oils thus are considered to be conventional crude oils irrespective of production method or flaring and actual carbon intensity.

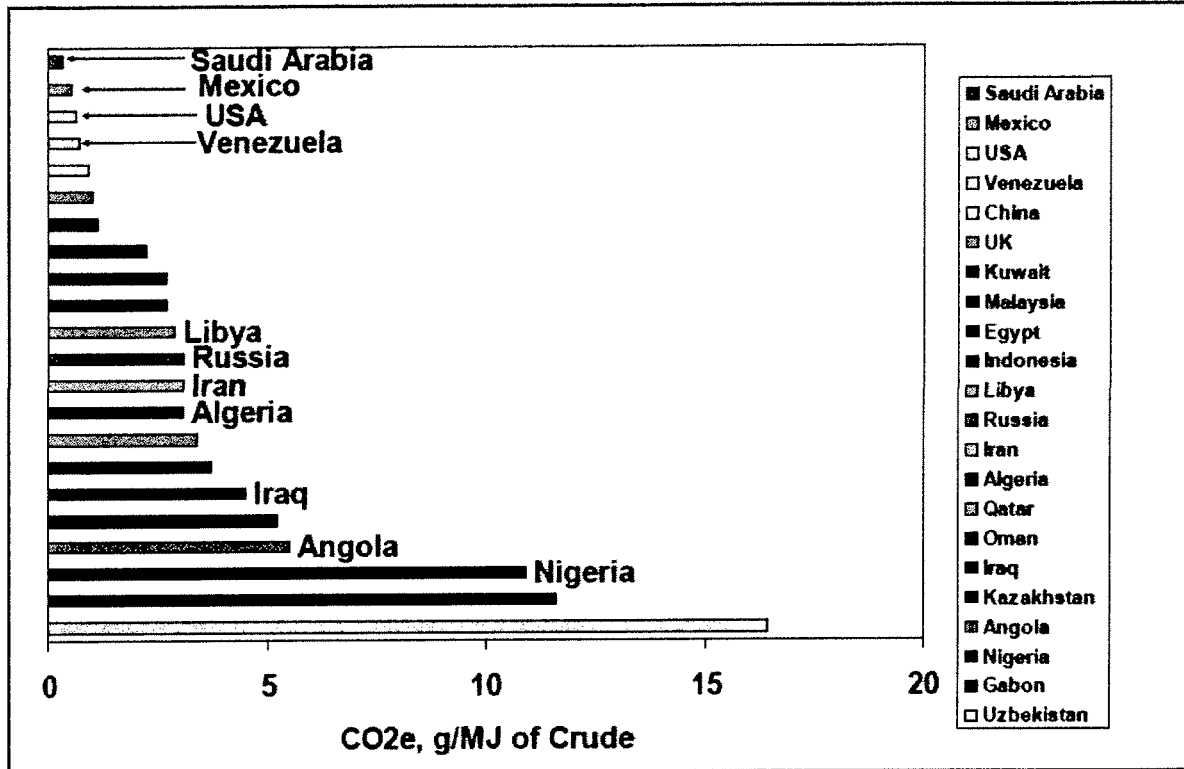
Figure 1-4 shows that the EU currently supplies most of its crude oil from Russia, the North Sea, Africa, and the Middle East.<sup>5</sup>

**Figure 1-4.**  
**EU Crude Supply**



Satellite surveys conducted by the National Oceanic and Atmospheric Administration (NOAA) for the World Bank<sup>6</sup> (Figure 1-5) show that many of the regions that supply Europe with crude oil are identified as having high sulfur content. In fact, a rough estimate indicates that as much as 50% of the EU crude supply would be classified by CARB as being HCICO.<sup>7</sup>

Figure 1-5.  
Flaring from Crude Oil Production



A more accurate way to assess carbon intensity is to properly differentiate between low- and high-intensity crudes based on a WTW LCA that takes into account actual GHG from crude oil production, including flaring, transport, refining and product delivery. Presumably the categorization of a crude oil as low-intensity or high-intensity would change if technically-sound WTW LCA results justify re-classification.

## Current Life Cycle Studies Related to EU Pathways

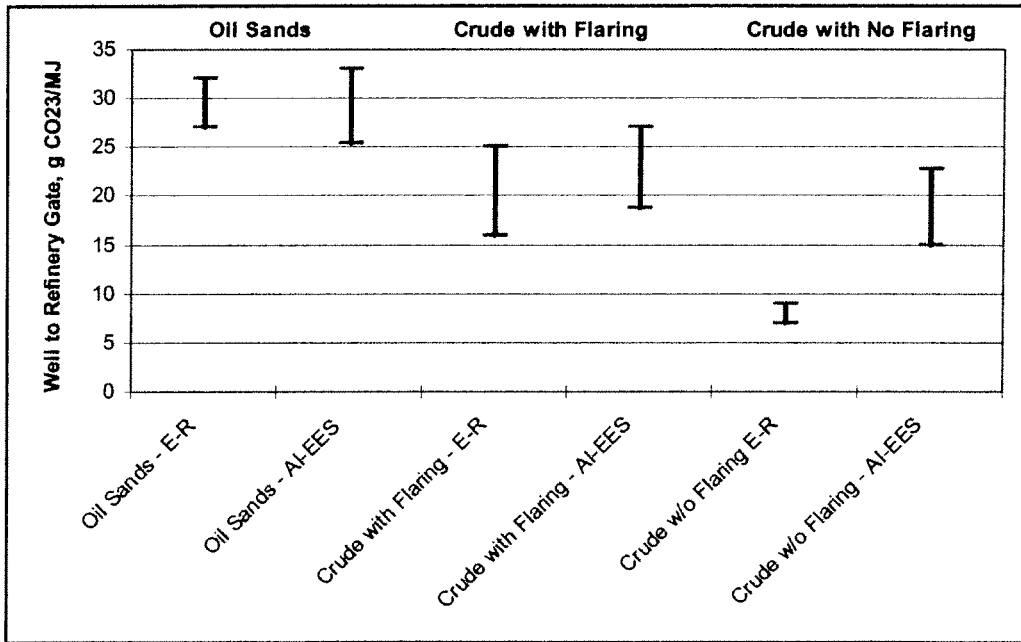
Several studies have looked at bitumen and synthetic crude oil in an EU context. Both the Energy-Redefined study for ICCT<sup>8</sup> and the Brandt study<sup>9</sup>, which is an overview of a number of studies, have tended to over-penalize bitumen while not taking into account some of the GHG emissions from the production of conventional crude oils.

The Energy-Redefined Study estimated the carbon intensity for refined products from a large number of crude oils refined in the EU. Unfortunately none of the data are available for review, and this lack of transparency makes it difficult to understand the origin of some of the Study's numbers. One difference between this work and the AERI Study is that Energy-Redefined did not identify water to oil ratio as an important parameter in determining the energy and GHG in crude oil production. Water to oil was a significant parameter in the AERI Study—when the ratio is 5 (5 barrels of water per barrel of crude) and the reservoir depth is 15,000 ft, there may be considerable energy needed to lift this oil-water mixture to the surface.

Figure 1-6 shows the range in GHG from well to refinery gate for a number of crude oils from the Energy-Redefined Study and the AERI Study. Note that while there is fair agreement, the Energy-Redefined work gives a much lower carbon intensity for crude oils produced with no flaring and then refined, and may therefore underestimate the refining contribution to GHG.

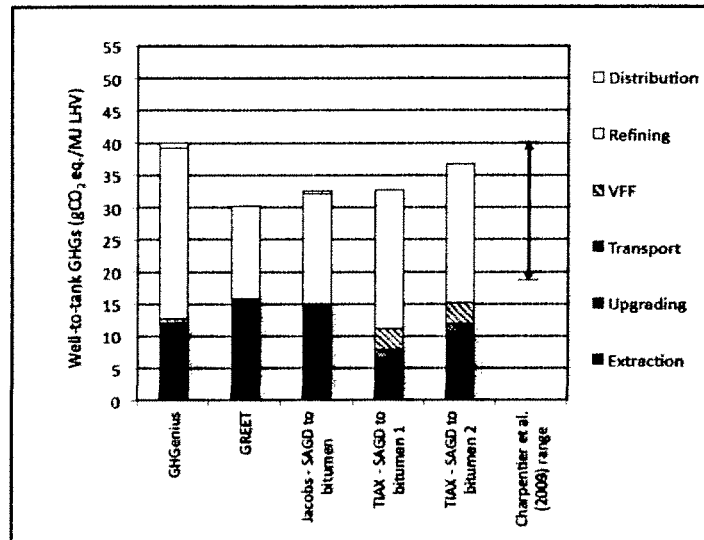
Figure 1-7 shows the results summarized by Brandt from a number of studies on in-situ bitumen production and refining to gasoline and diesel.

**Figure 1-6.**  
**GHG for Crude Oil Production and Well to Refinery Gate – Energy-Redefined (E-R) vs. AERI**



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Figure 1-7.  
GHG In-Situ Bitumen Production to Refined Products – Brandt Study



Missing from the Energy-Refined Study, the AERI Study, and the studies summarized by Brandt is the impact from the latest improvements in oil sands production that significantly reduce GHG emissions.

## Improvements in Bitumen Production

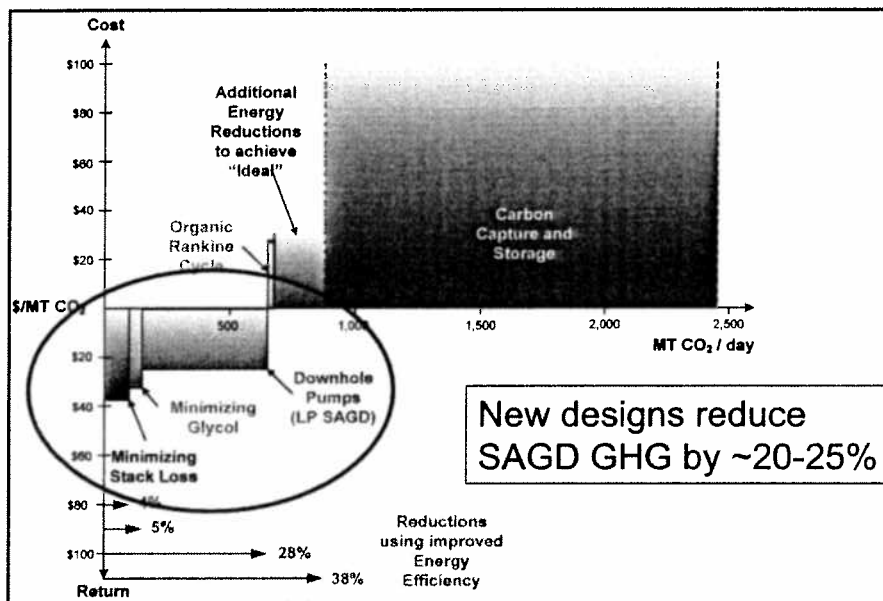
Ongoing improvements in mining and SAGD are bringing down the energy, GHG emissions, and environmental impact of these two methods of bitumen production. The major new developments in bitumen production are highlighted as follows:

- Mining
  - Paraffin froth treatment at the mine removes significant carbon resid which improves refining yield and reduces energy and GHG
  - Mature fine tailings recovery is reducing tailing ponds
  - Other technologies are being evaluated and deployed to reduce energy consumption and water use
- SAGD
  - Better heat integration and high efficiency designs reduce energy use
  - Fast SAGD makes better use of heat injected into the reservoir

- Improved lift technology—use of mechanical lift instead of gas lift
- Better reservoir pressure management
- Use of solvents reduces steam required
- Use of CO<sub>2</sub> to enhance oil recovery
- Improved recovery with polymer flooding
- Water reduction and reuse reducing the environmental burden

Figure 1-8 shows the potential impact on GHG emissions from improvements in SAGD. These results from a recent study show that a 20-25% reduction in GHG emissions vs. typical prior designs is feasible using many of the options highlighted above before implementing more expensive GHG reduction methods such as carbon capture and storage (CCS).

**Figure 1-8.**  
**Continued Development Driving Down GHG from SAGD**



One of the driving forces in energy reduction in SAGD is to reduce the steam to oil ratio (SOR) used. In the AERI Study the SOR was assumed to be 3, which was in the range of demonstrated performance at the time of the report. The SOR actually achieved depends on reservoir conditions, design, and operation of the production site. Subsequent commercial data (Table 1-1) show that SORs below 3 have been routinely demonstrated in commercial production. Reducing SOR from 4 to 2 cuts the GHG emissions from SAGD in half.

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**Table 1-1.**  
**Commercial SAGD Production Demonstrating Cumulative Steam Oil Ratio < 3**

Project	After 9 Months of Operation		Intermediate Results	Mar-10
	Date	SOR	SOR	SOR
Foster Creek	Jul-98	4.0	—	—
	Mar-10	—	—	2.5
MacKay	Jul-03	3.4	—	—
	Jul-05	—	2.5	—
	Mar-10	—	—	2.5
Christina Lake	May-03	2.8	—	—
	Mar-10	—	—	2.0
Firebag	May-04	7.3	—	—
	Aug-06	—	3.9	—
	Mar-10	—	—	3.3
Sumont				
Pilot	Aug-98	5.2	—	—
Pilot	Nov-99	—	3.5	—
Commercial	Mar-08	—	3.4	—
Commercial	Mar-10	—	—	3.0

Results are from a report for Alberta Energy<sup>10</sup>

## Limitations of Prior LCA Studies

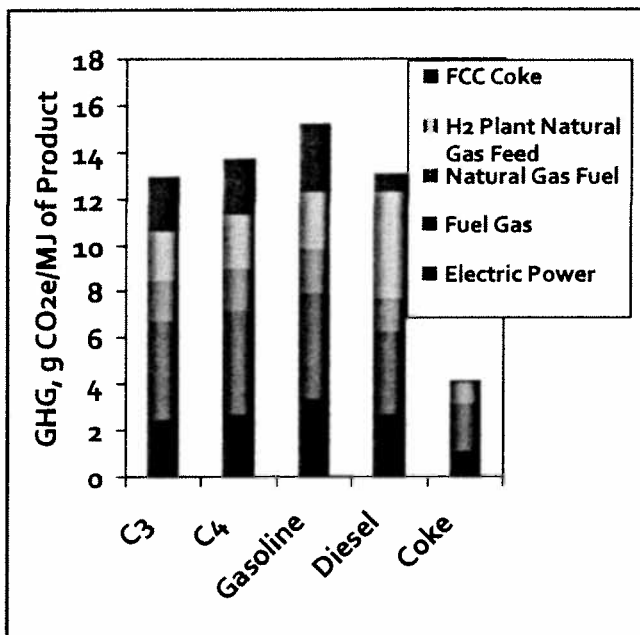
Many WTW life cycle analyses, including the Energy-Redefined Study for ICCT, allocate total energy used in the refinery to the products. This is an approach first suggested by Michael Wang.<sup>11</sup> In the absence of any detailed knowledge about refinery processing, this approach gives a first pass estimate of the carbon intensity of refined products. However, more detailed consideration of the relationships between processing steps often gives very different results.

The Energy-Redefined Study shows LPG from processing oil sands to have nearly one-third the carbon intensity of gasoline and one-fourth the carbon intensity of diesel fuel. Heavy products from oil sands are shown to have nearly the same carbon intensity of highly refined products like gasoline in this Study. In fact, because oil sands bitumen does not contain much material lighter than naphtha, any LPG produced from oil sands bitumen is made by cracking, and thus is actually high in carbon intensity. In addition, heavy products like coke or fuel oil see very little processing and in fact have a very low carbon intensity.

One significant difference between the AERI Study and others is that the AERI Study distributed utilities consumed in each processing step in upgrading and refining to the intermediate products, which were then either blended or processed further. In this approach, each intermediate stream carries with it the carbon intensity from the prior step. Finished products

carry the utility and energy burdens from each intermediate processing step and reflect the actual refining intensity to produce them. Refining GHG burden for products from refining bitumen in the AERI Study are shown in Figure 1-9. The distribution of energy in refining is shown. Note the low carbon intensity of coke and the relatively high carbon intensity of LPG.

**Figure 1-9.**  
**Product Carbon Intensity from Refining Bitumen – AERI Study**



## Primary Study Objectives

Given the background discussed above, the goal of this Study is to provide a fair and balanced LCA of Canadian bitumen with other major crude oils processed in the EU to produce finished products such as gasoline, jet fuel, diesel, fuel oil, and LPG. Key to meeting these objectives is determining the carbon intensities of refined products from individual crude oils, and bitumen in an EU context, which means with product specifications, transport distances, and refining configurations reflecting those predominant in the EU.

The primary objective of the Study is to provide a first-order technical assessment of European crude oil supply pathways that provides a high degree of transparency in terms of data and methodology. This Study is a “first-order” study and is not a “meta assessment” of other studies, as are the studies by the University of California-Davis, Brandt, CERA, NETL and numerous others. Further:

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- This Study will include the major sources of crude consumed in Europe, both indigenous and imported.
- This Study will evaluate Brazilian crude oil, which is expected to be a significant crude source for the EU in the future.
- For crudes used in Europe that have not been covered under the previous AERI Study but are imported into North America, this Study will also assess a North American landing point. This will include North Sea crude oil, Russian crude oil, and Brazilian crude oil.

A second objective is to provide an update to the AERI Study of new pathways for Alberta-based crude production reflecting current and emerging production trends, including a reflection of the types of SOR under emerging commercial SAGD projects, as shown in Table 1-1. Emerging production trends in bitumen production include:

- Solvent addition
- Oil sands primary production methods—Cold Heavy Oil Production with Sand (CHOPS), enhanced oil recovery (EOR), polymer floods, etc.
- Sequencing (changes in pumping/production technologies for low-pressure SAGD fields from gas lift to ESPs, metal-to-metal PCPs, fast SAGD, water / chemical floods, etc.)
- Mined bitumen using paraffinic solvents (asphaltene rejection)
- Another objective of the Study is to improve on the AERI Study estimates of methane released in bitumen production from mining.

A third objective is to evaluate the availability of information required to determine GHG emissions and carbon intensity for producing a typical Canadian crude basket. To determine the characteristics (blend, API, sulphur content) and carbon intensity of this Canadian crude basket data must be gathered on:

- The total amount of crude production in Canada
- The total amount of Canadian crude oil exported to the United States, including the amount exported to each PADD
- Characteristics of the specific crude streams produced in Canada and exported to the United States: API, sulphur content, and the GHG/CI associated with producing each crude stream



## Key Study Issues

There are several key issues related to the Study:

- Because the Study addresses important issues facing policymakers and energy providers, it is critical that the results, methodology and underlying data are transparent to others.
  - Use public and defensible data sources
  - Use recognized and transparent LCA methodology and model, similar to what is used in California for LCFS, in the AERI Study, and other well-validated life-cycle studies
- Maintain focus on important issues and main objectives.
  - Control the number of cases and level of detail
  - Include but do not focus heavily on lower-priority aspects of LCA
- Define typical crude oils processed in the EU from the major supplying regions. This requires defining the GHG emissions from crude oil production including flaring and the transport distance and mode of transport of these crude oils to the EU.
- Use refining configurations and product yields that are typical to the EU.
- Use emission factors for electricity, natural gas, and emissions from the vehicles that are typical to the EU and oil producing regions.

## Section 2.



## Scope of Work

*This document, and the opinions, analysis, evaluations, or recommendations contained herein are for the sole use and benefit of the contracting parties. There are no intended third party beneficiaries, and Jacobs Consultancy Canada Inc. shall have no liability whatsoever to third parties for any defect, deficiency, error, omission or any statement contained in or in any way related to this document or the services provided.*

The primary scope of this Study is to develop a life cycle comparison of emissions from different conventional crudes vs. heavy crude oils and bitumen-derived oils as follows:

## Crudes to Be Considered

It is anticipated that the following crude oils will be evaluated in the Study:

- Major crude oils processed in the EU
  - Russian crude—Urals
  - Russian intermediates—gas oil and atmospheric resid imports
  - North Sea Norway—Ekofisk
  - North Sea UK crude—Brent
  - Saudi Arabian crude—Arab Medium
  - Libyan crude—Sirte or other
  - Nigerian crude—Bonny Light
  - Iran crude—Sirri or other
  - Iraq crude—Kirkuk
- Canadian oil sands and heavy crude
  - Diluent-bitumen blends with bitumen refined in the EU—bitumen production via mining and via SAGD
  - Oil sands-derived synthetic crude oil refined in EU
  - Venezuelan Bachaquero heavy crude refined in EU
  - Diluent-bitumen blend refined in USGC with distillate export to Europe
- Crude oils from the EU that are processed in the United States
  - Russian crude—Urals
  - North Sea UK crude—Brent
- Crude oils from new Brazilian reservoirs expected to become a major future crude supply
  - Brazilian crude—Tupi or other (processed in both EU and United States)

These crude oils will be finalized during the Study.

## Refining Configurations

Three major European refining configurations will be considered:

- Configuration 1: conversion provided by FCC unit and Visbreaking unit
- Configuration 2: conversion provided by Hydrocracking unit and Visbreaking unit
- Configuration 3: conversion provided by FCC unit and Coking unit

The high conversion refinery configuration from the AERI Study will also be used to evaluate Russian crude, North Sea crude, and Brazilian crude in a US context and for the production of diesel export to the EU from Alberta dilbit. The location of the refinery will be the US Gulf Coast vs. the PADD II location assumed in the AERI Study. Transportation distances will be adjusted accordingly.

Each crude oil will be evaluated in one of the EU refinery configurations. Three crudes will be evaluated in the two other configurations. The Russian, North Sea and Brazilian crude oils will be evaluated in the AERI Study high conversion refinery. Alberta dilbit will be evaluated in the AERI Study high conversion refinery to produce diesel for the EU.

The Study crudes and EU refinery configurations are shown in Table 2-1.

**Table 2-1.**  
**Crude-Refinery Configurations for Study**

	Country	Name	Refinery Configurations			
			EU Config 1 - FCC Visbreaking	EU Config 2 HCU Visbreaking	EU Config 3 FCC Coking	AERI High Conversion
1	Russia/FSU	Urals	X	X	X	X
2	Norway-North Sea	Ekokisk	X			
3	Libya	Es Sider or other	X			
4	Saudi Arabia	Arab Medium	X			
5	Iran	Sirri or other	X			
6	UK	Forties	X	X	X	X
7	Iraq	Kirkuk	X			
8	Nigeria	Bonny Light	X	X	X	
9	Brazil Offshore	Tupi or other	X			X
10	Venezuela	Bachaquero	X		X	
11	Russia/FSU	Intermediates - Mazut and Hydrotreated Gas Oil	X			

	Country	Name	Refinery Configurations			
			EU Config 1 - FCC Visbreaking	EU Config 2 HCU Visbreaking	EU Config 3 FCC Coking	AERI High Conversion
12	Alberta Synthetic Crude Oil	SCO from Coking	X	X		
13	Alberta dilbit	Athabasca	X		X	X
<b>Total in Each Column</b>			<b>13</b>	<b>4</b>	<b>5</b>	<b>4</b>

## Improvements in Bitumen Production

Jacobs Consultancy will conduct a high-level review of the impact of the following methods to improve the efficiency of mining and SAGD on WTW life cycle GHG emissions:

- For improvements in mining, paraffin froth treatment and other potential energy efficiency improvements being considered by the industry
- For SAGD:
  - Better heat integration and high efficiency design to reduce energy use
  - Fast SAGD to make better use of heat injected into the reservoir
  - Improved lift technology—use of mechanical lift instead of gas lift
- Other in-situ production methods
  - Use of solvents to reduce steam required
  - Improved recovery with polymer flooding
  - Enhanced oil recovery with CO<sub>2</sub>
  - CHOPS

## Identification of Data Sources

The sources of input data for each specific crude pathway will clearly be defined, including reference to data that were sought but were not available.

## Uncertainty Measurements

Where possible, a measure of uncertainty (e.g., confidence interval, box and whisker plots) resulting from data or modeling methodology will be provided on the pathway assessment.

## Carbon Intensity of Canadian Crude Basket

Jacobs Consultancy will evaluate the available information on crude oil production in Canada and determine if there is sufficient detail to determine a carbon intensity for a Canadian crude basket.

## Life Cycle Assessment

Jacobs Consultancy will work closely with APMC to finalize goals and scope definition and carry out the Life Cycle Assessment, including:

- **Develop Crude Production Data**—This will entail gathering publicly available information with vetting, updating, and supplementing by in-house upstream experts.
- **Develop Upgrading and Refining Data**—This includes development of simulation-based configuration models to determine the performance and emissions of this step in the life cycle for each case. Various sensitivities as agreed upon with APMC will also be explored, such as varying G/D ratio, refinery complexity, or technology basis.
- **Develop Other Data**—This includes crude, intermediate, and final product transportation and other required data.
- **Develop Utilities and Emissions Estimates**—These estimates will be developed based on the information above.
- **Perform Life Cycle Assessment**—The final assessment shall be carried out using data generated as described above.
- **Compare Results**—We will prepare comparative charts illustrating life cycle by processing stage in a consistent form with other life cycle analyses.
- **Prepare and Deliver Final Study Outputs and Deliverables**

## **Section 3.**



## **Schedule and Public Meetings**

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## Schedule

The Study commences in June of 2011 and is scheduled for completion in November of 2011.

## Public Meetings

Two public meetings will be held in Europe to review results and gather stakeholder input. These meetings are tentatively scheduled for September and November (exact dates to be finalized).



## Section 4.



## Deliverables

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The following are the primary deliverables of the Study:

- A final written report including:
  - Executive Summary
  - Study Goals and Objectives
  - Study Approach, Methodology and Basis
  - Study Results (including appropriate sensitivity analyses)
  - Study Conclusions and Recommendations
  - Supporting Data
- Interim and final public stakeholder meetings

## Section 5.



## References

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1. California Air Resources Board, *California Low Carbon Fuel Standards, Subchapter 10. Climate Change Article 4. Regulations to Achieve Greenhouse Gas Emission Reductions Subarticle 7. Low Carbon Fuel Standard*, 2010.
2. EU Directive 2009/30/EC amending Directive 98/70/EC on fuel quality, Consultation paper on the measures necessary for the implementation of Article 7a(5).
3. Jacobs Consultancy for AERI. *Life Cycle Assessment Comparison of North American and Imported Crudes*, July 2009.
4. Energy Information Administration, *Crude Supply Data*
5. International Energy Agency, *Monthly Oil Survey*, November 2010.
6. National Oceanic Atmospheric Administration, *A Twelve-Year Record of National and Global Gas Flaring Volumes Estimated Using Satellite Data - Final Report to the World Bank*, May 30, 2007.
7. California Air Resources Board, *Determining Carbon Intensity Values for Fuels Derived from Crude Oil – Interim Oil Screening Process*, February 16, 2011.
8. Energy-Redefined for ICCT, *Carbon Intensity of Crude Oil in Europe Crude*, December 2010.
9. Brandt, Adam R., *Upstream greenhouse gas (GHG) emissions from Canadian Oil Sands as a Feedstock for European Refineries*, January 2011.
10. Triangle Three Engineering for the Alberta Department of Energy, *Technical Audit Report: Gas Over Bitumen Technical Solutions*, December 2010.
11. Wang, Michael, *Allocation of Energy Use in Petroleum Refineries to Petroleum Products Implications for Life-Cycle Energy Use and Emission Inventory of Petroleum Transportation Fuels*, Int J LCA 9 (1) 34 – 44, 2004.

# JACOBS™ Consultancy

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## INVITATION

### **POLICY BRIEFING ON THE LIFE CYCLE ASSESSMENT OF EUROPEAN CRUDE OILS**

The Life Cycle Assessment (LCA) of Green House Gas (GHG) emissions of fuels consumed in Europe has been at the forefront of European Union (EU) policy under the 2009 Fuel Quality Directive, which aims to reduce carbon emissions of transportation fuels. Current knowledge gaps related to the well-to-wheels assessment of GHG from EU crude oils have posed a number of regulatory challenges, especially in comparison to other crude oils such as oil produced from the oil sands regions of Canada.

To facilitate further understanding, the Government of Alberta, Canada, has commissioned a study to Jacobs Consultancy, an internationally recognised technical expert in the field of crude oils and LCA evaluations. Specifically, the study examines emissions from crude oil production, refining and transportation in a European context in a manner that positively contributes to existing research and complements available or missing data. Work is well underway and should be completed in November 2011. The work is being overseen by a technical steering committee, with ongoing discussions and updates with a broader group of technical stakeholders.

To help put this study into context, the Government of Alberta and Jacobs Consultancy are pleased to invite you to a briefing that will present the study's scope and objectives, discuss life cycle interim results, and outline the project's next steps. The venue and agenda are as follows:

Wednesday, September 14, 2011,  
8:30 to 10:30 (breakfast will be provided)  
STANHOPE HOTEL  
Rue Du Commerce 9, Brussels, Belgium

Draft agenda:

- Background and project objectives
- Project overview and status
- Production analysis
- Refining/upgrading analysis
- Life cycle interim results
- Updates to Jacobs Consultancy's 2009 North American Crude Pathway Study
- Project next steps

For those unable to travel to Brussels, it will be possible to attend online via WebEx.

To register for the workshop, please RSVP to [Jacobsevent@hanovercomms.com](mailto:Jacobsevent@hanovercomms.com) and indicate whether you will participate in person or by WebEx.

We look forward to a constructive and collaborative discussion with EU policy-makers, and welcome your views on findings to date.

**Jacobs Consultancy**

**Department of Energy, Government of Alberta, Canada**

**August 5, 2011**

**Van:**  
**Verzonden:** maandag 12 september 2011 9:53  
**Aan:** @shell.com'  
**Onderwerp:** RE: Dringende vraag  
**Bijlagen:** BJZ2011041732 Besluit brandstofkwaliteit-gepubliceerd 27 april 2011\_EN.docx;  
 BJZ2011043268 Regeling brandstofkwaliteit - gepubliceerd 29 april 2011\_EN.docx;  
 MRFQD\_stort-2011-7532.pdf; BesluitFQD\_stb-2011-192.pdf

Ik denk dat de Engelsen het niet goed hebben geïnterpreteerd.  
 In onze regelgeving hebben we een tabel met **aparte** waarden voor

- Conventionele diesel
- Conventionele benzine
- **Benzine/diesel uit teerzandolie**
- GtL
- CtL
- Etc.

Dat zouden niet omschrijven als 'single default value'.

Ik zal dit woensdag opnemen met , mijn VK-contactpersoon.

Hierbij de Engelse vertalingen van onze regelgeving. Anders dan bestandsnamen doen vermoeden zijn de Word-bestanden de Engelse vertaling.  
 Deze zijn echter alleen te lezen in combinatie met de pdf-bestanden, omdat de waarden uit de tabellen ontbreken.

Groet,

---

**Van:** @shell.com [mailto: @shell.com]  
**Verzonden:** maandag 12 september 2011 9:28  
**Aan:**  
**Onderwerp:** Dringende vraag

Goedemorgen

Ik krijg een spoed vraag uit Engeland en wend me meteen tot jou als zijnde de Nederlandse FRQ expert.

In het engels: " UK government says that NL implementing legislation provides for a single default value."

Hoe moet ik dit interpreteren. Klopt dit? Ik dacht dat er nog geen standpunt was, of lopen er verschillende trajecten naast elkaar heen? Ik hoor het graag zsm i.v.m. een meeting zometeen.

Dank je wel!  
 Groet.

---

**Van:** @shell.com  
**Verzonden:** woensdag 14 september 2011 0:18  
**Aan:**  
**CC:** @shell.com; @shell.com  
**Onderwerp:** FQD  
**Bijlagen:**

Dear

With best regards,

Shell International



Tel: +32  
GSM:+32  
Fax: +32  
E-mail : [realenergy@shell.com](mailto:realenergy@shell.com)  
Internet : [www.shell.com/realenergy](http://www.shell.com/realenergy)

**Van:** [redacted] @dft.gsi.gov.uk  
**Verzonden:** donderdag 15 september 2011 10:38  
**Aan:**  
**Onderwerp:** FQD - latest draft  
**Bijlagen:** FQD ISC draft June11.pdf

This is the latest draft version that I have.

Best regards,

Low Carbon Fuels  
 Greener Transport & International Directorate – Department for Transport  
 Zone 1/32, Great Minster House, 76 Marsham Street, London SW1P 4DR  
 ☎ +44(0)20 [redacted] ☎ +44(0) [redacted]  
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**Van:** [redacted]@dft.gsi.gov.uk  
**Verzonden:** woensdag 28 september 2011 15:57  
**Aan:** DBO-stas  
**CC:**  
**Onderwerp:** Article 17 of the Fuel Quality Directive  
**Bijlagen:** 110927 - NB letter to Joop Atsma - NL.pdf  
**Urgentie:** Hoog

Dear Sir,  
 Please find attached letter to Mr Atsma which is sent on behalf of the Parliamentary Under Secretary of State for Transport. A hard copy of this letter has also been sent through the post.

Please do contact me if you have any queries

Regards

[redacted] | Environment Strategy | UK Department for Transport | +44 (0) [redacted]  
 [redacted] | +44 (0) [redacted] | [@dft.gsi.gov.uk](mailto:[redacted]@dft.gsi.gov.uk)

---

**Van:** [redacted] [mailto:[redacted]@dft.gsi.gov.uk]  
**Verzonden:** vrijdag 16 september 2011 12:28  
**Aan:**  
**CC:**  
**Onderwerp:** RE: NL implementation FQD

Dear Rob,

My name is [redacted] and I am working with [redacted] on oil sands (and will be taking over much of the oils sands work in the short to medium term). As per your discussion with yesterday, we would like to suggest that our Minister writes to yours with about the Commission's forthcoming proposals and setting out the UK's proposed approach.

I would be grateful if you could please provide your Ministers contact details so we ensure the letter goes to the right place.

I look forward to hearing from you.

Regards,

[redacted] | Environment Strategy | UK Department for Transport | +44 (0) [redacted]  
 [redacted] | +44 (0) [redacted] | [@dft.gsi.gov.uk](mailto:[redacted]@dft.gsi.gov.uk)

Brussels, xxx  
C(2011) yyy final

Draft

**COMMISSION DIRECTIVE ..../.../EU**

**of [...]**

**laying down calculation methods and reporting requirements pursuant to Article 7a of  
Directive 98/70/EC of the European Parliament and of the Council relating to the  
quality of petrol and diesel fuels**

Draft

**COMMISSION DIRECTIVE ../.../EU**

**of [...]**

**laying down calculation methods and reporting requirements pursuant to Article 7a of Directive 98/70/EC of the European Parliament and of the Council relating to the quality of petrol and diesel fuels**

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,  
Having regard to Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Council Directive 93/12/EEC<sup>1</sup>, and in particular Article 7a(5) thereof,

Whereas:

- (1) Article 7a(5) of Directive 98/70/EC requires that a methodology for the calculation of life cycle greenhouse gas (GHG) emissions from fuels other than biofuels and from energy shall be adopted.
- (2) Such a methodology should cover emissions over the whole lifecycle of the production and use of fuel or energy in road vehicles and non-road mobile machinery. In applying this approach, choices have been made to balance the accuracy of the measurement with the complexity of the requirements and the incentive provided to suppliers to reduce emissions. In view of the complexity of the EU refining sector, careful consideration of the impact on refineries needs to be given when designing the implementation measures as set out in the Commission Staff Working Paper on refining and the supply of petroleum products in the EU<sup>2</sup>.
- (3) It is appropriate to consider in the methodology the use of high GHG intensity fuels and to update the methodology to take into account fuels derived from other emerging feedstocks. To this end, if scientifically warranted, the Commission will introduce a future amendment to this Directive setting out GHG intensity default values for such feedstocks. The proposed amendment will be based on a review that will focus on the GHG intensity of such feedstocks as optimized for consumption in the EU.
- (4) The calculation method should be based on average default values, which has the advantage of imposing a smaller administrative burden on suppliers and Member States, whilst not providing incentives to improve performance in some parts of the life cycle.
- (5) In order to provide incentives for further GHG emission reductions, savings claims concerning upstream emission reductions including flaring and venting should be included in the calculation of suppliers' life cycle greenhouse gas emissions. Further, in order to facilitate the claiming of savings by suppliers, the use of various emission

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<sup>1</sup> OJ L 350, 28.12.1998, p.58.

<sup>2</sup> SEC(2010) 1398/2

schemes should be allowed for calculating and certifying emission reductions. A supplier will be able to report emissions against a default value stated in Annex I. Only upstream reduction projects which start after the date when the particular default value was established are eligible, as earlier savings would be reflected in the particular default value.

GHG reductions associated with oil and gas upstream emissions will be estimated in accordance with principles and standards identified by the Commission and employed by voluntary schemes to be approved and identified by the Commission in separate Commission Decisions. Upstream emission reductions can only be claimed after this is accomplished.

- (6) Multiple sources of feedstocks and processes should be represented as average default values presented in Annex I.
- (7) Article 7a(5)b of Directive 98/70/EC states that a methodology specifying the fuel baseline standard based on the EU-average level of the life cycle greenhouse gas emissions per unit of energy from fossil fuels in 2010 shall be adopted.
- (8) Since the composition of the relevant fossil fuel mix changes vary little each year, the overall baseline greenhouse gas intensity of the fossil fuel used only changes by a small fraction of a percentage point within a few years. In view of this, the 2010 fuel baseline standard emission value of fossil fuels should be based on the available Union average 2007 consumption data as reported by the Member States to the United Nations Framework Convention on the Climate Change. The fuel baseline standard should be calculated with the respective fuel default values and as such represent an average upstream GHG intensity and average complex refinery GHG intensity for fossil fuels. The fuel baseline standard emission value should remain unchanged for the duration of the Directive and will not be changed as a result of introducing default values for high GHG intensity fuels, such as oil sands or oil shale, which were not consumed in the EU in 2007. If, pursuant to a review, the method for establishing the default values used to calculate the current baseline changes, it might be appropriate to also adjust the baseline emission value.
- (9) Directive 98/70/EC Article 7a(5) also provides for adoption of a methodology to calculate the contribution of electric road vehicles. The methodology should be compatible with Article 3(4) of Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC<sup>3</sup>. To ensure this compatibility the same adjustment factor should be used for powertrain efficiency.
- (10) Electric energy supplied for use in road transport may be reported by suppliers as part of their annual reports to the Member States. The right to make a claim to the consumption of electricity in a vehicle or a motorcycle for the purpose of Article 7a of Directive 98/70/EC belongs to the first owner of the electric vehicle or a motorcycle upon first registration of the road vehicle or motorcycle. The basis on which suppliers could claim that their electricity supply is consumed in that road vehicle or motorcycle is by presenting to the designated Member State authorities a certificate signed by the owner of the vehicle declaring the transfer of this right to claim the consumption volume from the vehicle owner to the supplier. This right may be transferable to other suppliers.

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<sup>3</sup>

OJ L 140, 5.6.2009, p.16-62

- (11) In order to limit administrative costs it is appropriate that this Directive establishes an optional methodology based on a calculated estimate rather than an actual measurement of the consumption of electricity in an electric road vehicle or motorcycle for the purpose of supplier reporting. This methodology allows calculating electricity in road transport based on vehicle consumption specifications pursuant to Regulation (EC) 385/2009 of 7 May 2009 replacing Annex IX to Directive 2007/46/EC of the European Parliament and of the Council establishing a framework for the approval of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles<sup>4</sup> and an average number of kilometres driven per vehicle per year. Suppliers may also prove that the electricity consumed and the GHG intensity of that electricity is based on measurements rather than estimates. From 2018, consumption shall be based on actual measurements of consumed electricity.
- (12) More accurate methods for actual measurements of consumed electricity or GHG intensity of that electricity may be subject to review and a subsequent proposal by the Commission when deemed necessary. For the purpose of this review, Member States may make available information about the alternative methods used by suppliers as referred to in Annex III, point (4).
- (13) Electric energy supplied for use in road transport may be reported by suppliers as part of their annual reports to Member States. Where the number of electric (battery electric and plug-in-hybrid) light and medium duty vehicles in a Member State do not exceed 2 % of a Member State's total fleet of light and medium duty vehicles, for the purpose of Member States reporting, electric energy use may be estimated based on registry data of battery electric and plug-in hybrid vehicles pursuant to Commission Regulation (EC) No 385/2009. If the share of electric vehicles in the Member States overall light-duty vehicle fleet exceeds 2%, the contribution should be based on the actual figures of electricity consumption of electric vehicles. The GHG intensity of electricity used for reporting should be the Member State average. More accurate methods may be subject to review and proposed by the Commission when deemed necessary.
- (14) Pursuant to Article 7a(1) suppliers shall report annually to the designated authority of the Member State. As a minimum they shall submit information about the total volume of each type of fuel or energy supplied, indicating where purchased and its origin and the life cycle GHG emissions per unit of energy. The reported information should be verified by the Member States and the Commission shall, where appropriate, establish guidelines for the implementation of these requirements. Member States are encouraged to allow suppliers to report by employing data being collected pursuant to other EU or Member State legislation. Such Union legislation includes but is not limited to Commission Regulation (EC) No 684/2009 of 24 July 2009 implementing Council Directive 2008/118/EC as regards the computerised procedures for the movement of excise goods under suspension of excise duty<sup>5</sup>, Commission Regulation (EEC) No 2454/93 of 2 July 1993 laying down provisions for the implementation of Council Regulation (EEC) No 2913/92 establishing the Community Customs Code<sup>6</sup>, Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC<sup>7</sup> and subsequent

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<sup>4</sup> OJ L 118, 13.5.2009, p. 13–65

<sup>5</sup> OJ L 197, 29.7.2009, p. 24.

<sup>6</sup> OJ L 253, 11.10.1993, p. 1.

<sup>7</sup> OJ L 140, 5.6.2009, p. 16.

implementing acts thereof as well as Commission Decision 2007/589/EC of 18 July 2007 establishing guidelines for the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council<sup>8</sup>.

- (15) Consistent and accurate monitoring, reporting and verification of life cycle greenhouse gas emissions per unit of fuel should be conducted in a stable and harmonized manner. It is of fundamental importance to facilitate the tasks for the suppliers and the Member States respectively. It is therefore necessary to establish guidelines, where appropriate, on reporting by suppliers to the Member States designated authorities.
- (16) Pursuant to Article 8(3) of Directive 98/70/EC Member States shall submit an annual report of national fuel quality data for the preceding year in accordance with the format established in the Commission Decision 2002/159/EC of 18 February 2002 on a common format for the submission of summaries of national fuel quality data<sup>9</sup>. To cover the amendments introduced to Directive 98/70/EC by Directive 2009/30/EC<sup>10</sup> and the subsequent additional reporting requirements on the Member States it is necessary in the interest of effectiveness and harmonization to clarify which information, falling under the reporting obligation on fuel quality data in Article 8 of Directive 98/70/EC, shall be reported and also adapt the format for the submission of that data.
- (17) Over time the sources of EU fuels may vary and it is desirable, therefore, to review periodically the various feedstocks and sources. This review requires more detailed reporting of the relevant information but can be carried out less frequently than annual reporting. The default values will be subject to review based upon this information.

If appropriate, the GHG intensity of fuels should be based on life cycle data and quantitative environmental impacts derived in compliance with the International Life Cycle Data System (ILCD) Handbook requirements. If appropriate, the data included in the European Reference Lifecycle Data System (ELCD) database should be used as the preferred source of information.

In addition, the review will address the feasibility, appropriateness, and impacts for the EU refinery sector of a move towards the use by suppliers of actual GHG intensity values for fuels as well as the necessity to change the greenhouse gas calculation methodology in this Directive resulting from changes to the greenhouse gas savings requirements of biofuels laid down in Article 7d(6) of Directive 98/70/EC or Article 19(6) of Directive which affect substantially the proportion of biofuels used in road transportation.

- (18) The measures provided for in this Directive are in accordance with the opinion of the Committee on Fuel Quality, established by Article 11, paragraph 4 of Directive 2009/30/EC.

HAS ADOPTED THIS DIRECTIVE:

*Article 1*  
*Definitions*

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<sup>8</sup> OJ L 229, 31.8.2007, p. 1.

<sup>9</sup> OJ L 53, 23.2.2002, p. 30–36

<sup>10</sup> OJ L 140, 5.6.2009, p. 88–113



For the purposes of this Directive, and in addition to the definitions already contained in Directive 98/70/EC, the following definitions shall also apply:

1. "upstream emissions" means all GHG emissions occurring prior to transport and distribution of feedstocks to a refinery.
2. "natural bitumen feedstock source" means a refinery feedstock source as situated in a reservoir formation at its place of origin with an annual average API of 10 or less measured at a standard temperature, an annual average viscosity at reservoir temperature greater than that calculated by the equation below and falling within the definition for tar sands under CN 2714 10 00 as outlined in Commission Regulation 948/2009. Mobilization of the feedstock source is achieved by mining extraction or thermally enhanced gravity drainage where the thermal energy is mainly derived from sources other than the feedstock source itself.

$$cP = 518.98e^{-0.038t}$$

Where,

t is reservoir temperature in degrees Celsius

cP is viscosity in Centipoise

3. "oil shale feedstock source" means any refinery feedstock source as situated in a shale formation containing solid kerogen and falling within the definition for oil shale under CN 2714 10 00 outlined in Commission Regulation 948/2009. Mobilization of the feedstock source is achieved by mining extraction or thermally enhanced gravity drainage.
4. "conventional crude feedstock source" means any refinery feedstock source as situated in the reservoir formation at the place of origin as not falling within the definition for CN 2714 10 00 as outlined in Commission Regulation 948/2009. If it can be demonstrated that the conventional crude oil was not subjected to thermal or mining processes at the time and project place of extraction from the subsurface, then the CN code identity of the raw material does not have to be verified.

#### *Article 2*

##### *Methodology for calculating the greenhouse gas intensity of fuels and energy supplied other than biofuels*

For the purposes of the second subparagraph of Article 7(a)1 of Directive 98/70/EC Member States shall require suppliers to use the methodology set out in Annex I to this Directive for the calculation of life cycle greenhouse gas emissions from fuels others than biofuels, and from all electric energy.

#### *Article 3*

##### *Calculation of greenhouse gas intensity reduction*

For the purposes of Article 7(a)2 of Directive 98/70/EC, Member States shall require suppliers to compare their achieved reductions of life cycle greenhouse emissions from fuel and from electric energy to the fuel baseline standard set out in Annex II to this Directive.

#### *Article 4*

##### *Reporting by suppliers*

Reporting by suppliers to the Member States pursuant to Article 7a(1) of Directive 98/70/EC shall be provided in accordance with Annex III to this Directive.

Member States may allow suppliers to refer to data being reported pursuant to other Union legislation or national legislation.

#### *Article 5*

##### *Reporting by Member States*

When submitting reports to the Commission under Article 8 of Directive 98/70/EC, Member States shall provide the Commission with information relating to compliance with Article 7a of Directive 98/70/EC and Annex IV of this Directive.

Member States may refer to data being reported pursuant to other Union legislation or national legislation

#### *Article 6*

##### *Review*

1. The Commission shall propose by 31 December 2015 how to address high greenhouse gas intensity sources in the greenhouse gas calculation methodology for fossil fuels and any significant impacts from any potential indirect emissions of fossil fuels.
2. By 31 December 2015, the Commission shall review the overall greenhouse gas calculation methodology set out in this Directive taking into account the effects and potential of any self-initiated industry or Member State efforts to incentivise reductions in the GHG intensity of fossil fuels. Such a review may be accompanied by proposals to amend this Directive if appropriate.
3. The review in paragraph (2) above shall in particular assess the:
  - a. accuracy and reliability of the monitoring and reporting of fossil fuel GHG intensity as well as the effectiveness of Article 7a of Directive 98/70/EC to incentivise reductions in GHG intensity and overall GHG emissions;
  - b. appropriateness of introducing elevated default values or, as an alternative, actual reporting by operators. In particular, the Commission shall assess the potential for extending the possibility for reporting, on the basis of actual values, a GHG intensity for the upstream part of the fuel or energy lifecycle that is lower than those included in the table of default values in Annex I;
  - c. the necessity to amend the current greenhouse gas calculation methodology in the event that amendments are made to Article 7d(6) of Directive 98/70/EC or Article 19(6) of Directive 2009/28/EC or their implementing measures which change the required greenhouse gas savings of biofuels which in turn result in significant changes to the proportion of biofuels used in road transportation.
4. The Commission may update at periodic intervals the default greenhouse gas intensity values in this Directive in line with the latest technical and scientific information.

#### *Article 7*

##### *Transposition*

1. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by [...] at the latest. They shall forthwith communicate to the Commission the text of those provisions.

When Member States adopt those provisions, they shall contain a reference to this Directive or be accompanied by such a reference on the occasion of their official publication. Member States shall determine how such reference is to be made.

2. Member States shall communicate to the Commission the text of the main provisions of national law which they adopt in the field covered by this Directive.

*Article 8*

This Directive shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

*Article 9*

This Directive is addressed to the Member States.

Done at Brussels, [...]

*For the Commission*  
*The President*  
[...]

## Annex I

### Rules for suppliers to calculate the greenhouse gas intensity of energy carriers and fuels

(1) Calculation of a supplier's greenhouse gas intensity

- (a) Greenhouse gas intensity for fuels and energy carriers shall be expressed in terms of grams of carbon dioxide equivalent per Mega Joule of fuel (gCO<sub>2eq</sub>/MJ.)
- (b) The greenhouse gases taken into account for the purposes of calculating the greenhouse gas intensity of fuel shall be carbon dioxide (CO<sub>2</sub>), nitrous oxide (N<sub>2</sub>O) and methane (CH<sub>4</sub>). For the purpose of calculating CO<sub>2</sub> equivalence, emissions of those gases shall be valued in terms of CO<sub>2</sub> equivalent emissions as follows:

CO<sub>2</sub>: 1

CH<sub>4</sub>: 23

N<sub>2</sub>O: 296

- (c) The intensity of a supplier's greenhouse gas intensity from the lifecycle use of all fuels they supply shall be calculated using the formula below:

$$\text{Greenhouse Gas intensity} = \frac{\sum_x (GHGi_x \times AF \times MJ_x) - UER}{\sum_x MJ_x}$$

Where:

x represents the different fuels and energy carriers falling within the scope of the Directive

UER is upstream emission reduction in gCO<sub>2eq</sub>

GHGi<sub>x</sub> is the unit GHG intensity of the annual supply sold on the market of fuel x expressed in gCO<sub>2eq</sub>/MJ. Only values presented or derived in accordance with point (2) shall be used.

MJ<sub>x</sub> is the total energy supplied and converted from reported volumes of fuel x pursuant to Annex III, points 2 and 3 for each fuel and expressed in Mega Joules.

AF are the adjustment factors for powertrain efficiency.

Predominant conversion technology	Efficiency factor
Internal combustion engine	1
Electric powertrain	0.4

AF used shall be that specified for internal combustion engines for all fuel and energy supplied except electricity.

UER is the upstream emission reduction of greenhouse gases claimed. It is measured in gCO<sub>2eq</sub> and shall be quantified in accordance with point (3).

- (d) Emissions from the manufacture of machinery and equipment utilized in extraction, production, refining and consumption of fossil fuels shall not be taken into account.

(2) Average default values for fossil fuels and electric energy established in [2010]

Feedstock source and process	Fuel or Energy Placed on the market	Upstream Unit GHG Intensity (gCO <sub>2eq</sub> /MJ)	Lifecycle Unit GHG Intensity (gCO <sub>2eq</sub> /MJ)
Conventional crude	Petrol	[5.2]	[87.5]
	Diesel or gasoil	[5.3]	[89.1]
Natural bitumen	Petrol	24.7	107
	Diesel or gasoil	24.7	108.5
Oil shale	Petrol	49	131.3
	Diesel or gasoil	49	133.7
Any fossil sources	Liquefied Petroleum Gas	3.5	73.6
Any fossil sources	Liquid or compressed natural gas	3.5	76.7
Coal converted to liquid fuel	CTL petrol, diesel or gasoil	100	172
Coal converted to liquid with Carbon Capture and Storage of process emissions	CTL petrol, diesel or gasoil	100	81
Natural gas converted to liquid fuel	GTL petrol, diesel or gasoil	25	97
Natural gas using steam reforming	Hydrogen	3,5	82
Coal	Hydrogen	100	190
Coal with Carbon Capture and Storage of process emissions	Hydrogen	100	6
Member State average electricity generation			
Austria			[86.1]
Belgium			[111.7]
Bulgaria			[251.7]
Cyprus			[283.1]
Czech Republic			[222.8]

Denmark			[211.1]
Estonia			[442.5]
Finland			[116.1]
France			[40.6]
Germany			[196.1]
Greece			[324.2]
Hungary			[188.3]
Ireland			[241.7]
Italy			[196.7]
Latvia			[156.4]
Lithuania			[48.3]
Netherlands			[198.9]
Poland			[329.2]
Portugal			[208.3]
Romania			[301.1]
Slovakia			[98.1]
Slovenia			[167.2]
Spain			[177.5]
Sweden			[21.9]
United Kingdom			[182.8]
Waste plastic derived fuel	Petrol, diesel or gasoil	0	86

For fuel-feedstock combinations with a GHG intensity higher than that of conventional crude based fuels, a lower GHG intensity for the upstream part of the fuel or energy lifecycle value may be used than the default values set out in the table if the supplier demonstrates to the Member State that this value is derived using an ISO 14064 compatible methodology.

For the purpose of reporting by suppliers the above listed numbers for the GHG intensity of the Member State electricity mix shall be used. Alternatively, suppliers may use the most recent statistics as published by Eurostat or the European Environment Agency.

(3) Eligibility of upstream emission reductions at oil and gas extraction and production sites

(a) Greenhouse gas emission reductions at oil production and extraction sites can only be applied to default values derived from solid or liquid feedstock sources such as petrol, diesel, and LPG

(b) Greenhouse gas emission reductions at gas production and extraction sites can only be applied to default values derived from gas or liquid feedstock sources such as CNG and LPG

(c) Upstream greenhouse gas emission reductions originating from any country may be counted as a reduction in GHG emission against fuels from any feedstock source supplied by any supplier designated as such for the purpose of Article 7a of Directive 98/70/EC.

(d) Only upstream GHG emission reductions can be counted towards the target that are associated with projects that have started after the date establishing the default values presented set out in point 2.

(e) GHG reductions associated with oil and gas upstream emissions shall be estimated in accordance with principles and standards identified by the Commission and employed by voluntary schemes to be approved and identified by the Commission. The schemes will be selected only if the Upstream Emission Reductions (UERs) certified by the schemes are monitored, reported and verified in accordance with Decision 2007/589/EC, if the schemes are accredited in accordance with ISO 14065 and if the certificates can be publicly disclosed and modified by the scheme prior to their issuance to include the information listed in point 8 of Annex III to this Directive.

(f) It is not necessary to prove that upstream emission reductions would not have taken place without the Article 7a reporting requirement.

(g) The Commission will establish guidelines, where appropriate, for verification of reporting from suppliers to the Member States

## Annex II

### Rules for calculating and applying the baseline greenhouse gas intensity of fossil fuels

#### Methodology

The baseline GHG intensity shall be calculated based on Union average fossil fuel consumption of petrol, diesel, gasoil, LPG and CNG, where:

- (a) Baseline GHG intensity calculation

$$\frac{\sum_x (GHG_{i_x} \times AF \times MJ_x) - UER}{\sum_x MJ_x}$$

Where:

x represents the different fuels and energy carriers falling within the scope of the Directive and as defined in the table below

GHG<sub>i<sub>x</sub></sub> is the unit GHG intensity of the annual supply sold on the market of fuel x or energy carrier falling within the scope of the Directive expressed in gCO<sub>2eq</sub>/MJ. The values for fossil fuels presented in Annex I shall be used.

MJ<sub>x</sub> is the total energy supplied and converted from reported volumes of fuel x expressed in Mega Joules.

- (b) Consumption data

The consumption data used for calculation of the value shall be as follows:

<b>Fuel</b>	<b>Consumption (TJ)</b>	<b>Source</b>
Conventional crude derived diesel	7,99589 * 10 <sup>6</sup>	2007 MS reporting to UNFCCC
Conventional crude derived non-road gasoil	0,277890 * 10 <sup>6</sup>	2007 MS reporting to UNFCCC
Conventional crude derived petrol	4,51357 * 10 <sup>6</sup>	2007 MS reporting to UNFCCC
LPG	0,205363 * 10 <sup>6</sup>	2007 MS reporting to UNFCCC
CNG	0,024485 * 10 <sup>6</sup>	2007 MS reporting to UNFCCC



## **GHG intensity**

The GHG intensity for 2010 shall be: [88,3] gCO<sub>2eq</sub>/MJ

This represents the latest available actual average emissions value for the purpose of Annex IV (19) of the Fuel Quality Directive.

## Annex III

### Supplier Reporting

Suppliers shall report annually the following data to the relevant Member State authority:

1. **Supplier identification.** The supplier shall provide information enabling their identification. This shall be as defined in Commission Regulation 684/2009 as the Trader Excise Number (SEED registration number or VAT ID number in Annex I to that Regulation Table 6(4a)) for Destination Type codes 1, 2, 3, 4, 5 and 8 identified as the entity liable to pay the excise duty in accordance with Article 8 of Directive 2008/118/EC at the time excise duty was released for consumption in accordance with Article 7(2) of Directive 2008/118/EC. If excise duty was not due, the Member State shall collect equivalent data in accordance with a nationally established reporting scheme.
2. **Volume of each fuel supplied distinguished by feedstock.** This shall be derived from data in Table 5 point 10(c), (d), (f), and (o) of Annex I to in Commission Regulation 684/2009 supplemented with the 10 digit CN code and volume of the mixed in biofuels and converted to energy content pursuant to the energy densities of fuel set out in Annex III to Directive 2009/28/EC. Where multiple biofuels are blended with fossil fuels, the quantity and type of each biofuels shall be reported. Information on the volume of biofuel supplied that does not meet the requirements of Article 7b(1) of Directive 98/70/EC shall be reported separately. E85 petrol-ethanol blend volumes shall be reported as a separate fuel for the purpose of Article 6 of Regulation (EC) No 443/2009 of the European Parliament and of the Council<sup>11</sup>. To fulfil this reporting, Member States may choose to allow suppliers to refer to data being reported pursuant to other EU or Member State legislation.
3. **Electric energy.** Where a supplier holds proof of claim to the consumption of an amount of electricity consumed in road vehicles or motorcycles, the supplier may report this amount of energy as part of their reporting to the Member State.
  - 3.1. Proof of the claim by a supplier for consumption of their electricity supply in road vehicles or motorcycles shall be provided on a signed statement from the first vehicle owner. This statement, at a minimum, shall contain the vehicle identification number, the Member State vehicle registration number, a statement agreeing to the transfer of the right to claim the electricity consumption to another party for the lifetime of the vehicle for the purpose of complying with Article 7a of Directive 98/70/EC and a signature of the first owner. This right is transferable to other suppliers
  - 3.2. For the purpose of reporting to the Member State, the electric energy consumption for battery and plug-in electric motorcycles or vehicles must be calculated as follows:

**Electric energy consumed = distance travelled (km) X electric energy consumption efficiency (MJ/km)**

Where:

**Distance travelled** equals the maximum electric range in kilometers on board the motorcycle or vehicle as reported by manufacturers pursuant to Directive 2007/46/EC multiplied by 312, not to exceed 12,000 km per year.

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<sup>11</sup> OJ L 140, 5.6.2009, p. 1.

Alternatively, the number of kilometres used for the calculation shall be based on an average number of kilometres driven by a representative sample size of the fleet of electric vehicles. A separate number for plug-in hybrids shall be obtained, only considering the number of kilometres driven on electric energy generated by a power source outside the vehicle. Member States may prescribe those numbers for cars registered in their territory. If a Member State does not prescribe those numbers, it must verify the data used by the supplier in the reporting.

Alternatively, suppliers may report electric energy consumed as measured and stored on-board of the vehicle or as measured and stored at charging facilities for each individual vehicle or motorcycle. Member States shall take measures to ensure that suppliers submit reliable data and make available to the Member State, on request, this data. Member States shall require suppliers to arrange for an adequate standard of independent auditing of the data submitted, and to provide evidence that this has been done. The auditing shall verify that the systems used by suppliers are accurate, reliable and protected against fraud. It shall evaluate the frequency and methodology of sampling and the robustness of the data.

From 2018, suppliers shall report electric energy consumed as measured and stored on-board of the vehicle or as measured and stored at charging facilities for each individual vehicle or motorcycle. Member States shall take measures to ensure that suppliers submit reliable data and make available to the Member State, on request, this data. Member States shall require suppliers to arrange for an adequate standard of independent auditing of the data submitted, and to provide evidence that this has been done. The auditing shall verify that the systems used by suppliers are accurate, reliable and protected against fraud. It shall evaluate the frequency and methodology of sampling and the robustness of the data.

**Electric energy consumption efficiency** equals the value pursuant to Regulation 385/2009<sup>12</sup>.

4. **Fuel or electric energy type.** This shall be reported on the basis of definitions contained in Annex 1, Table 5 point 10(c) of Annex I to Regulation 684/2009 or if not available, as defined by the relevant CEN standard.
5. **Greenhouse gas intensity for energy other than biofuels.** For fossil fuels and electric energy the greenhouse gas intensity shall be calculated in accordance with the rules set out in Annex I to this Directive.
6. **Greenhouse gas intensity of biofuels.** Biofuels meeting the requirements of Article 7b(1) of Directive 98/70/EC shall be included in the calculation of greenhouse gas intensity. Their greenhouse gas intensity shall be calculated in accordance with Article 7d of that Directive 98/70/EC. The greenhouse gas intensity for biofuels not meeting the requirements of Article 7b(1) of Directive 98/70/EC shall be reported separately.
7. **Simultaneous co-processing of fossil fuels and biofuels.** The following approach shall be followed for estimating the GHG intensity of biofuels in cases where processing of a biofuel and of a fossil fuel occurs simultaneously during the same process and where the resulting volume of the biofuel is not measurable such as during co-hydrotreatment of vegetable oils. The volume and the greenhouse gas

<sup>12</sup>

OJ L 118, 13.5.2009, p. 13–65

intensity of biofuels shall reflect the post-processing state of the fuels. Pre-processing volume and the greenhouse gas intensity shall be converted to the post-processing volume and GHG intensity by applying rules of molecular mass-balance. The post-processing greenhouse gas intensity may be aggregated for all blending components for a given fuel. Processing is defined as any modification along the life cycle of a fuel or energy supplied causing a change to the molecular structure of the product. Addition of denaturant shall fall under the process of blending.

8. **Upstream emission reductions.** Reporting of upstream emission reductions shall be supported with the following information:
  - (a) Starting date of the project, DD.MM.YYYY. This must be after the date used to establish the default values presented in Annex I;
  - (b) Annual emission reductions, gCO<sub>2eq</sub>;
  - (c) Duration of time during which the claimed reductions occurred from DD.MM.YYYY to DD.MM.YYYY;
  - (d) Project location closest to the source of the emissions in latitude and longitude coordinates in degrees to the fourth decimal place;
  - (e) Baseline annual emissions prior to installation of reduction measures and annual emissions after the reduction measures have been implemented in gCO<sub>2eq</sub>/MJ of feedstock produced. Method for estimating BAU emissions remains to be determined by the Commission;
  - (f) Non-reusable certificate number uniquely identifying the scheme and the claimed GHG reductions;
  - (g) Non-reusable number uniquely identifying the calculation method and the associated scheme;
  - (h) Certification that the claimed reductions are not certified emission reductions (CERs) pursuant to the CDM method;
  - (i) Where the project relates to oil extraction, the average annual historical and reporting year gas-to-oil ratio (GOR) in solution, reservoir pressure, depth and well production rate of the crude oil.
9. **Place of purchase for fossil and bio fuels.** Point (a) of the second subparagraph of Article 7a(1) of Directive 98/70/EC requires the reporting of where supplied fuel is purchased. This "place of purchase" shall mean the country where the feedstock was cultivated or where the raw material for the feedstock was extracted. To fulfil this reporting, Member States may choose to allow suppliers to refer to data being reported pursuant to other EU or Member State legislation.
10. **Origin of fuel or energy (annual reporting).** Point (a) of the second subparagraph of Article 7a(1) of Directive 98/70/EC requires the reporting of the origin of fuel supplied. This "origin" shall mean type of feedstock as cultivated or as defined by the raw material extracted from the subsurface for the purpose of producing the fuel or energy, as identified with a 10-digit CN code or to categories of biofuels as defined in Annex IV of Directive 98/70/EC. Where multiple feedstocks are used, the quantity and type of each feedstock shall be provided. To fulfil this reporting, Member States may choose to allow suppliers to refer to data being reported pursuant to other EU or Member State legislation. The data may be aggregated on annual basis.
11. **Origin of fuel or energy (periodic reporting)**

- 11.1. For specified years in the compliance period (2011 – 2020), suppliers shall provide more detailed reports of the origin of feedstock or processing fuel used providing information on the sources supplying the feedstock as well as the processing that it undergoes. This more complete data shall be reported twice during the compliance period. The first submission must be completed by 1 June 201[X] representing the 201[X] reporting period and the second by 1 June 201[X] representing the 201[X] reporting period.
- 11.2. For biofuel production facilities, for each installation that provides fuel to the supplier during that year, the processing fuel and the corresponding feedstock used to produce the fuel shall be reported. Processing fuel shall be any substance used to fuel a physical, chemical or biological process on an intermediary product resulting in creation of a fuel or energy placed on the market. Where multiple processing fuels are used, the data shall provide the quantity and type of each fuel. This reporting requirement shall be met only if such data is voluntarily provided or is already reported pursuant to other EU or Member State legislation.
- 11.3. For fossil fuels production facilities, for each installation that provides fuel to the supplier during that year, the feedstock source and the feedstock used to produce the fuel as defined in point 10 shall be reported. For oil or gas the source shall mean oil/gas field or oil/gas field group and the corresponding API density if appropriate. Oil field or oil field group shall mean all fields fed into a spur of a pipeline closest to the source or as defined pursuant to other EU or Member State legislation. For other feedstock sources including those extracted using induced gravity drainage or mining, or processed with coal-to-liquid conversion, gas-to-liquid conversion, or electricity generation, installations shall report the project name and location as the feedstock source. To satisfy this reporting, Member States may choose to supplement it with data being reported pursuant to other EU or Member State legislation.

## Annex IV

### Member State Reporting to the Commission

1. [The reporting data together with the full set of data shall be transmitted by the Member States via electronic data transfer to the Central Data Repository managed by the European Environmental Agency. Member States shall notify the Commission when the data is transmitted.]
2. Member States shall report the following data listed in point 4 annually to the Commission. Data shall be reported for all fuel and energy consumption within the scope of Directive 98/70/EC (by 10-digit CN code of fuel or energy) placed on the market in the Member State. Where multiple biofuels are blended with fossil fuels, the quantity and type of each biofuel shall be provided.
3. The following data listed in point 4 shall be reported separately for fuel or energy placed on the market by suppliers within the Member State (including joint suppliers operating in a single Member State) and supply placed on the markets of two or multiple Member States by joint suppliers (inter-Member State joint suppliers). Inter-Member State joint supplier data shall be further disaggregated by the Member State of the joining supplier.
4. For each feedstock-fuel combination, Member States shall report the following data to the Commission:
  - (a) Fuel or electric energy type as defined in point 4 of Annex III;
  - (b) Volume as defined in point 2 of Annex III;
  - (c) Electric energy as defined in point 3 of Annex III;
  - (d) GHG intensity defined in point 6 of Annex III for biofuels and in point 5 of Annex III for other fuel and energy;
  - (e) Upstream emission reductions as defined in point 8 of Annex III;
  - (f) Place of purchase, as defined in point 9 of Annex III;
  - (g) Origin as defined in points 10 and 11 of Annex III;
  - (h) Any methodology submitted for using lower default values as set out in Annex I.

To satisfy this reporting, Member States may choose to refer to data being reported pursuant to other EU or Member State legislation.

For periodic reporting, Member States shall aggregate information submitted by feedstock, source and process fuel where appropriate for submission to the Commission.





22

Department for  
**Transport**

From the Parliamentary  
Under Secretary of State

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Joop Atsma  
State Secretary  
Ministry of Infrastructure and the  
Environment  
PO BOX 20901  
2500 EX  
Den Haag  
Netherlands

27 September 2011

Dear Joop Atsma,

**Fuel Quality Directive (2009/30/EC) Article 7a**

As Parliamentary Under Secretary of State with responsibility for sustainable travel in the UK, I am responsible for the implementation of the Fuel Quality Directive (2009/30/EC). I am writing to you about the forthcoming proposal that the European Commission will be putting forward in the coming weeks under this Directive.

The Fuel Quality Directive requires Member States to reduce the lifecycle GHG emissions from fuel used in road transport and related uses by 6% in 2020. Article 7a of this Directive stated that a methodology to calculate the lifecycle GHG emissions from fossil fuels will be adopted through the comitology process.

The UK Government is committed to reducing greenhouse gas emissions (GHG) and we want the Fuel Quality Directive to be a key tool to achieve this aim. Our objective is an outcome that would not single out any particular crude source, including oil sands and oil shale, but would allow us to take account of the GHG intensity of all crudes using robust and objective data based as far as possible on current industry practice and that also encourages the production and use of crudes with the lowest greenhouse gas emissions.



The evidence is that fuel derived from oil sands has a high GHG emissions intensity. This is also true for a number of other heavy crude sources and those that have significant associated flaring. Clearly those sources where extraction leads to higher greenhouse gas emissions are less attractive than those which do not.


To reflect the emissions associated with different crudes properly, I believe that we need a methodology that allows the emissions of all GHG intensive crudes to be accounted for. One possible option might be to split crude sources into three broad categories based on lifecycle greenhouse gas emissions (for example, low, medium and high). This system would tackle the most GHG intensive crudes without singling out any particular sources and would also encourage industry to reduce the GHG intensity of the processes involved in producing fuel. As with a proposal to single out any particular crude source, a banding approach would also require the introduction of a mechanism to track oil from source to supplier (a "chain of custody") and would need further analysis on the possible impacts.

I trust you will agree that it is important that an impact assessment is shared with Member States in order that we can make informed decisions on the Commission proposal.

The UK Government considers it crucial that, whatever proposal is adopted, it helps us meet our ultimate objective of reducing GHG emissions.

I would be very interested in your views on this issue and for your thoughts on how we might best meet the objectives of this Directive.

Yours sincerely

A handwritten signature in black ink, appearing to read 'N. Baker', written in a cursive style.

**NORMAN BAKER**

---

**Van:** [redacted]@exxonmobil.com]  
**Verzonden:** dinsdag 4 oktober 2011 10:23  
**Aan:**  
**Onderwerp:** Upstream BKG emissies fossiele brandstoffen.  
**Bijlagen:** FQD Hybrid model WoodMac Study Roadshow final 2010.pdf

Beste

Een collega vertelde dat je deze week in een task-force zit, daarom probeer ik het maar even via e-mail.  
Ik heb gehoord dat druk overleg plaatsvindt over de broeikasgas berekening voor fossiele brandstoffen voor de FOD, en dan met name het upstream gedeelte.

Dit wordt gesteunt door ExxonMobil en Europa.  
Europa stelt ook voor om de gemiddelde BKG emissiewaarde voor upstream te verhogen van 3.6 naar 5.3 g CO<sub>2</sub>/MJ, op basis van laatste JEC WTW studie, en dit te reviewen in 2014.

Andere voorstellen bevatten echter BKG differentiatie naar crude-type.  
Dit zou zeer schadelijk zijn voor de concurrentiekracht van de Europese raffinage industrie, levert geen BKG reductie op en is administratief niet of nauwelijks uitvoerbaar en verifieerbaar door overheden.  
Bijgaande Europa presentatie legt uit waarom.  
Als je naar aanleiding hiervan vragen of opmerkingen hebt, neem dan even contact op.

Met vriendelijke groet,

Esso Nederland B.V. Rotterdam Refinery  
Postbus 5120, 3197 ZG Botlek-Rotterdam  
Tel: +31-  
Fax: +31  
E-mail: [redacted]@exxonmobil.com

Esso Nederland B.V., Graaf Engelbertlaan 75, 4837 DS Breda, statutaire zetel: Breda, handelsregisternummer: 27004771.



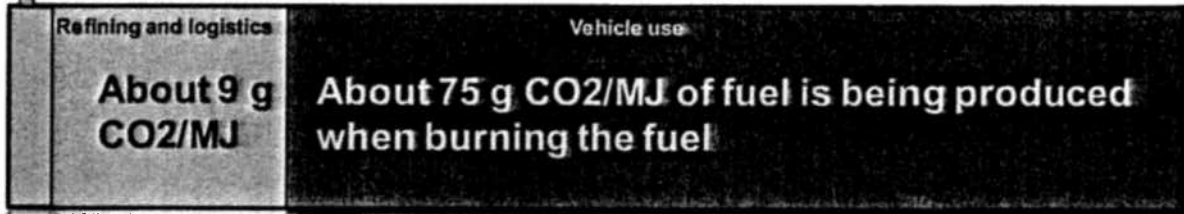
# GHG calculation methodology for fossil fuels in the FQD

# DG ENER's request for a "hybrid" model for upstream CO2 emissions



**DG ENER:** arbitrary increase of the upstream CO2 footprint to incentivize batch-by-batch or oil field-by-oil field reporting of actual CO2 emissions

3-4 g CO2/MJ upstream emissions including flaring



Crude Production



Refining



Distribution

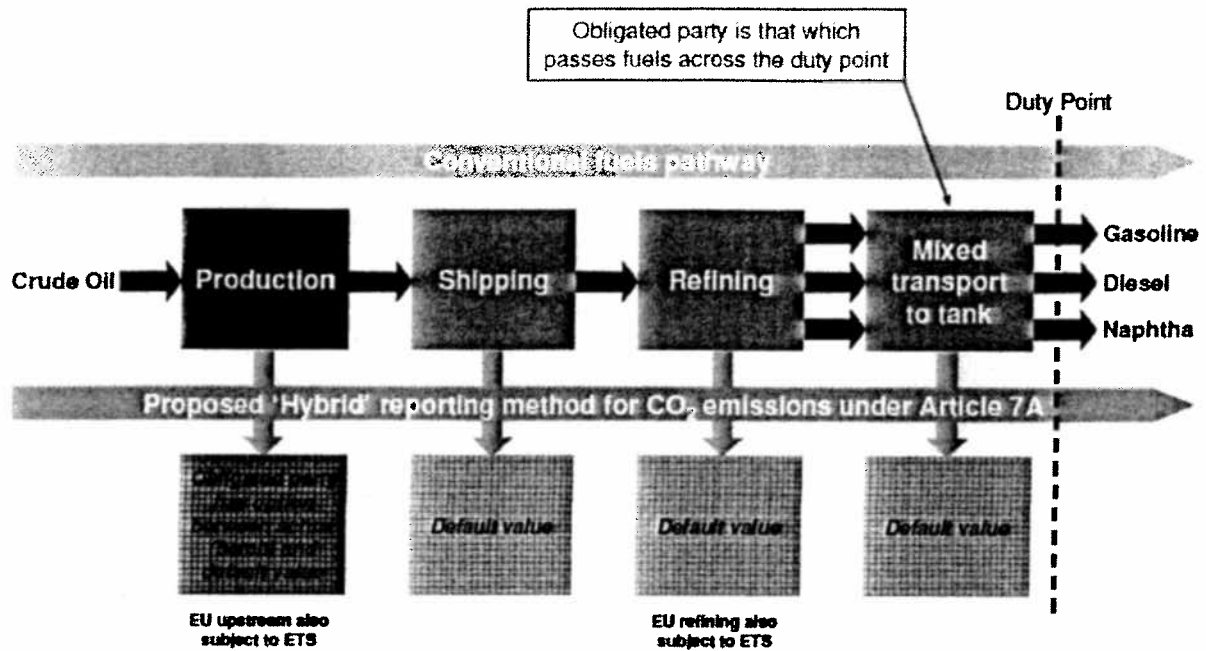


End use

JEC WTW study: 87,4 g CO2/MJ of diesel

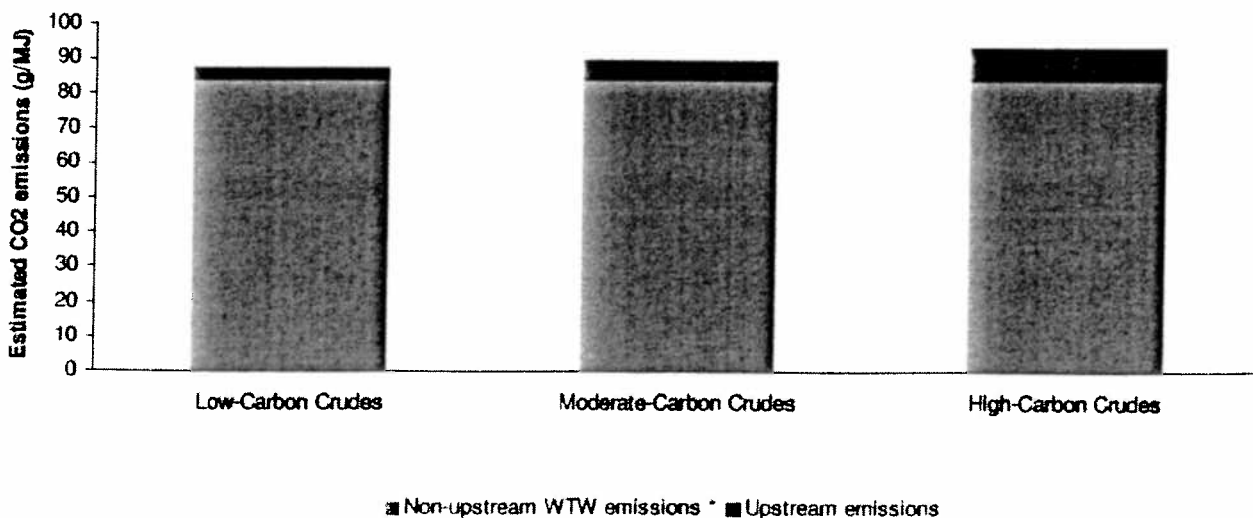
Source: JEC

# Article 7a of the FQD imposes a CO2 reduction obligation for the entire Well-to-Tank value chain at the duty point for fuels



Source: Wood Mackenzie

# Assessed variations in upstream oil emissions are small when considered on a well-to-wheels basis



Note: The emissions figures presented are Wood Mackenzie's own estimates based on limited available emission data. Further, it should be noted that a wide range of emissions could be expected for specific traded crude streams. The data presented here has been aggregated into emissions categories, which represent averaged data from each 33-percentile grouping of the crudes analysed in the study (in terms of carbon emitted).

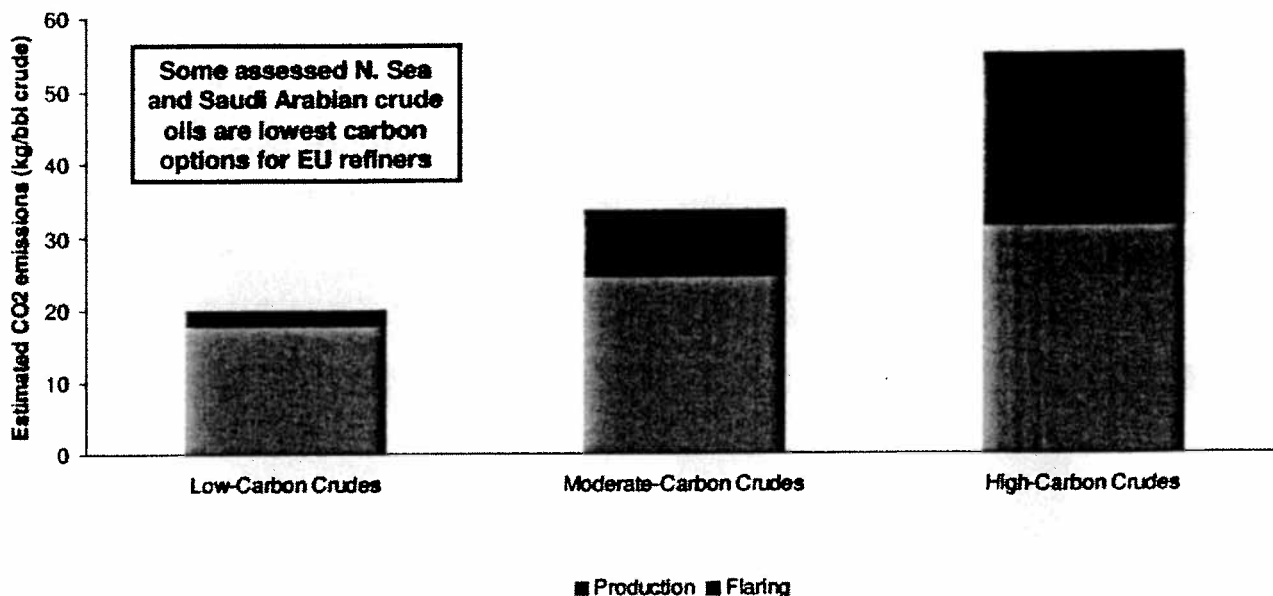
\* Non-upstream well-to-wheel emissions figure of 83.8g/MJ for conventional diesel (per JRC study) assumed for comparison purposes

Source: Wood Mackenzie

But the range of carbon emissions associated with production of crude oils typically processed in EU refineries is significant when viewed in isolation



european  
petroleum  
industry  
association

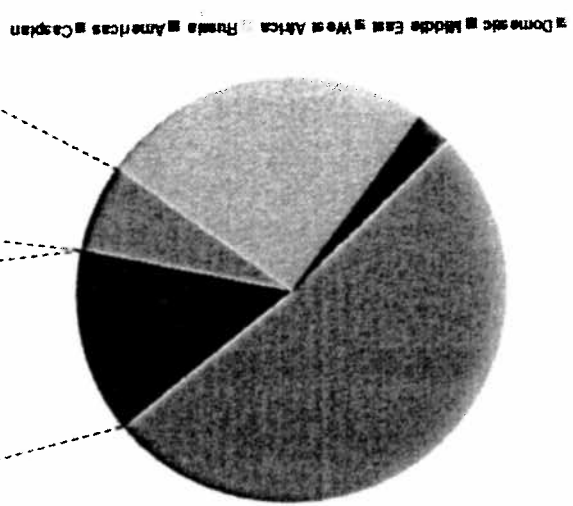


Note: The emissions figures presented are Wood Mackenzie's own estimates based on limited available emission data. Further, it should be noted that a wide range of emissions could be expected for specific traded crude streams. The data presented here has been aggregated into emissions categories, which represent the range of emissions (in terms of carbon emitted)

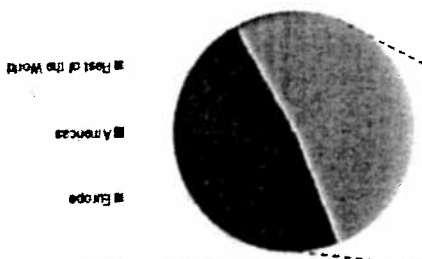
The majority of EU crude supply already finds alternative outlets beyond the EU – most supplies from the Middle East and West Africa



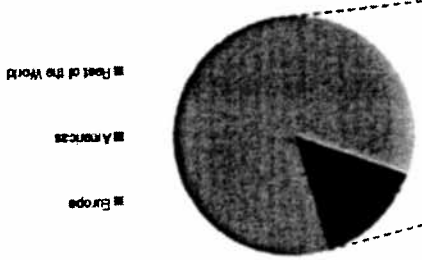
Source of European Refinery Crude Oils (2008)



Nigerian Crude Oil Exports (2008)



Saudi Arabian Crude Oil Exports (2008)



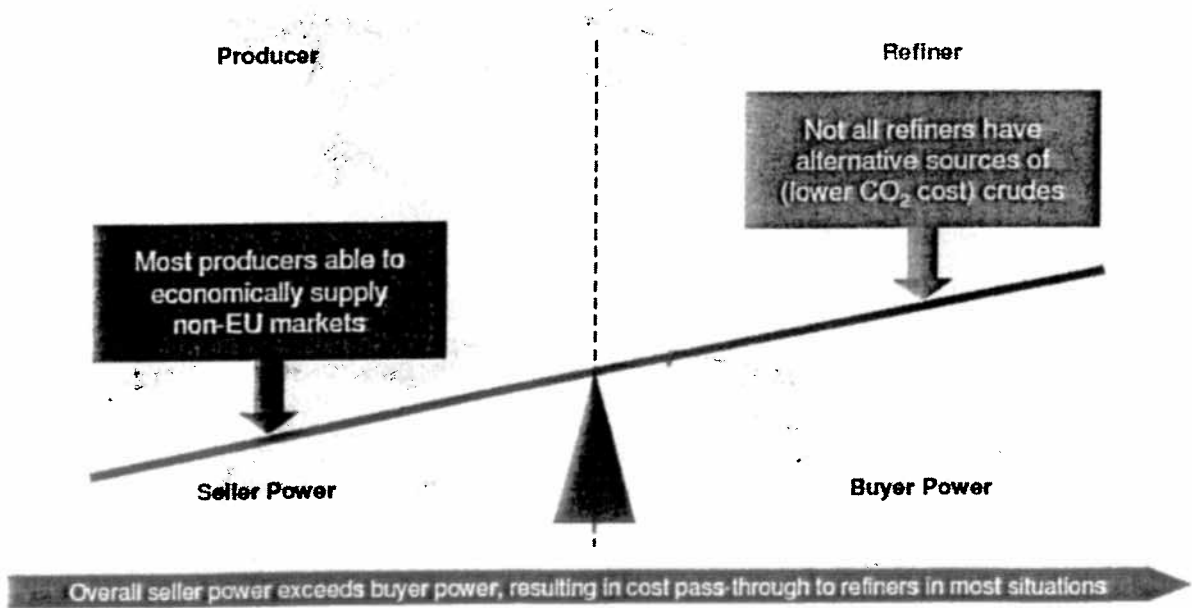
Note: In this context, Domestic includes production from Norway

Source: Wood Mackenzie

MARKET POWER

Source: Wood Mackenzie

Most crude suppliers to EU markets have non-EU supply options and are unlikely to pay all crude CO<sub>2</sub> cost providing limited incentive to reduce emissions



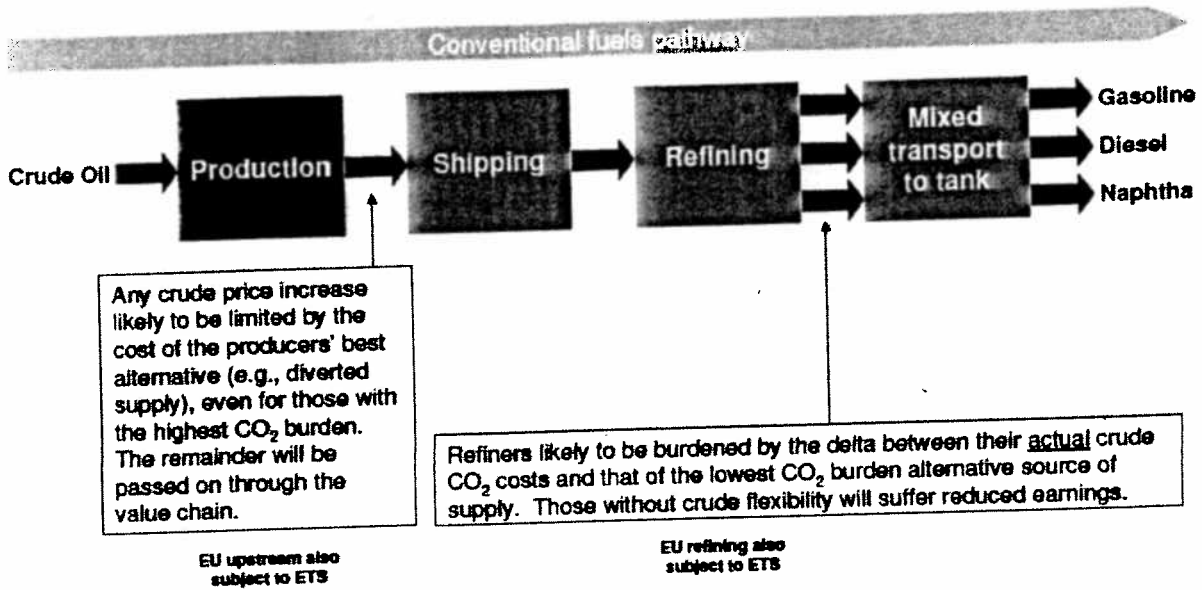
Source: Wood Mackenzie



The crude CO<sub>2</sub> burden is likely to be spread throughout the value chain, with those EU refiners without crude flexibility being most impacted

europa

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petroleum  
industry  
association



Source: Wood Mackenzie

Supply

Uraie

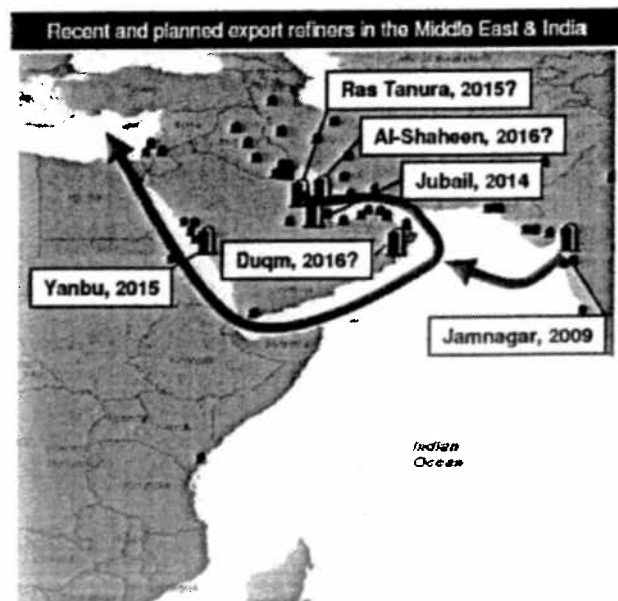
8

Source: Wood Mackenzie

Strategic investments in Mid-East export refineries will ensure abundant low- GHG supply and sustained pressure on disadvantaged EU refiners

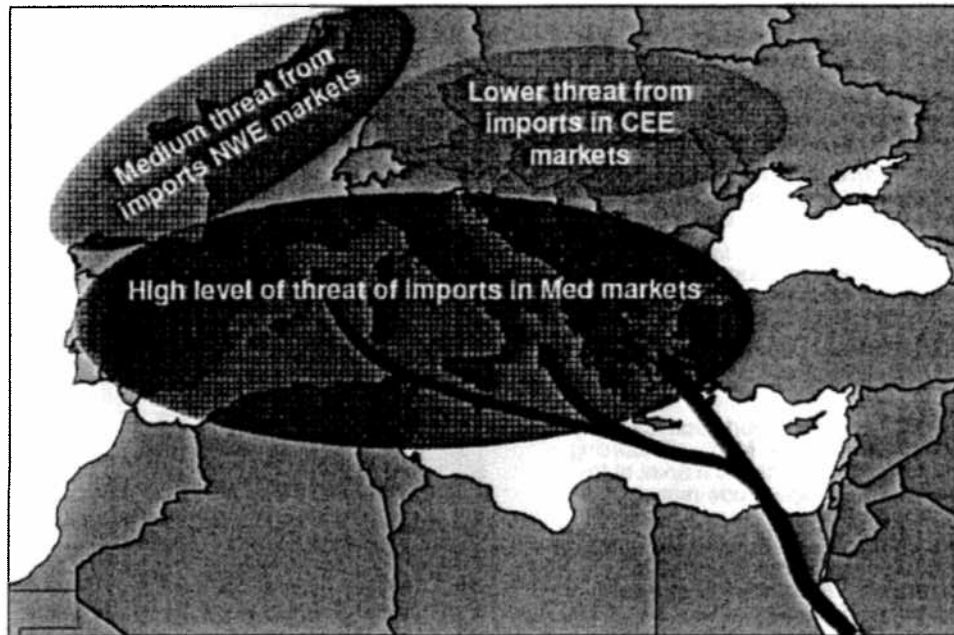


- › Planned refineries in India, Saudi Arabia, Qatar, Oman etc. are intended to create employment opportunities and associated socio-economic growth through development of an industrial base
- › Refined product supply in the region will exceed demand, and so the majority of production will be destined for export markets
  - These refiners will hence be seeking to gain market share in export markets such as the EU, typically achieved by discounting their product prices
- › Our analysis of a limited number of specific crude producers suggests that refiners in the region will have access to low GHG crudes
  - Volumes of low GHG supply to EU markets are therefore expected to increase, as export refiners are able to discount due to the low CO<sub>2</sub> burden relative to many EU refiners



Source: Wood Mackenzie

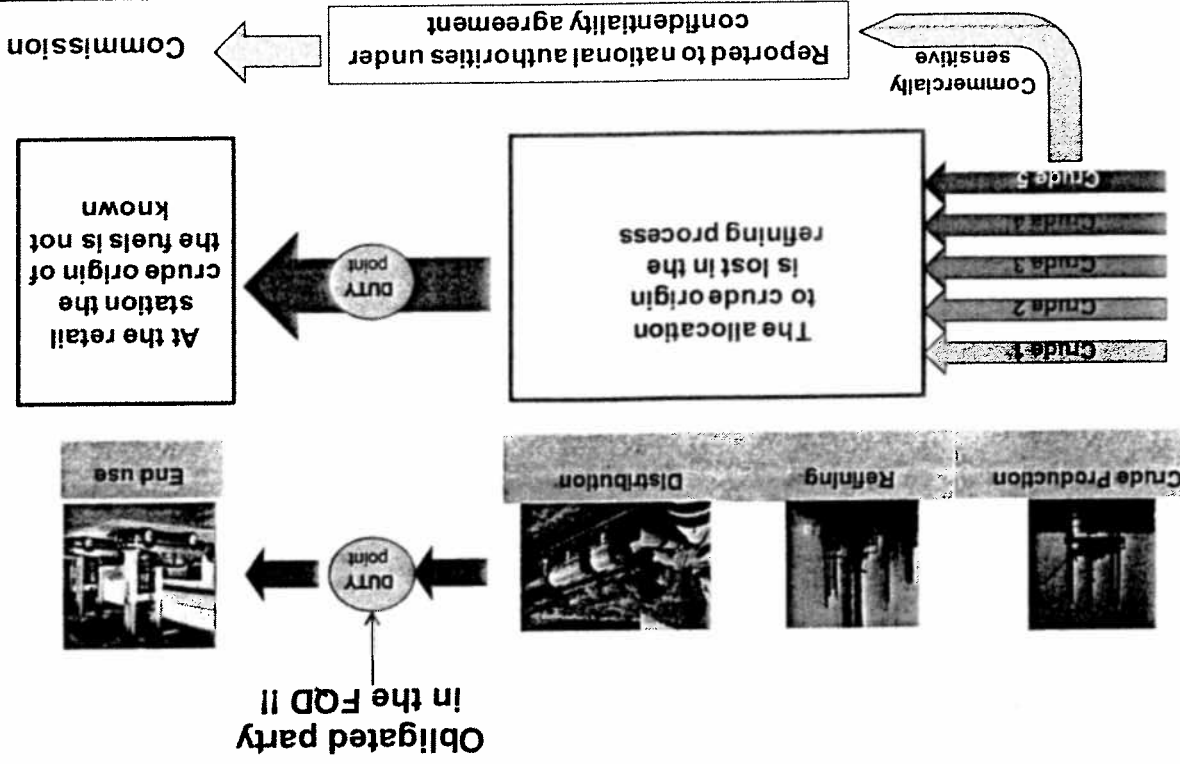
The threat to EU refiners from non-EU imports will be exacerbated by Art. 7a, with those closest to alternative sources of supply likely to be most effected



Source: Wood Mackenzie

## Wood Mackenzie study: Main messages

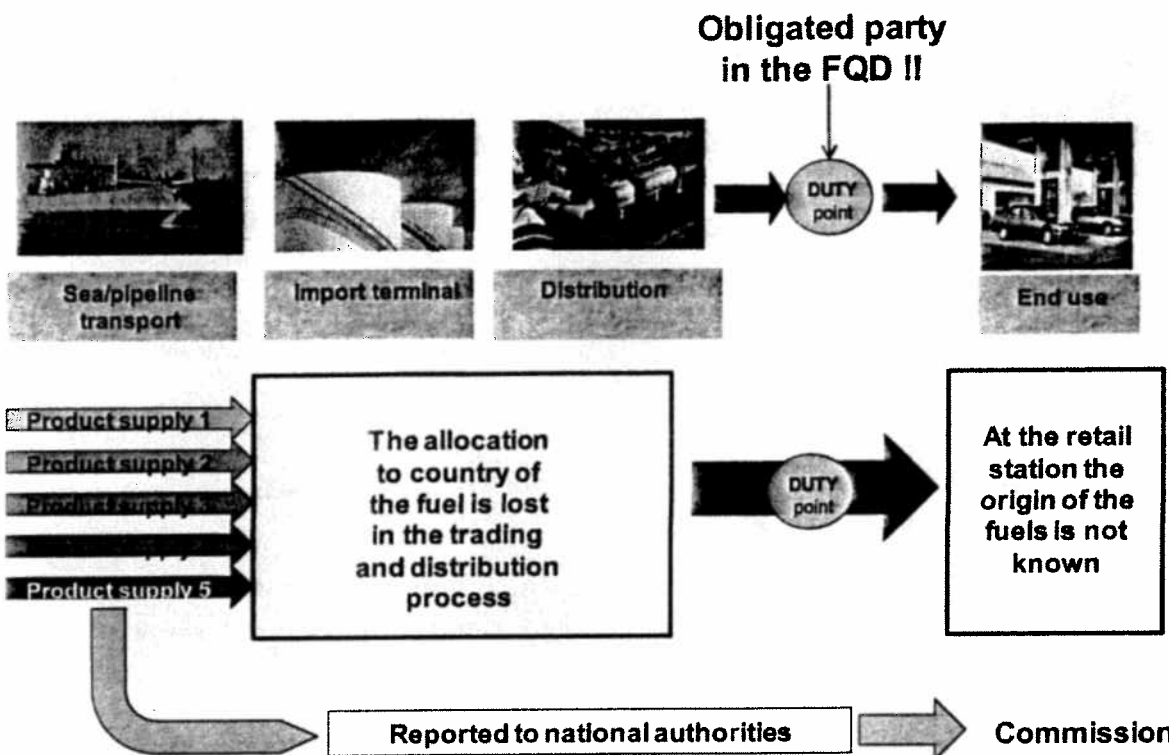
- Significant cost impact expected:
  - The magnitude of crude CO<sub>2</sub> burden will be significant when compared with typical industry economic metrics
- Detrimental effect on security of supply:
  - Most crude suppliers have non-EU supply options thus decreasing crude supply sources for the EU.
- Damages the EU refining sector competitiveness:
  - Overall crude “seller power” exceeds “buyer power”, resulting in cost pass-through to refiners in most situations
  - The potential margin reduction could not be borne by the EU refining population
  - Non-EU refiners will have the ability to gain market share over single-crude EU refiners
- Does not incentivise CO<sub>2</sub> reductions:
  - Due to alternative non-EU supply options for crude producers there will be limited incentive to reduce CO<sub>2</sub> emissions at source.
  - A moderate increase of CO<sub>2</sub> emissions could result due to additional crude shipments



**For EU fuel production the crude origin information is lost in the refining process....**



...while for product imports the product origin is getting lost in trading activities.



23

Even simplified batch-by-batch reporting models would constitute an undue administrative burden

- Gasoline and diesel come from a multitude of different and interlinked processing technologies in refineries.....
- .....whose operation mode and therefore energy demand may change on a frequent basis.
- A tracking of crudes in refineries is therefore highly complex and virtually impossible.
- Even simplified batch-by-batch reporting would add an enormous administrative burden on the fuel suppliers (reporting) and member states (verification).

24

## EUROPIA is strongly advising against different & separate values for crudes



- It does not decrease CO2 emissions,
  - but increases shipping CO2 emissions through reshuffling of crudes and products.
  - but increases CO2 in refining because of suboptimum crude use
- It does not incentivise CO2 reduction at source.
- It reduces EU energy supply sources hence decreases EU energy security.
- It seriously damages the EU refining industry.
  - European refining will have to pay the premium for lower CO2 crude.
  - This premium will be largely superior to their operational margin
- It carries an enormous administrative burden for fuel suppliers and member states and it may be impracticable to be enforced.
- The difference between biofuels and crude is that biofuels are mandated for GHG
  - Without mandate biofuels would not penetrate EU market, asking for GHG for biofuels will not suppress the mandated market
  - Crude is a world wide market, any specific GHG constraint in EU on crude will distort the market and damage the EU industry access to WW market
- No CO2 savings, destruction of local industry, enormous bureaucracy for member states and industry

## EUROPIA's suggested compromise could form the basis for an agreement within the Commission



- EUROPIA continues to support the use of industry average default values for fossil fuels (= Option 1 of the 2009 consultation document )
- On that basis the suggested EUROPIA compromise would be in the interest of the industries involved and in the spirit of the Commission's objectives
- Production emissions should be regulated at source
- It would enable a pragmatic and cost-efficient implementation of the RED and FQD targets



Back up





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**Van:** namens Postbus Secretariaat KenL  
**Verzonden:** dinsdag 4 oktober 2011 14:42  
**Aan:**  
**Onderwerp:** Terugbelverzoek  
**Urgentie:** Hoog

Hallo

UK dept. Transport heeft voor jou gebeld.  
Het gaat over Fuel quality.  
Wil jij contact met hem opnemen?  
Hij is bereikbaar op +44

Alvast bedankt.

Met vriendelijke groet,

directie Klimaat en Luchtkwaliteit

.....  
Ministerie van Infrastructuur en Milieu  
Rijnstraat 8 | Postbus 20951, 2500 EZ | Den Haag  
.....  
T 070  
[www.rijksoverheid.nl](http://www.rijksoverheid.nl)

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EUROPEAN COMMISSION

Brussels, xxx  
C(2011) yyy final

Draft

**COMMISSION DIRECTIVE ..../EU**

**of [...]**

**laying down calculation methods and reporting requirements pursuant to Directive 98/70/EC of the European Parliament and of the Council relating to the quality of petrol and diesel fuels**

## EXPLANATORY MEMORANDUM

### **1. BACKGROUND AND PURPOSE**

The Climate and Energy package adopted by the Council and Parliament on 22 April 2009 sought to achieve a 20% reduction in greenhouse gas emissions by 2020. It contained a revision to Directive 98/70/EC<sup>1</sup> on the quality of petrol and diesel.

The revised Directive obliges suppliers<sup>2</sup> to reduce by 6% the lifecycle greenhouse gas intensity of fuel and other (electric) energy supplied for use in road vehicles and of fuel for use in non-road mobile machinery by the end of the compliance period in 2020. The article establishing this new element is Article 7a of the Directive which effectively establishes a "low-carbon fuel standard" in Union legislation. The Directive also obliges suppliers to report information, from 2011, on the greenhouse gas intensity of the fuel they have supplied, to authorities designated by the Member States.

The 6% reduction is likely to be achieved through the use of biofuels, renewable electricity and a reduction in the flaring and venting of gases at the extraction stage of fossil fuel feedstocks.

More specifically Article 7a requires the Commission to prepare a draft Directive to be adopted through the regulatory procedure with scrutiny. The Commission was asked to consider proposals for:

- A method for calculating greenhouse gas emissions of fuels and other energy from fossil sources (elements dealing with the calculation of greenhouse gas emissions for biofuels are already included in Annex IV of the Directive);
- A method for calculating the baseline fossil fuel greenhouse gas intensity to be used as a reference for measuring compliance with the target;
- Calculation and verification of the greenhouse gas intensity of electric energy used in electric vehicles;
- Any rules necessary to give effect to the requirement that two or more suppliers are allowed to report their greenhouse gas intensity jointly.

The draft Directive addresses the first three elements outlined above. The last item on joint reporting is not believed to be necessary at this time following the consultation process described below.

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<sup>1</sup> Directive 2009/30/EC

<sup>2</sup> The entity responsible for passing the fuel or electricity through the excise duty point e.g. the oil refiner

## 2. CONSULTATION WORK UNDERTAKEN & TECHNICAL BASIS

A public consultation<sup>3</sup> was launched in July 2009 which focussed on the issues to be addressed in the draft Directive. This was followed by a stakeholder meeting comprising the fossil and biofuel industries, Member States and NGOs in January 2010. In March 2010 the Commission Services discussed a concept paper with the Member States with a view to developing an appropriate draft Directive.

In formulating the current proposal the Commission has relied upon:

- The work of the JEC and its "well to wheels" study<sup>4</sup>;
- The Brandt study on natural bitumen<sup>5</sup>,
- The Brandt study on shale oil<sup>6</sup>,

The work of Dr. Brandt was subjected to an external peer-review process whose findings were discussed with stakeholders at a public meeting on 27 May 2011<sup>7</sup>.

## 3. APPROACH AND CONTENT OF THE PROPOSAL

### 3.1. Overview

The main features of the draft Directive regarding the method for calculating greenhouse gas emissions of fuels and other energy from fossil sources are:

- The use of one average default value<sup>8</sup> to represent the unit greenhouse gas intensity per fuel and feedstock type;
- An option for suppliers of high greenhouse gas intensity fuels to calculate actual emissions;
- A method for claiming greenhouse gas savings from changes in upstream practices<sup>9</sup> from projects validated in accordance with voluntary schemes to be recognised by the Commission (all non-CDM projects);
- The annual reporting of the origin of each fuel or energy supplied on a country level basis, of the greenhouse gas intensity, of the volume and of the purchase location;

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<sup>3</sup> <https://circabc.europa.eu/faces/jsp/extension/wai/navigation/container.jsp> for both the questions and responses

<sup>4</sup> The JEC consortium comprises the JRC, EUCAR and CONCAWE. Thus the Commission, EU automobile industry and oil industry take part in this work.

<sup>5</sup> <https://circabc.europa.eu/w/browse/9e51b066-9394-4821-a1e2-ff611ab22a2d>

<sup>6</sup> <https://circabc.europa.eu/w/browse/9ab55170-dc88-4dcb-b2d6-e7e7ba59d8c3>

<sup>7</sup> <https://circabc.europa.eu/w/browse/9e51b066-9394-4821-a1e2-ff611ab22a2d>

<sup>8</sup> Default values represent unit GHG intensities.

<sup>9</sup> Recital 9 "...this reduction should amount to at least 6 % by 31 December 2020, compared to the EU-average level of life cycle greenhouse gas emissions per unit of energy from fossil fuels in 2010, obtained through the use of ... reductions in flaring and venting at production sites."

- Reporting of the origin of fuel or energy on the oil/gas field or project level twice within the compliance period;
- A review of the draft Directive and of the average default values and of the calculation method.

### 3.2. Approach to determine the greenhouse gas intensity of specific fossil fuel feedstocks

The aim of Article 7a of the Fuel Quality Directive is to reduce the greenhouse gas emissions associated with the production and use of transport fuels. This includes those greenhouse gas emissions associated with the production of fossil fuel feedstocks, their subsequent transport and processing as well as the use in road vehicles. The greenhouse gas emissions associated with production depend upon the chemical and physical parameters of the particular fossil fuel deposit and the related production methods.

Although, it would be desirable to attribute a specific greenhouse gas intensity to each fossil fuel feedstock from each and every geographical source globally, such an approach requires a massive amount of information which is currently not readily available on evenly distributed geographical basis. In the light of the consultation exercise and discussions with the Member States, the Commission concluded that the most appropriate methodology, at least in the short term, should be based on "average default greenhouse gas intensity values" (gCO<sub>2</sub> per MJ) for petrol and diesel which reflect the underlying feedstock. These default values are typical and representative of particular types of fossil fuel feedstock. The feedstock based approach is already contained in the Fuel Quality Directive as regards biofuels.

In this context it should be recalled that specific default values for biofuels already exist even when such biofuels represent a very low share of the total fuel used in transport, e.g. biodiesel from sunflower (0.09%) or bioethanol from wheat (0.21%, where this percentage is further differentiated into five default values according to different production processes).

The approach taken in this proposal is to establish a limited number of fossil fuel feedstock categories which are distinguishable in terms of their average or typical greenhouse gas intensity and the underlying physical and chemical properties and related extraction techniques. Such an approach has been employed in other Union legislation where, for example, the greenhouse gas emissions of natural bitumen (i.e., oil sands and tar sands) and oil shales are differentiated in the European Emissions Trading System guidelines for monitoring and reporting greenhouse gas emissions (i.e. a higher emission factor for "oil shale and tar sands", is recommended than for conventional crude oil<sup>10</sup>), in line with the emission factors established by the Intergovernmental Panel on Climate Change in its 2006 Guidelines for National Greenhouse Gas Inventories.<sup>11</sup> Accordingly, the present proposal distinguishes, in Annex I, a number of average default values for different conventional fossil fuel

<sup>10</sup> OJ L 229, 31.8.2007, p.1 (and p.33). This is further substantiated by the 2006 IPCC "Guidelines for National Greenhouse Gas Inventories."

<sup>11</sup> 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Vol. 2 (Energy), see [http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2\\_Volume2/V2\\_2\\_Ch2\\_Stationary\\_Combustion.pdf](http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf)

feedstocks such as crude oil, natural gas, liquid petroleum gas, as well as for greenhouse gas intensive unconventional oil feedstocks, such as coal converted to liquid, natural gas converted to liquid, oil shale and natural bitumen.

As these unconventional crude oil feedstocks are not included in the baseline calculated in Annex II, against which the achievement of the 6 % reduction target in lifecycle greenhouse gas intensity of fuels consumed in the EU will be measured, by definition, the reduction of their greenhouse gas intensity will not contribute directly to achieving this target. However, the very purpose of the target is to reduce the greenhouse gas intensity of fuels consumed in the EU. In case new fuels, which are more greenhouse gas intensive than the baseline (i.e. 88.3 gCO<sub>2</sub>eq/MJ), enter the Union market without having to account for their higher emissions and without being subject to any incentive to reduce their greenhouse gas intensity (as is the case for the venting and flaring emissions, for which a saving incentive is foreseen in Annex II of this proposal), this will unavoidably mean that, in real terms, part of the savings in greenhouse gas intensity of EU fuels will be offset. Therefore, a transparent framework for accounting for the higher greenhouse gas intensity of all unconventional feedstock sources is necessary in order not to undermine the credibility of the 6 % saving target and of climate policies more generally.

### 3.3. Differences between natural bitumen and conventional feedstocks

In most simple terms, the greenhouse gas intensity of extracting and preparing any petrol/diesel feedstock for further refining is, inter alia, directly linked to the energy needed for extraction. Consequently, the greenhouse gas intensity of such activities is related to how immobile the feedstock is, as found in-ground, prior to extraction. There is evidence<sup>12</sup> to show, on this basis alone, that it is appropriate to differentiate natural bitumen and oil shale feedstocks from other feedstock sources. Furthermore, numerous publications differentiate "tar sands"<sup>13</sup>, as an unconventional fossil fuel feedstock source<sup>14, 15, 16</sup> compared to more conventional fossil fuel feedstocks.

Natural bitumen feedstocks are generally more dense and viscous and do not flow freely under natural conditions<sup>17</sup>. The further differentiation of natural bitumen feedstock from conventional crude oil is linked to the extraction methods employed<sup>18, 19, 20</sup>. This also stems from its viscosity and density. Natural bitumen is

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<sup>12</sup> E.g. World Energy Outlook 2010", International Energy Agency (IEA), p.156;

<sup>13</sup> The public consultation included the words "tar sands" which are mentioned in Union legislation (e.g. Commission Decision of 18 July 2007 establishing guidelines for the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council); it is also the way in which the NGO community<sup>13</sup> describes these feedstock deposits. However the expression is not used by the Canadian authorities who employ the words "oil sands". In preparing this draft Directive the Commission has concluded that "natural bitumen" forms the appropriate definition of the feedstock concerned when taking account of the available science.

<sup>14</sup> "Crude Oil and Oil Sands Market Outlook – LCFS impacts on Oil Sands", Purvin and Gertz International Energy Consultants, 2010, p. 23; see [http://www.purvingertz.com/userfiles/products/LCFS\\_Description.pdf](http://www.purvingertz.com/userfiles/products/LCFS_Description.pdf)

<sup>15</sup> "World Energy Outlook 2010", International Energy Agency (IEA), p.145

<sup>16</sup> "An Evaluation of the Extraction, Transport and Refining of Imported Crude Oils and the Impact on Life Cycle Greenhouse Gas Emissions", US Department of Energy's National Energy Technology Laboratory (NETL), 2009, p. 5

<sup>17</sup> "Enhanced Recovery Methods for Heavy Oil and Tar Sands" Speight, 2009, p.23

<sup>18</sup> "Enhanced Recovery Methods for Heavy Oil and Tar Sands" Speight, 2009, p.20-22

<sup>19</sup> "World Energy Outlook 2010", IEA, 2010, p.145

extracted through mining or thermally enhanced gravity drainage where the fossil fuel deposit is heated with steam so as to lower its viscosity and where the thermal energy is mainly derived from sources other than the feedstock source itself<sup>21</sup>. It is important to note that the presence of natural bitumen is not unique to any one location. United States Geological Survey (USGS) reports the presence of natural bitumen in specific geological provinces discovered in North and South America, Europe, Asia and Africa<sup>22</sup>.

Different tariff classification further underlines the fact that certain feedstock sources vary from others. Natural bitumen and oil shale are classified under the same CN code (CN 2714 10 00), separate from other conventional crude oil.

In addition, it is clear from the study on oil sands<sup>23</sup> that there is an overlap in the greenhouse gas emissions of the worst performing conventional crude feedstocks (due, for example, to uncontrolled or illegal flaring and venting) and the best performing natural bitumen feedstocks (because of efficient extraction). It is important to note that this overlap does not stem from the naturally occurring differences in physical properties of the respective feedstock sources (described in Section 3.3) that are directly linked to fuel lifecycle greenhouse gas emissions. For example, flaring and venting emissions occurring during extraction of oil, result from the inappropriate management of the simultaneous extraction of two separate fossil fuels; crude oil and natural gas.

#### **4. SPECIFIC PROVISIONS**

##### **4.1. Article 1: definitions**

Article 1 contains definitions for "upstream emissions"; "natural bitumen"; "oil shale" and "conventional crude". The last three definitions relate to feedstocks for the production of petrol and diesel.

The feedstock approach is already contained in the Fuel Quality Directive as regards biofuels. Indeed, for biofuels Annex IV contains a set of differentiated values where feedstocks with higher greenhouse gas emissions (e.g. biodiesel made from palm oil or soybean) are differentiated from those feedstocks with lower greenhouse gas emissions (e.g. biogas or sugarcane ethanol). This differentiation is appropriate to account more accurately for the greenhouse gas impact of these different feedstocks on the achievement of the 6% greenhouse gas savings target set out in Article 7a.

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<sup>20</sup> "Handbook of Alternative Fuel Technology", Speight, p.198

<sup>21</sup> "Upstream greenhouse gas (GHG) emissions from Canadian oil sands as a feedstock for European refineries", 20 June 2011, Brandt

<sup>22</sup> "Heavy Oil and Natural Bitumen Resources in Geological Basins of the World" USGS, 2007, p.36

<sup>23</sup> The graph on page 41 of the Brandt study shows an overlap in GHG emissions between oil sand feedstock crudes and conventional crudes.



#### 4.1.1. Natural bitumen

Natural bitumen is defined on the basis of its specific physical properties regarding density and viscosity. The index of the American Petroleum Institute (API<sup>24</sup>) gives a measure of specific gravity and is measured according to testing method ASTM<sup>25</sup> D287<sup>26,27</sup>. Natural bitumen has also been defined in these terms by the United States Geological Survey (USGS)<sup>28</sup> and the International Energy Agency (IEA)<sup>29</sup>. According to all four references, natural bitumen is generally defined as exhibiting an API of 10 or less.

As viscosity varies with reservoir temperature, a specific empirical equation identifying the viscosity-temperature relationship is used to define the natural bitumen feedstock<sup>30</sup>. The formula presented in Article 1 of the Directive follows the empirical lower viscosity-temperature limit for Lloydminster "heavy oil". Not all heavy oils above this line are natural bitumen. This more conservative lower limit was chosen to allow for variances in the reported viscosity data measurements. Employing the 10 API density factor in conjunction with this formula for viscosity in the definition is considered to be the most reliable approach to indentifying natural bitumen. Viscosity is measured in accordance with testing method ASTM D445.

In addition, the specific tariff classification is used to define Natural bitumen / tar sands and oil shale.

#### 4.1.2. Oil shale

Oil shale is defined as any refinery feedstock source as situated in a shale formation containing solid kerogen and falling within the definition for oil shale under CN 2714 10 00 outlined in Council Regulation (EEC) N° 2658/87. Mobilization of the feedstock source is achieved by mining extraction or thermally enhanced gravity drainage.

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<sup>24</sup> American Petroleum Institute (API) is an American National Standards Institute (ANSI). API provides quality, environmental, and occupational health and safety management systems certification through APIQR. This service is accredited by the ANAB (ANSI-ASQ National Accreditation Board) for ISO 9001 and ISO 14001. It therefore, operates with approved standards and development procedures and undergoes regular audits of its processes. API gravity was established in 1921 and became a global standard (see <http://www.api.org/>)

<sup>25</sup> American Society for Testing and Materials, <http://www.astm.org/index.shtml>

<sup>26</sup> "Kirk-Othmer Encyclopaedia of Chemical Technology", Speight, p.8

<sup>27</sup> "Handbook of Alternative Fuel Technology", Speight, p.199

<sup>28</sup> "Heavy Oil and Natural Bitumen Resources in Geological Basins of the World" USGS, 2007, p.1

<sup>29</sup> "World Energy Outlook 2010", IEA, p.145

<sup>30</sup> As published e.g. by the USGS, by Dr. Speight and the *Oil and Gas Journal* – extraction data 2010. Speight has also suggested a different set of characteristics to corroborate the API-and-viscosity approach. These draw a distinction between natural bitumen and heavy oil feedstocks and, consequently, clearly define the feedstocks in accordance with their extraction methods. This latter approach would define natural bitumen – oil sands in terms of their "pour point" (determined according to testing procedure ASTM D97; the pour point of a liquid is the lowest temperature at which it will pour or flow under prescribed conditions. It is a rough indication of the lowest temperature at which oil is readily pumpable) and the reservoir temperature. While the "pour point" approach is an acceptable methodology, supporting the conclusion that natural bitumen is a separate feedstock, it is less demonstrable than API due to a smaller amount of published data being available.

#### 4.1.3. Conventional crude

Conventional crude is defined as any refinery feedstock source exhibiting an American Petroleum Institute Gravity that is higher than 10 degrees when situated in a reservoir formation at its place of origin as measured per testing method ASTM<sup>31</sup> D287 and not falling within the definition for CN 2714 10 00 as outlined in Council Regulation (EEC) N° 2658/87. If it can be demonstrated that the conventional crude oil was not subjected to thermal or mining processes at the time and project place of extraction from the subsurface, then the CN code identity of the raw material does not have to be verified.

#### 4.2. Article 2 and annex I: methodology for calculating the greenhouse gas intensity of fuels and energy supplied other than biofuels

As explained in section 3.3 there is basis to distinguish between Natural bitumen and conventional crude oil. The public consultation set out average default values for a number of petrol and diesel feedstocks. These default values were derived, in the main part, from the "Well to Wheel"<sup>32</sup> work carried out by the JEC consortium.<sup>33</sup> However the JEC has not developed default values for other feedstocks (such as oil sands/natural bitumen and oil shales) which were expected to enter the EU market during the next few years.

The Commission services were able to develop default values for the public consultation exercise for oil sands/natural bitumen and oil shales based on public data. However, to ensure that robust values were developed for the draft Directive, external expertise was considered necessary.

Accordingly studies were commissioned to establish default values for oil sands/natural bitumen and oil shales. The studies were subject to a peer review and discussed at a stakeholder meeting on 27 May 2011. The peer review comments as well as the revised studies have also been published on the Commission's website.<sup>34</sup>

The majority of stakeholders in response to the 2009 consultation preferred the choice of using the best available average emissions value without allowing the option to report actual values. The underlying reason is that average default values strike a balance between the required level of accuracy and the respective administrative burden. Further, for this reason, the majority of the stakeholders preferred one average default value for refining that encompasses the performance of simple and complex refineries and one average default value for conventional crude oil. It is also apparent that for the specified EU refinery mix, natural bitumen/oil sands have higher greenhouse gas emissions than conventional crudes<sup>35</sup>.

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<sup>31</sup> American Society for Testing and Materials, <http://www.astm.org/index.shtml>

<sup>32</sup> <http://ies.jrc.ec.europa.eu/jec-research-collaboration/activities-jec/jec-well-to-wheels-analyses-wtw.html>

<sup>33</sup> The JEC consortium comprises the JRC, EUCAR and CONCAWE. Thus the Commission, EU automobile industry and oil industry take part in this work.

<sup>34</sup> [http://ec.europa.eu/clima/studies/transport/fuel/index\\_en.htm](http://ec.europa.eu/clima/studies/transport/fuel/index_en.htm)

<sup>35</sup> See table on page 37 of the Brandt study.

#### 4.3. Article 3 and annex II: calculation of greenhouse gas intensity reduction

Article 3 and annex II contain the method for calculating the baseline fossil fuel greenhouse gas intensity to be used as a reference for measuring compliance with the target.

The calculation is based on the average greenhouse gas default values set out in annex I and the volume of fuels consumed. The consumption data for the calculation has been extracted from the Member States' reporting to the UNFCCC in 2007, the latest year for which the information is available.

#### 4.4. Articles 4 and 5 and annexes III and IV: reporting by suppliers and Member States

Pursuant to Directive 98/70/EC suppliers are required to report annually to Member States' designated authorities on the greenhouse gas intensity of fuel and energy supplied, the volume, the origin and the place of purchase of the fuel supplied. Member States are to report fuel quality data to the Commission on an annual basis.

It is important to consider the administrative burden associated with these requirements for imported fossil fuel products. Although it is true that fuel products are fungible (i.e. traded prior and after mixing), the current system of fuel trading includes an established system for data tracking as differentials in product quality and origin affect product price. This system of data transfer should be utilized to also transfer information pertinent to this implementing measure as also employed for biofuels. The question of burden is therefore related not to the burden of establishing and maintaining a similar system but to:

- the level of the burden of verification to be imposed on the competent authorities of the Member States to verify the data and,
- the level of rigor required to assure that the proper level of precision is reflected in the collected data.

Validation of data provided by the suppliers lies with the Member States. In line with the principle of subsidiarity, the Commission does not intend to mandate verification procedures. However, the Commission could issue guidance to assist the Member States in this task if they indicate that such guidance is necessary. In particular, a harmonized certification scheme would not be necessary as self-certification by producers of fuel to report the feedstock source and the country of extraction (i.e. the origin and the place of purchase) could be sufficient, as self-certification by farmers of biofuel feedstocks was deemed to be acceptable in the method established for biofuels in Annex IV to Directive 98/70. It is important to note that U.S. producers already report to their national authorities the API, the country of origin<sup>36</sup>, and feedstock stream (market) name<sup>37</sup>. The Member States could also rely on other relevant published data<sup>38</sup>.

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<sup>36</sup> [ftp://ftp.eia.doe.gov/pub/surveys/petroleum\\_supply/form814.pdf](ftp://ftp.eia.doe.gov/pub/surveys/petroleum_supply/form814.pdf)

<sup>37</sup> [http://www.eia.gov/pub/oil\\_gas/petroleum/survey\\_forms/eia856i.pdf](http://www.eia.gov/pub/oil_gas/petroleum/survey_forms/eia856i.pdf)

<sup>38</sup> Inter alia the publically available list, under California regulations (CARB), of fossil fuel feedstocks (identified by market names) that have not been extracted using thermal or mining techniques (cf.

Given that the collected information is intended for corroborating and periodically updating the greenhouse gas intensity default values, the level of aggregation and averaging of the collected data should be proportionate to the level of aggregation and averaging inherent in the greenhouse gas intensity values. On this basis, it is readily evident that it is not necessary to conduct batch-by-batch reporting. Rather, data averaged annually would yield the appropriate level of precision.

In addition, in order to keep the administrative burden as low as possible the Commission is proposing to make use of existing reporting requirements under customs and duty legislation. Importers will have to make arrangements to obtain the required information from the respective foreign refiners.

As regards electric vehicles, it is proposed in the draft Directive that the measurement and verification of electric energy use will vary between estimated and measured amounts based on the level of electric and plug-in hybrid vehicles registered in each Member State. The greenhouse gas intensity of electricity used will be the Member State average.

In addition to the annual reporting the Commission is requiring twice in the period to 2020 periodic reporting by suppliers and Member States on the origin of the fuel or energy. The purpose of this reporting is to collect information on the feedstock source location and API density for fossil fuel production facilities and on the processing fuels for biofuels.

#### **4.5. Article 6: review**

Any methodology included in this implementing act should be adapted for relevant technical and scientific progress. Article 6 contains a review clause, which foresees that the Commission shall review the current implementing act by no later than 31 December 2015. This review shall be accompanied by an evaluation, impact assessment (that would include a consideration of the level and composition of the administrative burden) and proposals to modify the current implementing act if appropriate. In particular the review shall address:

- the effectiveness of Article 7a of Directive 98/70/EC to incentivise reductions in greenhouse gas intensity and overall greenhouse gas emissions as well as the impacts on the EU refinery sector and supply of fossil fuel feedstocks to the EU;
- the overall greenhouse gas calculation methodology set out in this Directive taking into account the effects and potential of any self-initiated industry or Member State efforts to incentivise reductions in the greenhouse gas intensity of fossil fuels;
- how to address high greenhouse gas intensity sources in the greenhouse gas calculation methodology for fossil fuels and any significant impacts from any potential indirect emissions of fossil fuels;

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<http://www.arb.ca.gov/fuels/lcfs/070111lcfs-rep-adv.pdf> ) or country average crude mix produced in the producing country.

- the accuracy and reliability of the monitoring and reporting of fossil fuel greenhouse gas intensity;
- the appropriateness of introducing elevated default values and/or, actual reporting by operators;
- the potential for extending the possibility for reporting, on the basis of actual values, a greenhouse gas intensity for the upstream part of the fuel or energy lifecycle that is lower than those included in the table of default values in Annex I.

The Commission shall update at periodic intervals the default greenhouse gas intensity values in this Directive in line with the latest technical and scientific information.

Draft

**COMMISSION DIRECTIVE ..../EU**

**of [...]**

**laying down calculation methods and reporting requirements pursuant to Directive 98/70/EC of the European Parliament and of the Council relating to the quality of petrol and diesel fuels**

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels and amending Council Directive 93/12/EEC<sup>39</sup>, and in particular Article 7a(5) thereof,

Whereas:

- (1) Article 7a(2) of Directive 98/70/EC requires suppliers to reduce by 6% by 31 December 2010 the life cycle greenhouse gas emissions per unit of energy ("greenhouse gas intensity") of fuels used in the Union by road vehicles, non-road mobile machinery, agricultural and forestry tractors and recreational craft when not at sea.
- (2) Article 7a(5) of Directive 98/70/EC requires that a method be established for the calculation of life cycle greenhouse gas emissions from fuels other than biofuels, and other relevant energy sources such as electricity. Such a methodology should cover emissions over the whole lifecycle of the production and use of the fuel or energy.
- (3) Such a method should balance the necessary measurement accuracy with the complexity of the associated administrative requirements whilst providing an incentive to suppliers to reduce the greenhouse gas intensity of the fuel they supply. In view of the complexity of the Union refining sector, careful consideration should also be given to the impact on refineries when establishing the methodology.
- (4) The calculation method should be based on average greenhouse gas intensities that represent an industry average value which is typical for a particular fuel source ("average default values"). This has the advantage of imposing a smaller administrative burden on suppliers and Member States.
- (5) The calculation method should distinguish between the different fossil fuel sources ("feedstocks") on the basis of significant differences in their greenhouse gas intensities

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<sup>39</sup> OJ L 350, 28.12.1998, p.58.

which are linked to the physical and chemical properties of the different fossil sources and the processes deployed for their extraction.

- (6) Such a distinction is necessary in order to avoid that part of the reduction in greenhouse gas intensity achieved by fuels included in the baseline will be offset in real terms in case new fuels derived from feedstocks, which are more greenhouse gas intensive than the calculated baseline, enter the Union without having to account for their higher greenhouse gas intensity. Not accounting for the significant differences in the greenhouse gas intensities of unconventional feedstock sources through a transparent framework risks undermining the accuracy and credibility of the 6 % reduction target and of the Union's greenhouse gas reduction goals more generally.
- (7) In order to provide an incentive for greenhouse gas emission reductions from unconventional crude oil feedstocks and, at the same time, to avoid an unequal treatment with a limited volume of conventional crude feedstocks, due to overlaps in the greenhouse gas intensities of the feedstock categories, suppliers should have the opportunity to demonstrate to Member States that the fuel they supply has a lower greenhouse gas intensity than the respective applicable default values set out in Annex I.
- (8) In order to provide incentives for further greenhouse gas emission reductions, savings claimed for upstream emission reductions including from flaring and venting should be included in the calculation of suppliers' life cycle greenhouse gas emissions. Further, in order to facilitate for suppliers when they claim upstream emissions savings, the use of various emission schemes should be allowed for calculating and certifying emission reductions and a supplier should be able to report emissions against a default value. Only upstream reduction projects which start after the date when the particular default value was established should be eligible, as earlier savings would be reflected in the particular default value.
- (9) Greenhouse gas reductions associated with oil and gas upstream emissions should be estimated in accordance with principles and standards identified by the Commission and employed by voluntary schemes to be recognised by the Commission. It should be possible to claim upstream emission reductions only after such approval.
- (10) It is appropriate to consider the methodology further in respect of the use of high greenhouse gas intensity fuels and to update the methodology to take into account fuels derived from other emerging feedstocks. To this end, and if scientifically warranted, the Commission may, subject to impact assessment, introduce a future amendment to this Directive setting out greenhouse gas intensity default values for such feedstocks. The proposed amendment should be based on a review that will focus on the greenhouse gas intensity of such feedstocks as optimized for consumption in the EU.
- (11) Article 7a(5)b of Directive 98/70/EC requires a methodology to be established to determine the aggregate greenhouse gas intensity of fossil fuels used in the Union in 2010 (the "fuel baseline standard"). The fuel baseline standard is not the fossil fuel comparator to be used for calculating greenhouse gas savings from biofuels, which should remain as set out in Annex IV of Directive 98/70/EC.

- (12) Since the composition of the relevant fossil fuel mix changes little from year to year, the aggregate greenhouse gas intensity of the fossil fuels between years will also be small. It is therefore appropriate that the fuel baseline standard is based on the Union average 2007 consumption data as reported by the Member States to the United Nations Framework Convention on the Climate Change.
- (13) The 2010 fuel baseline standard should be calculated using the respective fuel default values and as such it should represent an average upstream greenhouse gas intensity and average complex refinery greenhouse gas intensity for fossil fuels. The fuel baseline standard emission value should remain unchanged for the period up until 2020 except if, pursuant to a review, the method for establishing the default values used to calculate the current baseline standard is changed in which case it may be appropriate to adjust the baseline emission value.
- (14) Directive 98/70/EC also provides for the adoption of a methodology to calculate the contribution of electric road vehicles. That methodology should be compatible with Article 3(4) of Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC<sup>40</sup>. To ensure this compatibility the same adjustment factor should be used for powertrain efficiency.
- (15) Electric energy supplied for use in road transport may be reported by suppliers as part of their annual reports to the Member States. The right to make a claim to the consumption of electricity in a vehicle or a motorcycle for the purpose of Article 7a of Directive 98/70/EC belongs to the first owner of the electric vehicle or a motorcycle upon first registration of the road vehicle or motorcycle in classes M1, M2, N1, N2, and L. The basis on which suppliers could claim that their electricity supply is consumed in that road vehicle or motorcycle is by presenting to the designated Member State authorities a certificate signed by the owner of the vehicle, obtained at its purchase, declaring the transfer of this right to claim the consumption volume from the vehicle owner to the supplier. This right can be transferred to other suppliers.
- (16) In order to limit administrative costs it is appropriate that this Directive establishes a methodology based on an estimate rather than an actual measurement of the consumption of electricity in an electric road vehicle or motorcycle for the purpose of supplier reporting. This methodology permits the calculation of electricity used in road transport based on vehicle consumption specifications pursuant to Regulation (EC) No 385/2009 of 7 May 2009 replacing Annex IX to Directive 2007/46/EC of the European Parliament and of the Council establishing a framework for the approval of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles<sup>41</sup> and is applicable in Member States where the proportion of electric vehicles in classes M1, M2, N1, N2, and L in a Member State does not exceed 2% of the overall fleet of such vehicles in the Member State. Suppliers may also prove that the electricity consumed and the greenhouse gas intensity of that electricity is based on measurements rather than estimates.

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<sup>40</sup> OJ L 140, 5.6.2009, p.16.

<sup>41</sup> OJ L 118, 13.5.2009, p. 13.



- (17) If the share of electric vehicles in classes M1, M2, N1, N2, and L in a Member State's overall fleet of such vehicles exceeds 2%, the contribution should be based on an average number of kilometres driven by a representative sample size of the fleet of electric vehicles. Alternatively, suppliers may choose to report the actual figures of electricity consumption of electric vehicles. The greenhouse gas intensity of electricity used for reporting should be the Member State average.
- (18) Article 7a(1) of Directive 98/70/EC requires suppliers to report annually to the designated authority of the Member State. As a minimum they should submit information about the total volume of each type of fuel or energy supplied, indicating where purchased and its origin and the life cycle greenhouse gas emissions per unit of energy employing a "low-heating value" approach. The reported information should be verified by the Member States. Member States should allow suppliers to report by using data being collected pursuant to other Union or national legislation so as to reduce the administrative burden. Such Union legislation includes Commission Regulation (EC) No 684/2009 of 24 July 2009 implementing Council Directive 2008/118/EC as regards the computerised procedures for the movement of excise goods under suspension of excise duty<sup>42</sup>, Commission Regulation (EEC) No 2454/93 of 2 July 1993 laying down provisions for the implementation of Council Regulation (EEC) No 2913/92 establishing the Community Customs Code<sup>43</sup>, Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC<sup>44</sup> and subsequent implementing acts thereof as well as Commission Decision 2007/589/EC of 18 July 2007 establishing guidelines for the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council<sup>45</sup>.
- (19) To ensure consistency and accuracy, monitoring, reporting and verification of life cycle greenhouse gas emissions per unit of fuel as well as of other data to be reported should be conducted in a stable and harmonized manner. In order to facilitate the tasks for the suppliers and the Member States respectively, the Commission should, where appropriate, establish guidelines for the implementation of these reporting requirements.
- (20) Pursuant to Article 8(3) of Directive 98/70/EC Member States are to submit an annual report of national fuel quality data for the preceding year in accordance with the format established in Commission Decision 2002/159/EC of 18 February 2002 on a common format for the submission of summaries of national fuel quality data<sup>46</sup>. To cover the amendments introduced to Directive 98/70/EC by Directive 2009/30/EC<sup>47</sup> and the subsequent additional reporting requirements on the Member States it is necessary in the interest of effectiveness and harmonization to clarify which information, falling under the reporting obligation on fuel quality data in Article 8 of

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<sup>42</sup> OJ L 197, 29.7.2009, p. 24.

<sup>43</sup> OJ L 253, 11.10.1993, p. 1.

<sup>44</sup> OJ L 140, 5.6.2009, p. 16.

<sup>45</sup> OJ L 229, 31.8.2007, p. 1.

<sup>46</sup> OJ L 53, 23.2.2002, p. 30.

<sup>47</sup> OJ L 140, 5.6.2009, p. 88.

Directive 98/70/EC, should be reported and also adapt the format for the submission of that data.

- (21) This Directive should be reviewed periodically to take account of the latest technical and scientific information and possible changes in the sources of fuels used in the Union. Such reviews require more detailed reporting of relevant information but can be carried out less frequently than the annual reporting foreseen by this Directive. The default greenhouse gas intensity values should be subject to review based upon the latest technical and scientific information and taking into account the life cycle data and quantitative environmental impacts derived in compliance with the International Life Cycle Data System (ILCD) Handbook requirements and the data included in the European Reference Lifecycle Data System (ELCD) database which should be used as the preferred source of information.
- (22) The measures provided for in this Directive are in accordance with the opinion of the Committee on Fuel Quality.

HAS ADOPTED THIS DIRECTIVE:

#### *Article 1*

#### *Definitions*

For the purposes of this Directive, and in addition to the definitions already contained in Directive 98/70/EC, the following definitions shall apply:

- (1) "upstream emissions" means all greenhouse gas emissions occurring prior to transport and delivery of feedstocks to a refinery;
- (2) "natural bitumen feedstock source" means a source of refinery feedstock with the following properties:
  - (a) An American Petroleum Institute Gravity of 10 degrees or less when situated in a reservoir formation at its place of origin and measured at the standard temperature prescribed in testing method American Society for Testing and Materials (ASTM)48 D287;
  - (b) An annual average viscosity at reservoir temperature greater than that calculated by the equation
$$\text{Viscosity (Centipoise)} = 518.98e^{-0.038T};$$
where T is the temperature in Celsius;
  - (c) Falling within the definition for tar sands under combined nomenclature code CN 2714 10 00 as outlined in Council Regulation (EEC) No 2658/8749;

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<sup>48</sup> American Society for Testing and Materials, <http://www.astm.org/index.shtml>

<sup>49</sup> OJ L 287, 31.10.2009, p. 1

- (d) Mobilization of the feedstock source is achieved by mining extraction or thermally enhanced gravity drainage where the thermal energy is mainly derived from sources other than the feedstock source itself;
- (3) "oil shale feedstock source" means any refinery feedstock source as situated in a shale formation containing solid kerogen and falling within the definition for oil shale under CN 2714 10 00 outlined in Regulation (EEC) No 2658/87. Mobilization of the feedstock source is achieved by mining extraction or thermally enhanced gravity drainage.
- (4) "conventional crude feedstock source" means any refinery feedstock source exhibiting an American Petroleum Institute Gravity that is higher than 10 degrees when situated in a reservoir formation at its place of origin as measured per testing method ASTM D287 and not falling within the definition for CN 2714 10 00 as outlined in Regulation (EEC) No 2658/87. If it can be demonstrated that the conventional crude oil was not subjected to thermal or mining processes at the time and project place of extraction from the subsurface, then the CN code identity of the raw material does not have to be verified.

## *Article 2*

### *Methodology for calculating the greenhouse gas intensity of fuels and energy supplied other than biofuels*

1. For the purposes of the second subparagraph of Article 7(a)1 of Directive 98/70/EC Member States shall require suppliers to use the methodology set out in Annex I to this Directive for the calculation of life cycle greenhouse gas emissions from fuels others than biofuels, and from all electric energy.
2. For fuel-feedstock combinations with a greenhouse gas intensity higher than that of conventional crude based fuels, a lower greenhouse gas intensity for the upstream part of the fuel or energy lifecycle value may be used than the default values set out in Annex I if the supplier demonstrates to the Member State that this value is derived using an ISO 14064 compatible methodology.

## *Article 3*

### *Calculation of greenhouse gas intensity reduction*

For the purposes of Article 7(a)2 of Directive 98/70/EC, Member States shall require suppliers to compare their achieved reductions of life cycle greenhouse emissions from fuel and from electric energy to the fuel baseline standard set out in Annex II to this Directive.

## *Article 4*

### *Reporting by suppliers*

Reports by suppliers to the Member States pursuant to Article 7a(1) of Directive 98/70/EC shall be provided in accordance with Annex III to this Directive.

Member States may allow suppliers to refer to data being reported pursuant to other Union legislation or national legislation.

## *Article 5*

### *Reporting by Member States*

When submitting reports to the Commission under Article 8 of Directive 98/70/EC, Member States shall provide the Commission with information relating to compliance with Article 7a of that Directive and Annex IV to this Directive.

Member States may refer to data being reported pursuant to other Union legislation or national legislation

## *Article 6*

### *Review*

1. The Commission shall review this Directive by 31 December 2015 at the latest. This review shall be preceded by an evaluation and an impact assessment that shall include a consideration of the level and composition of the administrative burden and shall be accompanied by proposals to modify this Directive, if appropriate. In particular the review shall address the following:
  - (a) the effectiveness of Article 7a of Directive 98/70/EC to incentivise reductions in the greenhouse gas intensity and the overall greenhouse gas emissions as well as the impacts on the EU refinery sector and supply of petroleum feedstocks to the EU;
  - (b) the overall greenhouse gas calculation methodology set out in this Directive taking into account the effects and potential of any self-initiated industry or Member State efforts to incentivise reductions in the greenhouse gas intensity of fossil fuels;
  - (c) how to address high greenhouse gas intensity sources in the greenhouse gas calculation methodology for fossil fuels and any significant impacts from any potential indirect emissions of fossil fuels;
  - (d) the accuracy and reliability of the monitoring and reporting of fossil fuel greenhouse gas intensity;
  - (e) the appropriateness of introducing elevated default values or, alternatively, actual reporting by operators;
  - (f) the potential for extending the possibility for reporting, on the basis of actual values, a greenhouse gas intensity for the upstream part of the fuel or energy lifecycle that is lower than those included in the table of default values in Annex I.

2. The Commission shall at periodic intervals update the default greenhouse gas intensity values in this Directive to bring them in line with the latest technical and scientific information.

#### *Article 7*

##### *Transposition*

1. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by [twelve months after adoption] at the latest. They shall forthwith communicate to the Commission the text of those provisions.

When Member States adopt those provisions, they shall contain a reference to this Directive or be accompanied by such a reference on the occasion of their official publication. Member States shall determine how such reference is to be made.

2. Member States shall communicate to the Commission the text of the main provisions of national law which they adopt in the field covered by this Directive.

#### *Article 8*

##### *Entry into force*

This Directive shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

#### *Article 9*

This Directive is addressed to the Member States.

Done at Brussels, [...]

*For the Commission*  
*The President*  
[...]

## Annex I

### Rules for suppliers to calculate the greenhouse gas intensity of energy carriers and fuels

- (1) Calculation of a supplier's greenhouse gas intensity
- (a) Greenhouse gas intensity for fuels and energy carriers shall be expressed in terms of grams of carbon dioxide equivalent per Mega Joule of fuel (gCO<sub>2eq</sub>/MJ.)
  - (b) The greenhouse gases taken into account for the purposes of calculating the greenhouse gas intensity of fuel shall be carbon dioxide (CO<sub>2</sub>), nitrous oxide (N<sub>2</sub>O) and methane (CH<sub>4</sub>). For the purpose of calculating CO<sub>2</sub> equivalence, emissions of those gases shall be valued in terms of CO<sub>2</sub> equivalent emissions as follows:

CO<sub>2</sub>: 1

CH<sub>4</sub>: 23

N<sub>2</sub>O: 296

- (c) The intensity of a supplier's greenhouse gas intensity from the lifecycle use of all fuels they supply shall be calculated using the formula below:

$$\text{Greenhouse Gas intensity} = \frac{\sum_x (\text{GHGi}_x \times \text{AF} \times \text{MJ}_x) - \text{UER}}{\sum_x \text{MJ}_x}$$

Where:

x represents the different fuels and energy carriers falling within the scope this Directive

UER is upstream emission reduction in gCO<sub>2eq</sub>

GHGi<sub>x</sub> is the unit greenhouse gas intensity of the annual supply sold on the market of fuel x expressed in gCO<sub>2eq</sub>/MJ. Only values presented or derived in accordance with point (2) shall be used.

MJ<sub>x</sub> is the total energy supplied and converted from reported volumes of fuel x pursuant to points (2) and (3) of Annex III for each fuel and expressed in Mega Joules.

AF are the adjustment factors for powertrain efficiency.

Predominant conversion technology	Efficiency factor
Internal combustion engine	1
Electric powertrain	0.4

AF used shall be that specified for internal combustion engines for all fuel and energy supplied except electricity.

UER is the upstream emission reduction of greenhouse gases claimed. It is measured in gCO<sub>2eq</sub> and shall be quantified in accordance with point (3).

- (d) Emissions from the manufacture of machinery and equipment utilized in extraction, production, refining and consumption of fossil fuels shall not be taken into account.

(2) Average default values for fossil fuels and electric energy established in 2010

Feedstock source and process	Fuel or Energy Placed on the market	Upstream Unit GHG Intensity (gCO <sub>2eq</sub> /MJ)	Lifecycle Unit GHG Intensity (gCO <sub>2eq</sub> /MJ)
Conventional crude	Petrol	5.2	87.5
	Diesel or gasoil	5.3	89.1
Natural bitumen	Petrol	24.7	107
	Diesel or gasoil	24.7	108.5
Oil shale	Petrol	49	131.3
	Diesel or gasoil	49	133.7
Any fossil sources	Liquefied Petroleum Gas	3.5	73.6
Any fossil sources	Liquid or compressed natural gas	3.5	76.7
Coal converted to liquid fuel	CTL petrol, diesel or gasoil	100	172
Coal converted to liquid with Carbon Capture and Storage of process emissions	CTL petrol, diesel or gasoil	100	81
Natural gas	GTL petrol, diesel or	25	97

converted to liquid fuel	gasoil		
Natural gas using steam reforming	Hydrogen	3,5	82
Coal	Hydrogen	100	190
Coal with Carbon Capture and Storage of process emissions	Hydrogen	100	6
Waste plastic	Petrol, diesel or gasoil	0	86
Member State average electricity generation			
Austria			86.1
Belgium			111.7
Bulgaria			251.7
Cyprus			283.1
Czech Republic			222.8
Denmark			211.1
Estonia			442.5
Finland			116.1
France			40.6
Germany			196.1
Greece			324.2
Hungary			188.3
Ireland			241.7
Italy			196.7
Latvia			156.4
Lithuania			48.3
Netherlands			198.9
Poland			329.2



Portugal			208.3
Romania			301.1
Slovakia			98.1
Slovenia			167.2
Spain			177.5
Sweden			21.9
United Kingdom			182.8

For the purpose of reporting by suppliers the above listed numbers for the greenhouse gas intensity of the Member State electricity generation mix shall be used. Alternatively, suppliers may use the most recent statistics as published by Eurostat or the European Environment Agency.

(3) Eligibility of upstream emission reductions at oil and gas extraction and production sites

(a) Greenhouse gas emission reductions at oil production and extraction sites can only be applied to default values derived from solid, gaseous or liquid feedstock sources such as petrol, diesel, CNG and LPG

(c) Upstream greenhouse gas emission reductions originating from any country may be counted as a reduction in greenhouse gas emission against fuels from any feedstock source supplied by any supplier designated as such for the purpose of Article 7a of Directive 98/70/EC.

(d) Only upstream greenhouse gas emission reductions can be counted towards the target that are associated with projects that have started after the date establishing the default values presented set out in point 2.

(e) Greenhouse gas reductions associated with oil and gas upstream emissions shall be estimated in accordance with principles and standards identified by the Commission and employed by voluntary schemes to be approved by the Commission. The schemes will be selected only if the Upstream Emission Reductions (UERs) certified by the schemes are monitored, reported and verified in accordance with Decision 2007/589/EC, if the schemes are accredited in accordance with ISO 14065 and if the certificates can be publicly disclosed and modified by the scheme prior to their issuance to include the information listed in point 8 of Annex III to this Directive.

(f) It is not necessary to prove that upstream emission reductions would not have taken place without the Article 7a reporting requirement.

(g) The Commission will establish guidelines, where appropriate, for verification of reporting from suppliers to the Member States

## Annex II

### Rules for calculating and applying the baseline greenhouse gas intensity of fossil fuels

#### Methodology

The baseline greenhouse gas intensity shall be calculated based on Union average fossil fuel consumption of petrol, diesel, gasoil, LPG and CNG, where:

- (a) Baseline greenhouse gas intensity calculation

$$= \frac{\sum_x (GHGi_x \times AF \times MJ_x) - UER}{\sum_x MJ_x}$$

Where:

x represents the different fuels and energy carriers falling within the scope of the Directive and as defined in the table below

GHGi<sub>x</sub> is the unit greenhouse gas intensity of the annual supply sold on the market of fuel x or energy carrier falling within the scope of this Directive expressed in gCO<sub>2eq</sub>/MJ. The values for fossil fuels presented in Annex I shall be used.

MJ<sub>x</sub> is the total energy supplied and converted from reported volumes of fuel x expressed in Mega Joules.

- (b) Consumption data

The consumption data used for calculation of the value shall be as follows:

Fuel	Consumption (TJ)	Source
Conventional crude derived diesel	7,99589 * 10 <sup>6</sup>	2007 MS reporting to UNFCCC
Conventional crude derived non-road gasoil	0,277890 * 10 <sup>6</sup>	2007 MS reporting to UNFCCC
Conventional crude derived petrol	4,51357 * 10 <sup>6</sup>	2007 MS reporting to UNFCCC
LPG	0,205363 * 10 <sup>6</sup>	2007 MS reporting to UNFCCC
CNG	0,024485 * 10 <sup>6</sup>	2007 MS reporting to UNFCCC

## **Greenhouse gas intensity**

The greenhouse gas intensity for 2010 shall be: 88.3 gCO<sub>2eq</sub>/MJ

## Annex III

### Supplier Reporting

Suppliers shall report annually to the relevant Member State authority in accordance with the following rules:

1. **Supplier identification.** The supplier shall provide information enabling their identification. This shall be as defined in Regulation (EC) No 684/2009 as the Trader Excise Number (SEED registration number or VAT ID number in Table 6(4a) of Annex I to that Regulation for Destination Type codes 1, 2, 3, 4, 5 and 8 identified as the entity liable to pay the excise duty in accordance with Article 8 of Council Directive 2008/118/EC at the time excise duty was released for consumption in accordance with Article 7(2) of Directive 2008/118/EC. If excise duty was not due, the Member State shall collect equivalent data in accordance with a nationally established reporting scheme.
2. **Volume of each fuel supplied distinguished by feedstock.** This shall be derived from data in Table 5 point 10(c), (d), (f), and (o) of Annex I to Regulation (EC) No 684/2009 supplemented with the 10 digit CN code and volume of the mixed in biofuels and converted to energy content pursuant to the energy densities of fuel set out in Annex III to Directive 2009/28/EC. Where multiple biofuels are blended with fossil fuels, the quantity and type of each biofuels shall be reported. Information on the volume of biofuel supplied that does not meet the requirements of Article 7b(1) of Directive 98/70/EC shall be reported separately. E85 petrol-ethanol blend volumes shall be reported as a separate fuel for the purpose of Article 6 of Regulation (EC) No 443/2009 of the European Parliament and of the Council<sup>50</sup>. To fulfil this reporting, Member States may choose to allow suppliers to refer to data being reported pursuant to other Union or national legislation.
3. **Electric energy.** Where a supplier holds proof of claim to the consumption of an amount of electricity consumed in road vehicles or motorcycles, the supplier may report this amount of energy as part of their reporting to the Member State.
  - 3.1. Proof of the claim by a supplier for consumption of their electricity supply in road vehicles or motorcycles shall be provided on a signed statement, delivered at the point of sale, from the first vehicle owner. That statement shall contain at least:
    - (a) the vehicle identification number;
    - (b) the Member State vehicle registration number;
    - (c) a statement agreeing to the transfer of the right to claim the electricity consumption to another party for the lifetime of the vehicle for the purpose of complying with Article 7a of Directive 98/70/EC;
    - (d) a signature of the first owner.

This right to provide such statement shall be transferable to other suppliers.

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<sup>50</sup> OJ L 140, 5.6.2009, p. 1.

- 3.2. For the purpose of reporting to the Member State, the electric energy consumption for battery and plug-in electric motorcycles or vehicles (in classes M1, N1, M2, N2 and L) must be calculated as follows:

**Electric energy consumed = distance travelled (km) x electric energy consumption efficiency (MJ/km)**

In Member States where the total number of battery and plug-in electric motorcycles or vehicles does not exceed 2% of the total fleet of such vehicles at the end of any calendar year, the distance travelled equals the maximum electric range in kilometres on board the motorcycle or vehicle as reported by manufacturers pursuant to Directive 2007/46/EC multiplied by 312, not to exceed 12 000 km per year.

In Member States where the total number of battery and plug-in electric motorcycles or vehicles exceeds 2% of the total fleet of vehicles at the end of any calendar year, the number of kilometres used for the calculation shall be based on an average number of kilometres driven by a representative sample size of the fleet of electric vehicles. A separate number for plug-in hybrids shall be obtained taking account of the number of kilometres driven on electric energy generated by a power source outside the vehicle. Member States may prescribe these numbers for vehicles registered in their territory. If a Member State does not prescribe these numbers, it must verify the data reported by the supplier.

Alternatively, suppliers may report electric energy consumed as measured and stored on-board of the vehicle or as measured and stored at charging facilities for each individual vehicle or motorcycle. Member States shall take measures to ensure that suppliers submit reliable data and make available to the Member State, on request, this data. Member States shall require suppliers to arrange for an adequate standard of independent auditing of the data submitted, and to provide evidence that this has been done. The auditing shall verify that the systems used by suppliers are accurate, reliable and protected against fraud. It shall evaluate the frequency and methodology of sampling and the robustness of the data.

Electric energy consumption efficiency equals the value pursuant to Regulation (EC) No 385/2009.

4. **Fuel or electric energy type.** This shall be reported on the basis of definitions contained in Table 5 point 10(c) of Annex I to Regulation (EC) No 684/2009 or if not available, as defined by the relevant CEN standard.
5. **Greenhouse gas intensity for energy other than biofuels.** For fossil fuels and electric energy the greenhouse gas intensity shall be calculated in accordance with the rules set out in Annex I to this Directive.
6. **Greenhouse gas intensity of biofuels.** Biofuels meeting the requirements of Article 7b(1) of Directive 98/70/EC shall be included in the calculation of greenhouse gas intensity. Their greenhouse gas intensity shall be calculated in accordance with Article 7d of that Directive. The greenhouse gas intensity for biofuels not meeting the requirements of Article 7b(1) of Directive 98/70/EC shall be reported separately.
7. **Simultaneous co-processing of fossil fuels and biofuels.** The following approach shall be followed for estimating the greenhouse gas intensity of biofuels in cases

where processing of a biofuel and of a fossil fuel occurs simultaneously during the same process and where the resulting volume of the biofuel is not measurable such as during co-hydrotreatment of vegetable oils. The volume and the greenhouse gas intensity of biofuels shall reflect the post-processing state of the fuels. The energy quantity of the co-processed biofuel shall be determined according to the energy content and the efficiency of the co-processing process as set out in Annex IV(17) of Directive 98/70/EC. The post-processing greenhouse gas intensity may be aggregated for all blending components for a given fuel. Processing is defined as any modification along the life cycle of a fuel or energy supplied causing a change to the molecular structure of the product. Addition of denaturant shall fall under the process of blending.

8. **Upstream emission reductions.** Reporting of upstream emission reductions shall be supported with the following information:
- (a) Starting date of the project, DD.MM.YYYY. This must be after the date used to establish the default values presented in Annex I;
  - (b) Annual emission reductions, gCO<sub>2eq</sub>;
  - (c) Duration of time during which the claimed reductions occurred from DD.MM.YYYY to DD.MM.YYYY;
  - (d) Project location closest to the source of the emissions in latitude and longitude coordinates in degrees to the fourth decimal place;
  - (e) Baseline annual emissions prior to installation of reduction measures and annual emissions after the reduction measures have been implemented in gCO<sub>2eq</sub>/MJ of feedstock produced. Method for estimating BAU emissions remains to be determined by the Commission;
  - (f) Non-reusable certificate number uniquely identifying the scheme and the claimed greenhouse gas reductions;
  - (g) Non-reusable number uniquely identifying the calculation method and the associated scheme;
  - (h) Certification that the claimed reduction certificates are not certified emission reductions (CERs) pursuant to the CDM method;
  - (i) Where the project relates to oil extraction, the average annual historical and reporting year gas-to-oil ratio (GOR) in solution, reservoir pressure, depth and well production rate of the crude oil.
9. **Place of purchase for fossil and bio fuels.** Point (a) of the second subparagraph of Article 7a(1) of Directive 98/70/EC requires the reporting of where supplied fuel is purchased. This "place of purchase" shall mean the country where the feedstock was cultivated or where the raw material for the feedstock was extracted. To fulfil this reporting, Member States may choose to allow suppliers to refer to data being reported pursuant to other Union or national legislation.

10. **Origin of fuel or energy (annual reporting).** Point (a) of the second subparagraph of Article 7a(1) of Directive 98/70/EC requires the reporting of the origin of fuel supplied. This "origin" shall mean type of feedstock as cultivated or as defined by the raw material extracted from the subsurface for the purpose of producing the fuel or energy, as identified with a 10-digit CN code and the corresponding API density if appropriate or the categories of biofuels as defined in Annex IV of Directive 98/70/EC. Where multiple feedstocks are used, the quantity and type of each feedstock shall be provided. To fulfil this reporting, Member States may choose to allow suppliers to refer to data being reported pursuant to other Union or national legislation. The data may be aggregated on annual basis.

11. **Origin of fuel or energy (periodic reporting)**

11.1. For specified years in the compliance period (2011 – 2020), suppliers shall provide more detailed reports of the origin of feedstock or processing fuel used providing information on the sources supplying the feedstock as well as the processing that it undergoes. This more complete data shall be reported twice during the compliance period. The first submission must be completed by 1 June 201[X] representing the 201[X] reporting period and the second by 1 June 201[X] representing the 201[X] reporting period.

11.2. For biofuel production facilities, for each installation that provides fuel to the supplier during that year, the processing fuel and the corresponding feedstock used to produce the fuel shall be reported. Processing fuel shall be any substance used to fuel a physical, chemical or biological process on an intermediary product resulting in creation of a fuel or energy placed on the market. Where multiple processing fuels are used, the data shall provide the quantity and type of each fuel. This reporting requirement shall be met only if such data is voluntarily provided or is already reported pursuant to other Union or national legislation.

11.3. For fossil fuels production facilities, for each installation that provides fuel to the supplier during that year, the feedstock source and the feedstock used to produce the fuel as defined in point 10 shall be reported. For oil or gas the source shall mean oil/gas field or oil/gas field group and the corresponding API density if appropriate. Oil field or oil field group shall mean all fields fed into a spur of a pipeline closest to the source or as defined pursuant to other Union or national legislation. For other feedstock sources including those extracted using induced gravity drainage or mining, or processed with coal-to-liquid conversion, gas-to-liquid conversion, or electricity generation, installations shall report the project name and location as the feedstock source. To satisfy this reporting, Member States may choose to supplement it with data being reported pursuant to other Union or national legislation.

## Annex IV

### Member State Reporting to the Commission

1. The reporting data together with the full set of data shall be transmitted by the Member States via electronic data transfer to the Central Data Repository managed by the European Environmental Agency. Member States shall notify the Commission when the data is transmitted.
2. Member States shall report the following data listed in point 4 annually to the Commission. Data shall be reported for all fuel and energy consumption within the scope of Directive 98/70/EC (by 10-digit CN code of fuel or energy) placed on the market in the Member State. Where multiple biofuels are blended with fossil fuels, the quantity and type of each biofuel shall be provided.
3. The following data listed in point 4 shall be reported separately for fuel or energy placed on the market by suppliers within the Member State (including joint suppliers operating in a single Member State) and supply placed on the markets of two or multiple Member States by joint suppliers (inter-Member State joint suppliers). Inter-Member State joint supplier data shall be further disaggregated by the Member State of the joining supplier.
4. For each feedstock-fuel combination, Member States shall report the following data to the Commission:
  - (a) Fuel or electric energy type as defined in point 4 of Annex III;
  - (b) Volume as defined in point 2 of Annex III;
  - (c) Electric energy as defined in point 3 of Annex III;
  - (d) Greenhouse gas intensity defined in point 6 of Annex III for biofuels and in point 5 of Annex III for other fuel and energy;
  - (e) Upstream emission reductions as defined in point 8 of Annex III;
  - (f) Place of purchase, as defined in point 9 of Annex III;
  - (g) Origin as defined in points 10 and 11 of Annex III;
  - (h) Any methodology submitted for using lower default values as set out in Annex I.

To satisfy this reporting, Member States may choose to refer to data being reported pursuant to other Union or national legislation.

For periodic reporting, Member States shall aggregate information submitted by feedstock, source and process fuel where appropriate for submission to the Commission.



