

Title: Amendments to the Renewable Transport Fuel Obligation for compliance with the Fuel Quality Directive - Non-Road Mobile Machinery (NRMM) IA No: DFT00051 Lead department or agency: Department for Transport (DfT) Other departments or agencies:	Impact Assessment (IA)		
	Date: 16/02/2012		
	Stage: Final		
	Source of intervention: EU		
	Type of measure: Secondary legislation		
Contact for enquiries: Craig Mills - 020 7944 4895 (craig.mills@dft.gsi.gov.uk)			
Summary: Intervention and Options		RPC: Not required	

Cost of Preferred (or more likely) Option

Total Net Present Value	Business Net Present Value	Net cost to business per year (EANCb on 2009 prices)	In scope of One-In, One-Out?	Measure qualifies as
£0.1m	-£0.1m	£0.01m	No	NA

What is the problem under consideration? Why is government intervention necessary?
 Transport greenhouse gas (GHG) emissions impose a significant external cost that is not reflected in the market price of transport fuel. The EU Fuel Quality Directive (FQD) requires fuel and energy suppliers to reduce the lifecycle GHG emissions per unit of energy of the fuel/energy that they supply. The UK's Renewable Transport Fuel Obligation (RTFO) requires road transport fuel suppliers to ensure that a certain proportion of the fuel they supply is sourced from renewable sources that deliver certain minimum GHG emission savings compared to the fossil fuels they replace. Government intends to extend the RTFO to include fuels used in non-road mobile machinery to implement, in part, the FQD.

What are the policy objectives and the intended effects?
 This impact assessment looks at options for including non-road mobile machinery (NRMM) fuel within the range of fuels obligated under the RTFO in order to implement, in part, the FQD. The objective is to ensure that the FQD requirement for fuel suppliers to reduce the aggregate GHG intensity of the fuels/energy they supply is delivered through an expanded RTFO (which would include fuels used in NRMM) to supply renewable fuel that delivers certain minimum GHG savings. We wish to achieve this outcome in a cost effective manner that takes into account (i) the concerns raised by NRMM users over the engine and storage incompatibility of biofuel with NRMM equipment; and (ii) issues related to the long-term sustainability of biofuels.

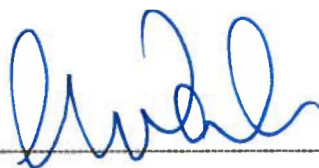
What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)
 This impact assessment considers the following options for including NRMM fuel in the RTFO:
 1) Same 2014 RTFO target of 5% biofuel (by volume) in fuel supplied; obligation and certification applied to both road and NRMM fuels.
 2) NRMM-adjusted 2014 RTFO target of ~4.7% biofuel (by volume) in fuel supplied; obligation and certification applied to both road and NRMM fuels.
 3) Same 2014 RTFO target of 5% biofuel (by volume) in fuel supplied; obligation stays on road fuel only and certification applied to both road and NRMM fuels.
 Option 2 is preferred as it delivers the requirement of the FQD that fuel suppliers reduce the aggregate GHG intensity of the fuels/energy they supply, addresses concerns of NRMM users and does not result in an increase to the overall amount of biofuel supplied thus addressing concerns regarding biofuel sustainability.

Will the policy be reviewed? It will be reviewed. If applicable, set review date: 04/2014

Does implementation go beyond minimum EU requirements?			No		
Are any of these organisations in scope? If Micros not exempted set out reason in Evidence Base.	Micro No	< 20 Yes	Small Yes	Medium Yes	Large Yes
What is the CO ₂ equivalent change in greenhouse gas emissions? (Million tonnes CO ₂ equivalent)			Traded: 0	Non-traded: 0	

I have read the Impact Assessment and I am satisfied that (a) it represents a fair and reasonable view of the expected costs, benefits and impact of the policy, and (b) that the benefits justify the costs.

Signed by the responsible Minister:



Date: 8 Mar 2012

Summary: Analysis & Evidence

Policy Option 1

Description: Retain 2014 RTFO target of 5% biofuel (by volume); obligation and certification applied to both road and NRMM fuels.

FULL ECONOMIC ASSESSMENT

Price Base Year 2010	PV Base Year 2011	Time Period Years 18	Net Benefit (Present Value (PV)) (£m)		
			Low: -214	High: -956	Best Estimate: -190

COSTS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	0	-18	-214
High	13	75	1032
Best Estimate	0	24	342

Description and scale of key monetised costs by 'main affected groups'

£342m of additional costs due to increased biofuel supply and £90,000 of admin costs (due to an increase in the number of obligated suppliers) have been estimated. The additional cost of supplying biofuel and admin costs will be borne by fuel suppliers and are assumed to be passed through 100% to final fuel consumers. In the high scenario £13m of transition costs have also been included. Transition costs are assumed to be borne by both NRMM fuel consumers and fuel suppliers.

Other key non-monetised costs by 'main affected groups'

BENEFITS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	0	6	76
High	0	17	226
Best Estimate	0	12	151

Description and scale of key monetised benefits by 'main affected groups'

£151m monetised GHG savings due to increased biofuel deployment.

Other key non-monetised benefits by 'main affected groups'

Key assumptions/sensitivities/risks

Discount rate (%)

3.5

The main assumptions are transition costs, carbon prices and biodiesel resource costs — these are subject to sensitivity analysis. Other assumptions include oil prices, fuel demand, rate of cost pass through, and marginal GHG savings per litre of biodiesel. GHG savings calculations do not include potential emissions from indirect land use change. This is thought to be of particular significance for biodiesel (which would be used in NRMM) feedstocks. This option therefore presents sustainability risks related to indirect land use change as there is an increase in the volume of biofuel. This option mitigates infringement risks as NRMM fuel would become obligated under the RTFO.

BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) £m:			In scope of OIOO?	Measure qualifies as
Costs: 24	Benefits: 0	Net: -24	No	NA

Summary: Analysis & Evidence

Policy Option 2

Description: Adjust 2014 RTFO target to 4.7%; obligation and certification applied to both road and NRMM fuels.

FULL ECONOMIC ASSESSMENT

Price Base Year	PV Base Year	Time Period	Net Benefit (Present Value (PV)) (£m)																				
			Low: 0	High: -13	Best Estimate: -0.1																		
<table border="1"> <thead> <tr> <th>COSTS (£m)</th> <th>Total Transition (Constant Price)</th> <th>Years</th> <th>Average Annual (excl. Transition) (Constant Price)</th> <th>Total Cost (Present Value)</th> </tr> </thead> <tbody> <tr> <td>Low</td> <td>0</td> <td rowspan="3">1</td> <td>0.003</td> <td>0.04</td> </tr> <tr> <td>High</td> <td>13</td> <td>0.014</td> <td>0.18</td> </tr> <tr> <td>Best Estimate</td> <td>0</td> <td>0.007</td> <td>0.09</td> </tr> </tbody> </table>						COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)	Low	0	1	0.003	0.04	High	13	0.014	0.18	Best Estimate	0	0.007	0.09
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BUSINESS ASSESSMENT (Option 2)

<p>Direct impact on business (Equivalent Annual) £m:</p> <p>Costs: 0.1 Benefits: 0 Net: -0.1</p>			<p>In scope of OIOO?</p> <p>No</p>	<p>Measure qualifies as</p> <p>NA</p>
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Summary: Analysis & Evidence

Policy Option 3

Description: Retain RTFO target of 5% biofuel (from 2014 onwards); obligation stays on road fuel only and certification applied to both road and NRMM fuels.

FULL ECONOMIC ASSESSMENT

Price Base Year	PV Base Year	Time Period	Net Benefit (Present Value (PV)) (£m)		
			Low: 0	High: -13	Best Estimate: 0
2010	2011	Years 18			

COSTS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low	0	1	0	0
High	13		0	13
Best Estimate	0		0	0

Description and scale of key monetised costs by 'main affected groups'

In the high scenario £13m of transition costs have been estimated. Transition costs are assumed to be borne by both NRMM fuel consumers and fuel suppliers.

Other key non-monetised costs by 'main affected groups'

BENEFITS (£m)	Total Transition (Constant Price)	Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	0		0	0
High	0		0	0
Best Estimate	0		0	0

Description and scale of key monetised benefits by 'main affected groups'

The overall supply of biofuel is not expected to change under this option, therefore there is no change to estimated GHG savings benefits.

Other key non-monetised benefits by 'main affected groups'

Key assumptions/sensitivities/risks

Discount rate (%) 3.5

The extent to which transition costs are incurred depends upon the extent to which biofuel is blended into NRMM fuel. Due to the expectation that NRMM users will demand fuel which has not biofuel blended into it (due to compatibility issues), it is assumed that no biofuel will be blended into NRMM fuel in the central scenario (i.e. no transition costs). A high (25%) sensitivity has been taken to reflect the full range of potential outcomes. This option would not be expected significantly to reduce the risk of infringement for failure to transpose the FQD as NRMM fuel would not become obligated under the RTFO (and thus be required to deliver GHG savings).

BUSINESS ASSESSMENT (Option 3)

Direct impact on business (Equivalent Annual) £m:			In scope of OIOO?	Measure qualifies as
Costs: 0	Benefits: 0	Net: 0	No	NA

Evidence Base (for summary sheets)

Introduction

1. This Impact Assessment (IA) focuses on the possible expansion in scope of the current Renewable Transport Fuel Obligation (RTFO) (which currently only obligates fuels used for road transport purposes) to include fuel supplied for the non-road uses as required by the Fuel Quality Directive (FQD).
2. Three options are examined, against a 'do nothing' baseline, for expanding the scope of the RTFO to cover fuel used in non-road mobile machinery (including rail and inland waterway vessels when not at sea), agricultural and forestry tractors, and recreational craft when not at sea. Throughout this document, all of these end uses are collectively referred to as NRMM for simplicity.
3. The structure of this IA is as follows: it will set out the problem under consideration and the rationale for government intervention, before then explicitly stating the policy objectives of this intervention. The three policy options for expanding the scope of the RTFO are described and the methodology for analysing the costs and benefits of each policy option is explained, including the key assumptions and areas of uncertainty. Wider impacts and relevant specific impact tests are described in the annex. The impact assessment concludes by describing the preferred option.
4. There are significant uncertainties in the analysis presented, not only because of the long timeframe considered (to 2030) but also in terms of the underlying costs, benefits, fuel prices etc. The analysis is presented to 2030 to capture the potential long-run effects of the policy options. Sensitivities around key uncertainties have been modelled in the following cost-benefit analysis.

Consultation

5. This final stage impact assessment follows a public consultation exercise carried out by the Department for Transport. Interested parties were invited to comment on the policy options and underlying analysis either at public meetings (2 of which were held) or through written responses.
6. Several stakeholders expressed concerns that the size of the NRMM market in the UK had been overestimated in the analysis. However, no additional evidence was presented which could be used to improve the consultation stage impact assessment methodology which remains unchanged.
7. Discussions with stakeholders also indicated that baseline assumptions (i.e. what would happen if the policy changes outlined in this impact assessment were not implemented and the RTFO remained unchanged) around the supply of biofuel to NRMM were inaccurate. In the consultation stage impact assessment, it was assumed that 25% of fuel supplied to NRMM would contain biofuel due to the impact of desulphurisation regulations (introduced in January 2011) on refinery flexibility. However, during meetings with NRMM fuel suppliers,

suppliers indicated that virtually no biofuel (or negligible amounts) is currently being supplied to the NRMM market. Therefore, the analysis in this impact assessment makes the central assumption that no biofuel will be supplied to NRMM in the baseline.

Problem under consideration

8. In 2008, transport accounted for around a quarter of UK greenhouse gas (GHG) emissions (132 MtCO₂e) and the majority (around 90%) of those emissions come from road transport (Committee on Climate Change, 2010). The UK has legally binding climate change targets both for the long term to reduce emissions by at least 80% below 1990 levels by 2050; and, in the short term to reduce emissions by 34% below 1990 levels by 2020 (Climate Change Act, 2008). We also have a renewable energy target which is for 15% of UK energy to be supplied from renewable sources by 2020, with a transport-specific target of 10% (Directive 2009/28/EC). The Fuel Quality Directive requires fuel and energy suppliers to reduce the lifecycle greenhouse gas emissions per unit energy, (the "GHG intensity") of the fuel/energy that they supply by 6% in 2020.
9. Biofuels are currently the only significant option for increasing renewable energy usage in transport, particularly in the period up to 2020 when other options are limited due to the lead in times for technological developments. However, concerns remain around the long-term sustainability of biofuels and these need to be taken into account when setting targets for use of renewable fuels.

Rationale for intervention

10. The costs of climate change are not directly reflected in transport fuel production costs and suppliers therefore lack the incentive to reflect these costs in their consumption decisions. In the absence of intervention, the transport fuel market is unlikely to decarbonise in line with targets set in the Fuel Quality Directive due to the additional costs required to make GHG savings.
11. The UK currently incentivises the supply of renewable energy through the Renewable Transport Fuel Obligation (RTFO). The RTFO sets targets for increasing the amount of renewable fuels used in road transport with the aim of reducing GHG emissions from this sector. Suppliers of road transport fuels are required to demonstrate that a certain proportion of the total volume of fuel they supply is sourced from renewable sources (biofuels). Owners of biofuel at the duty point are awarded one Renewable Transport Fuel Certificate (RTFC) per litre of liquid renewable transport fuel (or kilogram of gaseous renewable transport fuel) supplied. RTFCs may be traded between participants in the scheme. At the end of the obligation period, suppliers of road transport fuel demonstrate compliance with their obligation by redeeming the appropriate number of RTFCs to demonstrate that the required volume of biofuel was supplied. Alternatively, obligated suppliers can pay a buy-out price per litre of obligation. The supplied biofuels must meet certain sustainability criteria, including minimum GHG savings (compared to the fossil fuel the biofuels are replacing).

12. The RTFO currently places an obligation on suppliers of petrol and diesel used for road transport purposes to supply a certain proportion of the total volume of fuel they supply as biofuel. As suppliers have flexibility in meeting their obligation (a certificate trading mechanism), it is assumed that the RTFO enables suppliers to minimise the cost of meeting this obligation.
13. Article 7a of the FQD requires fuel suppliers to reduce the total aggregate GHG intensity (the GHG emissions per unit of energy) from the fuels/energy they supply for use in road vehicles, non-road mobile machinery (including inland waterway vessels when not at sea), agricultural and forestry tractors, and recreational craft when not at sea (note that for simplicity we refer to all of these end uses as “NRMM”).
14. Government wishes to implement the FQD, in part, through amendment of the RTFO. The RTFO already requires road transport uses to supply biofuel meeting minimum GHG savings. Expanding the scope of the RTFO to include fuels used in NRMM will give effect to the FQD requirement that suppliers reduce the aggregate GHG intensity of the fuels they supply for use in road vehicles and NRMM.
15. Therefore, this impact assessment considers options for expanding the scope of the RTFO so that suppliers of petrol, diesel and low sulphur gas oil¹ for use in road vehicles and NRMM are required to ensure that a certain proportion of the total volume of fuel they supply is renewable transport fuel (biofuel). Expanding the scope of the RTFO in this manner will, in effect, require that suppliers of petrol, diesel and low sulphur gas oil for use in road vehicles and NRMM reduce the aggregate GHG emissions associated with the supply of those fuels, thus delivering the GHG intensity reduction requirement of the FQD.

Policy objective

16. The objectives of the policy options considered in this impact assessment are to ensure that the FQD is implemented, in part, through the RTFO by expanding the scope of the RTFO so that it aligns with the requirements of the FQD. We wish to achieve this outcome in a cost-effective manner that takes into account (i) the concerns raised by NRMM users over the engine and storage incompatibility of biofuel with NRMM equipment and (ii) issues related to the long-term sustainability of biofuels.

Description of options considered (including do nothing)

17. Given that the RTFO is already in place, there are several options for making amendments to ensure that the requirements of the FQD on the NRMM fuels sector are implemented. Each option has its own costs, benefits and impacts on the market which will be explored in this section.

¹ Low sulphur gas oil is the technical term for fuel used in NRMM.

18. All options considered in this impact assessment are assessed against a 'do nothing' baseline:

Baseline

19. The baseline describes what would happen in the absence of any policy change relating to the inclusion of NRMM fuel in the RTFO. In the baseline, fuel suppliers will only be required to supply biofuel relative to the proportion of fuel that they supply for road transport applications. It is assumed that fuel supplied for NRMM applications does not contain biofuel.

Policy Options

20. A number of options have been considered around how to account for fossil fuel and biofuel supplied to NRMM under the RTFO. The options for consideration are as follows:
- 1) Expand certification and obligation to cover fuel supplied for NRMM. Hold supply targets at the same (percentage) level.**

This would count biofuel being supplied in NRMM fuel towards an unchanged percentage target of a larger obligated fuel supply (now including fuel supplied to NRMM). Under this option the absolute volume of biofuel required by the RTFO would increase. **This option is expected to reduce the risk of infraction penalties for non-compliance with the FQD, compared to the baseline.**
 - 2) Expand certification and obligation to cover fuel supplied for NRMM. Adjust supply targets to ensure the same volume of biofuel is supplied.**

This would count biofuel being supplied in NRMM fuel towards an adjusted percentage target of a larger obligated fuel supply (now including NRMM). Annual obligation percentage targets would be adjusted downwards so that the total volume of biofuel supplied is the same as that which would have been supplied had the obligation not been expanded to include NRMM. Under this option the absolute volume of biofuel required by the RTFO would remain constant. **This option is expected to reduce the risk of infraction penalties for non-compliance with the FQD, compared to the baseline.**
 - 3) Expand only certification to cover NRMM fuel. Keep obligation on road fuel only, not NRMM.**

Under this option suppliers would be able to use biofuel supplied to NRMM to demonstrate compliance with the RTFO. However, the obligation to supply biofuel would continue to be determined by the level of fossil fuel supplied to the road transport sector and would not be extended to cover fuel supplied to NRMM (i.e. NRMM-only fuel suppliers would not be required to supply any biofuel). Under this option the absolute volume of biofuel required by the RTFO would remain constant. **This option carries a higher risk of infraction penalties for non-compliance with the FQD compared to options 1 and 2.**

Market impact of including NRMM in the RTFO

21. At present, the RTFO only covers road transport fuel. This means that fuel suppliers who supply fuel to NRMM consumers are not required to supply biofuel under the RTFO. In addition, any biofuel which is supplied to NRMM cannot be used to demonstrate compliance with the RTFO (i.e. RTFCs are not issued for biofuel supplied to NRMM). As supplying fuel to NRMM will not result in the obligation to supply biofuel it is assumed that no biofuel related costs are currently passed through to NRMM fuel consumers.
22. Obligating NRMM in the RTFO (options 1 and 2) means that fuel suppliers will be legally required to supply an amount of biofuel (determined by the RTFO target level) for each litre of fossil fuel supplied to NRMM (the obligation would be expanded such that the amount of renewable transport fuel that is required to be supplied would be calculated as a percentage of the total volume of fuel supplied, which would now include NRMM fuel). Fuel suppliers would be free to supply biofuel to either road transport, NRMM or purchase RTFCs (from other suppliers) to demonstrate compliance with the obligation (the RTFO is designed to provide suppliers with the flexibility to determine their own blending strategies, i.e., suppliers may choose to only blend biofuel into road diesel and could still demonstrate compliance with the RTFO).
23. Following discussions with stakeholders, it is apparent that NRMM fuel consumers strongly prefer to purchase biofuel free NRMM fuel due to fuel storage and engine compatibility issues (see annex 2 for more detail). For this reason it is assumed that suppliers (due to a lack of demand) will not supply NRMM fuel blended with biodiesel and will instead choose to supply biofuel to road transport fuel streams instead. Fuel suppliers who supply exclusively to NRMM customers are assumed to purchase RTFCs on the market from other suppliers to meet their obligation rather than supply biofuel to NRMM (purchasing RTFCs does not involve additional costs as the RTFC price is set by the biodiesel price). Under options 1 and 2 the cost of supplying biofuel which results from NRMM fuel being obligated in the RTFO is assumed to be passed through 100% to NRMM fuel consumers.
24. Extending certification to allow biofuel supplied to NRMM to be counted towards the RTFO (option 3) whilst not actually obligating NRMM fuel will give fuel suppliers increased flexibility to meet their obligation. As with options 1 and 2, it is assumed that no biofuel is supplied to NRMM under option 3 due to a lack of demand. As supplying NRMM fuel will not result in the obligation to supply biofuel it is assumed that no biofuel related costs are passed through to NRMM fuel consumers under option 3.

Costs and benefits of each option

25. The following cost benefit analysis quantifies the following impacts for each policy option:
 - the volume of biofuel supplied;
 - the cost of biofuel supplied;
 - lifecycle GHG savings;
 - monetised GHG savings;

- NRMM pump price;
- transition costs of introducing biofuel into NRMM fuel;
- admin costs.

26. Estimated changes in these variables are presented relative to the baseline scenario outlined in paragraph 17. Quantified costs and benefits are presented in 2010 prices and future costs and benefits have been discounted into 2011 terms at the standard 3.5% government discount rate.

Results and sensitivities

Biofuel Supply/Transition Costs

27. For each option the additional cost of supplying biofuel (fuel costs – see figure 7) and transition costs resulting from biofuel being blended into NRMM fuel (i.e. filter replacement and tank cleaning costs – see annex 2) have been estimated.

Admin Costs

28. Inclusion of NRMM fuel in the RTFO is expected to result in 7 additional fuel suppliers² becoming obligated. Being obligated under the RTFO imposes administrative burden as obligated suppliers are required to register with, and report to, the RTFO administrator. Ongoing admin costs are estimated to be around £923 per annum for a small supplier (with a high estimate of £1,846 and a low estimate of £464). One-off RTFO registration costs are estimated to be £149 (with a high estimate of £298 and a low estimate of £75).

Benefits

29. The primary benefit of the options considered is GHG savings. Where more biofuel is supplied, increased GHG savings create a monetised benefit (calculated using Department of Energy and Climate Change (DECC) carbon prices). This estimate only takes into account 'direct' GHG emissions (in line with Renewable Energy Directive methodology) and does not take into account the potential higher emissions due to indirect land usage change (ILUC).

30. For each option the net change in lifecycle GHG emissions is presented along with the aggregated monetised value of estimated changes within the traded and non-traded sectors.

Sensitivities

31. For each option central, high and low overall cost (to society) scenarios have been presented capturing oil price and carbon price sensitivities (i.e. the high overall cost

² Based on analysis using HMRC and RTFO data.

scenario is based on a low oil price and high food prices, meaning that biofuels are relatively more expensive).

Option 1

Costs

32. Under option 1, NRMM fuel would become obligated under the RTFO (in addition to road transport fuel which is obligated in the baseline). RTFCs would be issued for biofuel supplied for NRMM use. The annual RTFO percentage biofuel blending targets would remain as currently legislated but the overall volume of biofuel supplied (across all sectors) would increase as the volume of fossil fuel obligated would increase (as the obligation will expand to cover fuel supplied for NRMM uses). Over the period 2012 to 2030 this leads to an estimated 2.9 billion litres of biodiesel being supplied (under central assumptions it is assumed that this fuel is supplied to the road transport fuel streams rather than NRMM - see paragraph 20) as a result of NRMM becoming obligated under the RTFO. As biodiesel costs more than the fossil fuel which would be displaced (see figure 7), this is estimated to cost around £342m over this period (in net present value terms discounted to 2010). High (low oil, high crop prices) and low (high oil, low crop prices) biofuel cost sensitivities have also been estimated.
33. Under this option all the additional biofuel that would need to be supplied because of extending the obligation to NRMM is assumed to be blended into the road diesel fuel stream (rather than the NRMM fuel stream). This is because there is assumed to be strong demand for NRMM fuel which has not been blended with biofuel (due to concerns around engine compatibility and storage). This assumption is based upon discussions with stakeholders. Reflecting this assumption, none of the potential transition costs have been attributed to this option. However, it is possible that some oil suppliers may choose to supply NRMM fuel blended with biodiesel. In order to take account of this possibility a high scenario has been estimated (25% additional potential transition costs).
34. As (under this option) NRMM fuel is explicitly obligated under the RTFO it is assumed that the additional cost of supplying the biofuel required by the RTFO is passed through 100% to consumers of NRMM fuel (this is the case even if the biofuel required as a result of NRMM fuel becoming obligated is blended into road transport fuel streams – see para 22 for more detail). This additional cost (of supplying the biofuel required by the RTFO) is therefore assumed to be reflected in higher pump prices. The additional pump price impact for NRMM fuel is estimated to be around 1.1ppl (including VAT) in 2013/14 when the obligation peaks (central estimate).
35. Including NRMM in the RTFO is expected to lead to 7 additional suppliers becoming obligated who would incur additional costs estimated to be £90,000 over the period to 2030. Low and high admin cost sensitivities have also been estimated.

36. Option 1, being the only option that implies an increase in the total volume of biofuel supplied, presents higher sustainability risks related to indirect land use change (see paragraphs 54-57).

Benefits

37. The increase in the supply of biodiesel is estimated to generate a rise in GHG savings³ relative to the baseline. Over the period 2012 to 2030, an estimated 3.7 MTCO₂e of additional GHG savings are estimated to be delivered. These are valued at a net present value of around £151m using central DECC carbon price values. Sensitivities have been estimated using the low and high DECC carbon price series.
38. The net benefit (i.e. the benefit to society net of costs) of this option is estimated to be -£190m (i.e. a net cost to society) over the period 2012 to 2030.

Cost Benefit Summary

Figure 1: Option 1 – Low, Central and High cost scenarios

		Low	Central	High
Costs				
biofuel costs	£m	-214	342	1018
transition costs	£m	0	0.0	13
admin costs	£m	0.04	0.09	0.18
Benefits				
lifecycle GHG savings	MTCO ₂ e	3.7	3.7	3.7
GHG savings	£m	226	151	76
Net Benefit				
net benefit	£m	440	-190	-956
Pump Price Impacts				
road diesel (2013)	ppl	0	0	0
NRMM (2013)	ppl	-0.3	1.1	2.8

Option 2

Costs

39. Under option 2, NRMM fuel (including rail) would be brought into the RTFO (in addition to road transport fuel), increasing the overall volume of obligated fossil fuel. RTFCs would be issued for biofuel supplied for NRMM use (in addition to road transport fuel). The annual RTFO percentage biofuel blending targets would be adjusted downwards (to roughly 4.7%) so that the overall volume of biofuel required by the RTFO (across all sectors) would remain constant (relative to the baseline). Therefore there are estimated to be no additional fuel supply costs associated with this option.

³ GHG savings are assumed to be the minimum permissible under the RED sustainability criteria (see the accompanying sustainability criteria impact assessment for more detail <http://assets.dft.gov.uk/consultations/dft-2011-05/minimumsustainabilitycriteria.doc>),

40. Explicitly obligating NRMM fuel would impose additional costs on suppliers of NRMM fuel (which would be offset by a reduction of biofuel related costs borne by road fuel suppliers) as they would now be required to supply biofuel under the RTFO. The cost of supplying additional biofuel required by the RTFO is assumed to be passed through 100% to NRMM fuel consumers. The additional pump price impact (including VAT), on top of the baseline, of supplying 4.7% biodiesel (the revised RTFO target in 2013/14 under this scenario) to NRMM fuel is estimated to be 1.0 ppl (including VAT) in 2013/14 when the RTFO peaks. The pump price impact of the RTFO on road transport fuel is expected to fall slightly (by around 0.07 ppl) as less biofuel will also be required to meet the obligation in those sectors.
41. Including NRMM in the RTFO is expected to lead to 7 additional suppliers becoming obligated who would incur additional costs estimated to be £90,000 over the period to 2030. Low and high admin cost sensitivities have also been estimated.
42. Under this option all of the additional biofuel that would need to be supplied because of extending the obligation to NRMM is assumed to be blended into the road diesel fuel stream (rather than the NRMM fuel stream – see paragraph 22). This is because there is assumed to be strong demand for biofuel free NRMM fuel (due to concerns around engine compatibility and storage). This assumption is based upon discussions with stakeholders. Reflecting this assumption, none of the potential transition costs have been attributed to this option. However, it is possible that some oil suppliers may choose to supply NRMM fuel blended with biodiesel. In order to take account of this possibility a high scenario has been estimated (25% additional potential transition costs).

Benefits

43. Under this option, there is no estimated change in the overall biofuel supply (and the composition of the biofuel supply is assumed to remain unchanged), therefore there is no estimated change in GHG savings benefits.
44. The net benefit (i.e. the benefit to society net of costs) of this option is estimated to be - £0.1m (i.e. a net cost to society) over the period 2012 to 2030.
45. Under option 2, there is no increase in the total volume of biofuel supplied which mitigates the risks around ILUC (as set out in paragraphs 54 to 57) compared with option 1.

Cost Benefit Summary

Figure 2: Option 2 – Low, Central and High cost scenarios

		Low	Central	High
Costs				
biofuel costs	£m	0	0	0
Transition costs	£m	0	0	13
admin costs	£m	0.04	0.09	0.18
Benefits				

lifecycle GHG savings	MTCO2e	0	0	0
GHG savings	£m	0	0	0
Net Benefit				
net benefit	£m	0.0	-0.1	-13
Pump Price Impacts				
road diesel (2013)	ppl	0.02	-0.07	-0.17
NRMM (2013)	ppl	-0.3	1.0	2.6

Option 3

Costs

46. Under option 3, the obligation to supply biofuel under the RTFO would continue to apply to road transport fuel suppliers only (i.e. NRMM-only fuel suppliers would not be legally obliged to supply biofuel under the RTFO). However, certification would be expanded to cover any biofuel that was voluntarily blended into NRMM fuel (i.e. suppliers would be able to use biofuel blended into the NRMM fuel stream to gain RTFCs and demonstrate compliance with the requirement to supply renewable transport fuel in relation to the total volume of petrol and diesel supplied for use in road vehicles). This approach would give obligated suppliers increased flexibility to meet RTFO targets. The annual RTFO percentage biofuel blending targets would remain as currently legislated and overall biofuel supply volumes would be expected to remain unchanged under this option.
47. Under this option, no additional pump price impacts (due to the additional cost of supplying biofuel) are expected for NRMM fuel as it is not explicitly obligated under the RTFO. The burden of payment for the RTFO is expected to remain on road transport fuel users (as this fuel is obligated and NRMM fuel isn't).
48. As with options 1 and 2, there is assumed to be strong demand for biofuel free NRMM fuel (due to concerns around engine compatibility and storage). Reflecting this assumption, none of the potential transition costs have been attributed to this option. However, it is possible that some oil suppliers may choose to supply NRMM fuel blended with biodiesel. In order to take account of this possibility a high scenario has been estimated (25% additional potential transition costs).

Benefits

49. Under this option, there is no estimated change in the overall biofuel supply (and the composition of the biofuel supply is assumed to remain unchanged), therefore there is no estimated change in GHG savings benefits.
50. The net benefit (i.e. the benefit to society net of costs) of this option is estimated to be zero over the period 2012 to 2030.

Figure 3: Option 3 – Low, Central and High cost scenarios

		Low	Central	High
Costs				

biofuel costs	£m	0	0	0
transition costs	£m	0	0	13
admin costs	£m	0	0	0
Benefits				
lifecycle GHG savings	MTCO2e	0	0	0
GHG savings	£m	0	0	0
Net Benefit				
net benefit	£m	0.0	0.0	-13.4
Pump Price Impacts				
diesel (2013)	ppl	0	0	0
NRMM (2013)	ppl	0	0	0

Summary of Costs and Benefits

51. The above cost benefit analysis is summarised in figure 4 (for the central cost scenario in each case).

Figure 4: Summary table of costs and benefits of verification system options, central scenario

		1	2	3
Costs				
biofuel costs	£m	342	0	0
transition costs	£m	0.0	0.0	0.0
admin costs	£m	0.09	0.09	0.00
Benefits				
lifecycle GHG savings	MTCO2e	3.7	0.0	0.0
GHG savings	£m	151	0	0
Net Benefit				
net benefit	£m	-190.3	-0.1	0.0
Pump Price Impacts				
road diesel (2013)	ppl	0.00	-0.07	0.00
NRMM (2013)	ppl	1.1	1.0	0.0

52. Option 1 is the only option which increases the supply of biofuel (as the obligation is extended to cover NRMM fuel). As biofuel supply is estimated to be a net-cost measure (i.e. the cost of supplying the biofuel outweighs the monetised GHG savings benefits) this option is estimated to have a negative net benefit to society of -£190m over the period 2012 to 2030. Option 2 is also estimated to have a negative net benefit to society of -£0.1m due to administrative costs. Option 3 is estimated to have no costs or benefits.

53. Options 1 and 2 both formally extend the RTFO to cover NRMM. Therefore the biofuel required by the obligation is attributed to NRMM fuel demand and suppliers are assumed to pass the additional cost of supplying biodiesel (shown for 2013 when the obligation peaks) through to NRMM fuel consumers, leading to an above baseline increase of 1.1ppl (for a 5% RTFO target) and 1.0 ppl (for a RTFO target adjusted downwards to 4.7%) for options 1 and 2 respectively. This impact is estimated to gradually fall over time as the price of fossil diesel rises, reducing the additional cost of supplying biofuel. In 2030, the estimated additional pump price impact for option 1 is 0.3ppl. Under option 3, no additional pump price impacts are expected on NRMM fuel as it remains outside the RTFO.

Risks and assumptions

Indirect land use change

54. Indirect land use change (ILUC) is the term used when production of biofuels on existing agricultural land results in the displacement of production on to previously uncultivated land. This is a particular concern where that land has either high carbon stocks, such as rainforest, or high biodiversity value.
55. International research continues to investigate the scale of indirect impacts of biofuel production and how the negative effects can be reduced. The European Commission is expected to come forward with a proposal addressing ILUC at the EU level in 2012.
56. While such impacts remain uncertain, there is robust evidence that widespread use of some biofuels may lead to significant indirect GHG emissions: there is a significant risk that some biofuels actually result in greater GHG emissions than the fossil fuels they replace due to emissions caused by ILUC. In particular, some biodiesel feedstocks are more susceptible to the effects of ILUC. This is of particular significance for biodiesel feedstocks that would be used in NRMM.
57. Option 1 presents a higher ILUC risk as it entails an increase in the total volume of biofuel required to be supplied. Options 2 and 3 present no additional ILUC risk compared to the baseline of doing nothing.

Infraction

58. Option 3 would carry a significant risk of infraction for non-compliance with the Fuel Quality Directive as, under this option, there would be no domestic legislative requirement for NRMM fuel suppliers to reduce the GHG intensity of the fuel they supply through the requirement to supply renewable transport fuel (current domestic legislation (the RTFO) only requires suppliers of road transport fuel to supply renewable transport fuel, and thus deliver GHG savings). Options 1 and 2 mitigate infraction risk as NRMM fuel would become obligated under the RTFO.

Biodiesel blending

59. In the baseline and throughout the scenarios it is assumed that biodiesel is blended with diesel (for road and, potentially, NRMM use) at a concentration determined by the RTFO target level (i.e. at a concentration of 5% for an unadjusted RTFO from 2013/14 onwards).

Carbon prices

60. Carbon prices are subject to uncertainty, and have therefore been modelled using low, central and high scenarios. Projected carbon prices affect the value of total costs through valuing lifecycle GHG savings/emissions associated with biofuels use. The proportion of carbon savings being made by biofuels in the traded and non-traded sectors has been split 14% (traded sector) and 86% (non-traded sector). This split has been determined using internal analysis.

GHG savings

61. The biodiesel used in NRMM fuel, and that biodiesel which is substituted out of the road fuel supply, is assumed to deliver the minimum 35% GHG savings from 2011 and 50%

from 2017 (compared to baseline petrol / diesel CO2 content), in line with the sustainability criteria assessed in the first section of this joint impact assessment. These GHG savings values are subject to uncertainty and may be different in practice. In addition, these savings do not take into account potential indirect emissions resulting from ILUC.

Biodiesel prices

62. Biodiesel prices (figure 7) are based upon vegetable oil prices sourced from the Aglink-Cosimo global agricultural model. Vegetable oil prices have been transformed to biodiesel prices using refining cost estimates produced by Poyry Energy Consulting.

Diesel prices

63. Diesel prices (figure 7) are sourced from the DfT fuel price forecasting model, and are used to calculate the additional cost of biodiesel over and above fossil diesel. Fuel price forecasts are based upon DECC oil price projections.

NRMM fuel demand

64. NRMM fuel demand (figure 6) is based on a combination of HMRC fuel duty data, data from the Digest of UK Energy Statistics and discussions with industry. NRMM fuel demand is assumed to hold constant over the period 2010 to 2030. More accurate information on the size of the NRMM fuel supply will become available following implementation of this policy (as suppliers will be required to report volumes in order to demonstrate compliance).

Figure 5: DECC traded and non-traded carbon price scenarios, £/tCO₂

Real £2010	Traded			Non-traded		
	Low	Central	High	Low	Central	High
2010	8	15	18	27	53	80
2011	8	15	19	27	54	81
2012	8	15	19	27	55	82
2013	8	15	19	28	56	84
2014	8	15	19	28	57	85
2015	8	16	20	29	57	86
2016	8	16	20	29	58	88
2017	8	16	20	30	59	89
2018	8	16	21	30	60	90
2019	9	17	21	31	61	92
2020	9	17	21	31	62	93
2021	11	22	30	31	63	94
2022	14	28	39	32	64	96
2023	17	33	47	33	65	98
2024	20	39	56	33	66	99
2025	22	45	65	34	67	101
2026	25	50	74	34	68	102
2027	28	56	82	35	69	104
2028	31	61	91	35	70	105
2029	33	67	100	36	71	107
2030	36	72	108	36	72	108

Figure 6: NRMM Fuel demand projections (internal analysis based on HMRC data, Digest of UK Energy Statistics and discussions with industry)

	obligation level	NRMM demand	NRMM biodiesel demand
	%	(million litres)	(million litres)
2012	4.50%	3,079	139
2013	5.00%	3,079	154
2014	5.00%	3,079	154
2015	5.00%	3,079	154
2016	5.00%	3,079	154
2017	5.00%	3,079	154
2018	5.00%	3,079	154
2019	5.00%	3,079	154
2020	5.00%	3,079	154
2021	5.00%	3,079	154
2022	5.00%	3,079	154
2023	5.00%	3,079	154
2024	5.00%	3,079	154
2025	5.00%	3,079	154
2026	5.00%	3,079	154
2027	5.00%	3,079	154
2028	5.00%	3,079	154
2029	5.00%	3,079	154
2030	5.00%	3,079	154

Figure 7: Diesel and biodiesel prices, pence per litre, real 2010 prices, central scenario

	Biodiesel Price	Diesel Price	Biodiesel Resource Cost
2012	75	56	19
2013	74	56	18
2014	74	57	17
2015	73	57	16
2016	72	58	14
2017	72	58	14
2018	71	59	13
2019	70	59	11
2020	70	60	10
2021	70	60	10
2022	69	60	9
2023	69	61	8
2024	69	61	8
2025	69	62	7
2026	69	62	7
2027	69	63	6
2028	69	63	6
2029	69	64	5
2030	69	64	5

Wider impacts

65. Under the options where small firms could be particularly impacted (1 and 2), in particular through higher NRMM fuel costs because they are obligated under some options explored,

wider knock-on impacts are possible. These could include a loss of future competitive pressure in the NRMM-dependent markets if small suppliers or new entrants are discouraged.

66. Biofuels might deliver lower lifecycle GHG savings than currently reported if Indirect Land Use Change (ILUC) impacts were found to be negative (see paragraphs 54 to 57).. However, currently the impacts are not sufficiently well quantified or understood to be able to be incorporated into GHG calculations. How any particular policy response regarding ILUC would affect the current mandatory sustainability criteria also remains unknown. Therefore ILUC impacts have had to be excluded from the present analysis of mandatory sustainability criteria. The EU is currently developing policy aimed at mitigating emissions from ILUC which is due to be announced in 2012.
67. Biofuel production could also potentially impact on food markets, through creating competition in demand for agricultural land and inputs, as well as increased demand for food crops also suitable for biofuel feedstock use. However, there is as yet no clear consensus on how to quantify and value any potential links between biofuel demand and food prices. Therefore any such possible impacts have been excluded from the analysis.

Equality Issues

68. No equality issues were identified as resulting from implementation of this policy proposal therefore no specific assessment of equality impacts has been included.

Summary and preferred option with description of implementation plan

Option 2 is currently the preferred option since this obligates NRMM, mitigating the risk of infraction for non-compliance with the Fuel Quality Directive, but without increasing the overall biofuel supply while concerns remain around sustainability, in particular the risk of increasing the supply of feedstocks that are known to be more susceptible to the risks associated with ILUC. At the same time, this option allows additional time to address NRMM users concerns over biofuel compatibility issues.

Annex 1 -Transition Costs

69. Introduction of biofuel into the NRMM fuel stream is expected to result in one-off transition costs for operators of NRMM machinery. Estimates of these transition costs are summarised in figures 8 to 12. Total costs are presented in 2010 terms.

Figure 8: Tank cleaning costs

	number of units	unit cost	total cost
Marinas	114	£500	£57,000
recreational vessels	66,200	£586	£38,793,347
commercial vessels	387	£5,000	£1,935,000

70. NRMM fuel storage tanks are assumed to require cleaning in advance of biofuel being introduced into the NRMM fuel stream in order to avoid microbial infection of the fuel.
71. The number of affected marinas is based upon data from the British Marine Federation and discussions with inland waterway stakeholders. The marina tank cleaning cost estimate is based upon discussions with ExxonMobil. The number of recreational vessels is based upon Association of Inland Navigation Authorities survey data (88,267 total recreational vessels) with an adjustment made to reflect that only 75% of these vessels are believed to be diesel powered. Tank cleaning costs for recreational vessels are based upon data from the Great Ouse Boating Association agreed by the inland waterway stakeholder group. Commercial vessel numbers are based upon input from the inland waterway stakeholder group (516 in total – 70% of which are not subject to regular tank cleaning).

Figure 9: Fuel pump seal replacement costs

	number of units	unit cost	total cost
recreational vessels	662	£525	£347,551

72. A small subset of NRMM engines will require fuel pump seals to be replaced in advance of biofuel being introduced into the NRMM fuel stream. The fraction of recreational vessels (1%) which will require replacement is based upon discussion with engine industry experts.

Figure 10: NRMM fuel filter replacement costs

	number of units	unit cost	total cost
general NRMM	643,772	£16	£10,300,352
Rail	4,285	£165	£707,025
recreational vessels	66,200	£16	£1,059,204
commercial vessels	516	£165	£85,140

73. NRMM engines will require new fuel filters in advance of biofuel being introduced into the NRMM fuel stream. These figures are likely to be overestimates as fuel filters tend to be replaced during routine servicing. Fleet size estimates for general NRMM and rail have been taken from UK Air Quality Archive data. Recreational and commercial inland waterway vessel data are as before. Unit cost data is based upon estimates provided by the NFU.

Figure 11: Marking costs

	number of units	unit cost	total cost
Marking Costs	44	£100,000	£4,400,000

74. As NRMM fuel is taxed at a lower rate than road transport fuel it is marked with a red dye. Sourcing NRMM fuel from the road transport fuel stream will require additional marking facilities to be installed at sites where this occurs. Data provided by the UK Petroleum Industry Association (UKPIA).

Figure 12: Aggregated costs

total transition costs	£53,284,619
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75. The total estimated (central) transition cost of introducing biofuel into the entire NRMM fuel stream is estimated at £53.3m.

Annex 2 - Competition Assessment

76. Under the options where small firms could be particularly impacted impacts are possible. These could (1 and 2), in particular through higher NRMM fuel costs, wider knock-on include a loss of future competitive pressure in the NRMM-dependent markets (e.g. agricultural markets) if small suppliers or new entrants are discouraged through higher prices. There could also be a negative impact on innovation if small suppliers were disadvantaged and future competition in supply was restricted.
77. Economic theory suggests that a less competitive market may be less likely to reduce costs in the long run, due to a lack of pressure to reduce costs through price competition. Therefore, barriers to entry, or barriers to small suppliers being able to compete for market share with major fuel suppliers, could reduce the long-run competitiveness of the market for transport fuels.
78. NRMM is supplied by the major fuel suppliers, as well as NRMM-majority or –only suppliers. There are estimated to be up to six NRMM suppliers for the purposes of this impact assessment. Options that increase the obligation may potentially create a barrier to entry for new market participants because they now face an additional hurdle (e.g. administrative costs) to enter the market.
79. Higher certification levels also mean that there are more RTFCs in circulation, as the obligation is not increased in absolute terms in options 2 and 3, and is only partly but not equivalently increased in option 1. Therefore the price of RTFCs may be reduced temporarily. This would only be likely in the short run as fuel suppliers would soon substitute biofuel out of the traditional fuel supply, since there are RTFCs available from blending in NRMM which occurs at a higher rate than the obligation % target level. This would return the total quantity of RTFCs to the level of the obligation in the long run. Even so, in the short run, any fall in the price of RTFCs would have a negative impact on the cashflow of biofuel suppliers, in particular smaller suppliers.

80. There may also be some profits created for NRMM-only suppliers who could sell RTFCs at a price higher than their production costs, if those suppliers could blend biodiesel into their NRMM supply at a lower cost than other suppliers.

Annex 3 - Small Firms Assessment

81. Under the options where small firms could be particularly impacted (1 and 2), in particular through higher NRMM fuel costs, wider knock-on impacts are possible. These could include a loss of future competitive pressure in the NRMM-dependant markets if small suppliers or new entrants are discouraged. There could also be a negative impact on innovation if small suppliers were disadvantaged and future competition in supply was restricted.
82. Higher certification levels also mean that there are more RTFCs in circulation, as the obligation is not increased in absolute terms in options 2 and 3, and is only partly but not equivalently increased in option 1. Therefore the price of RTFCs may be reduced temporarily. This would only be likely in the short run as fuel suppliers would soon substitute biofuel out of the traditional fuel supply, since there are RTFCs available from blending in NRMM which occurs at a higher rate than the obligation % target level. This would return the total quantity of RTFCs to the level of the obligation in the long run. Even so, in the short run, any fall in the price of RTFCs would have a negative impact on the cashflow of biofuel suppliers, in particular smaller suppliers.

Annex 4 - Rural Proofing Assessment

83. An increase in NRMM fuel prices (under options 1 and 2) could pose an additional cost burden on rural businesses, as many of these will be in the agricultural sector, which is one of the main users of non-road mobile machinery (e.g. tractors).
84. A reduction in biofuel demand (relatively greater under options 2 and 3) would reduce opportunities for UK biofuel producers, which may have impacts on rural incomes through either lower employment in biofuel production facilities or through reduced opportunities for UK biofuel supply chains.

Annex 5 – Equality Impact Assessment

85. An Equality Impact Assessment was carried out as part the implementation of the transport elements of the Renewable Energy Directive (RED) in July 2010.
86. The RED is being transposed using secondary legislation to make a number of changes to the current RTFO Order. The Order places an obligation on owners of relevant fuels at the duty point⁴ to ensure that a certain volume of biofuel is supplied, or a substitute amount of money is paid. As biofuels cost more to supply than fossil fuel this mandatory requirement imposes additional costs on obligated suppliers which are passed through to consumers of such fuels. However, this will apply to all such consumers. As such, we do not expect the implementing legislation to impact disproportionately on any group of people, or to adversely affect equality of opportunity for different equality groups.

² The duty point is the point at which fuel becomes liable for UK road transport duty, administered by HMRC. This is usually as fuel leaves UK refineries, import terminals or inland terminals supplied by pipeline. Relevant fossil fuels are petrol, diesel, sulphur-free gas oil, and renewable transport fuel that does not fall within these categories.

Annex 7 – OIOO

87. This is a European measure and is currently outside the scope of One in One Out.

Annex 8 – References

Digest of UK Energy Statistics (DUKES):

<http://www.decc.gov.uk/en/content/cms/statistics/publications/dukes/dukes.aspx>

DfT Consultation Impact Assessment for the draft Motor Fuel Regulations 2010

<http://www.dft.gov.uk/consultations/closed/2010-26/annexb.doc>

Climate Change Act 2008:

<http://www.legislation.gov.uk/ukpga/2008/27/contents>

The Renewable Transport Fuel Obligations (Amendment) Order 2009:

<http://www.legislation.gov.uk/uksi/2009/843/contents/made>

EU Fuel Quality Directive:

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0088:0113:EN:PDF>