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# Evaluation of Directive 98/70/EC Fuel quality Directive (FQD)

Study for:



13<sup>th</sup> March 2017

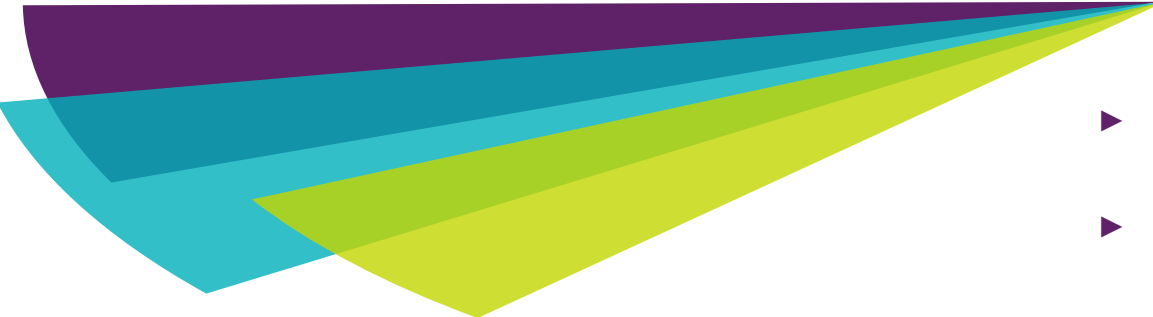


# Evaluation of Directive 98/70/EC

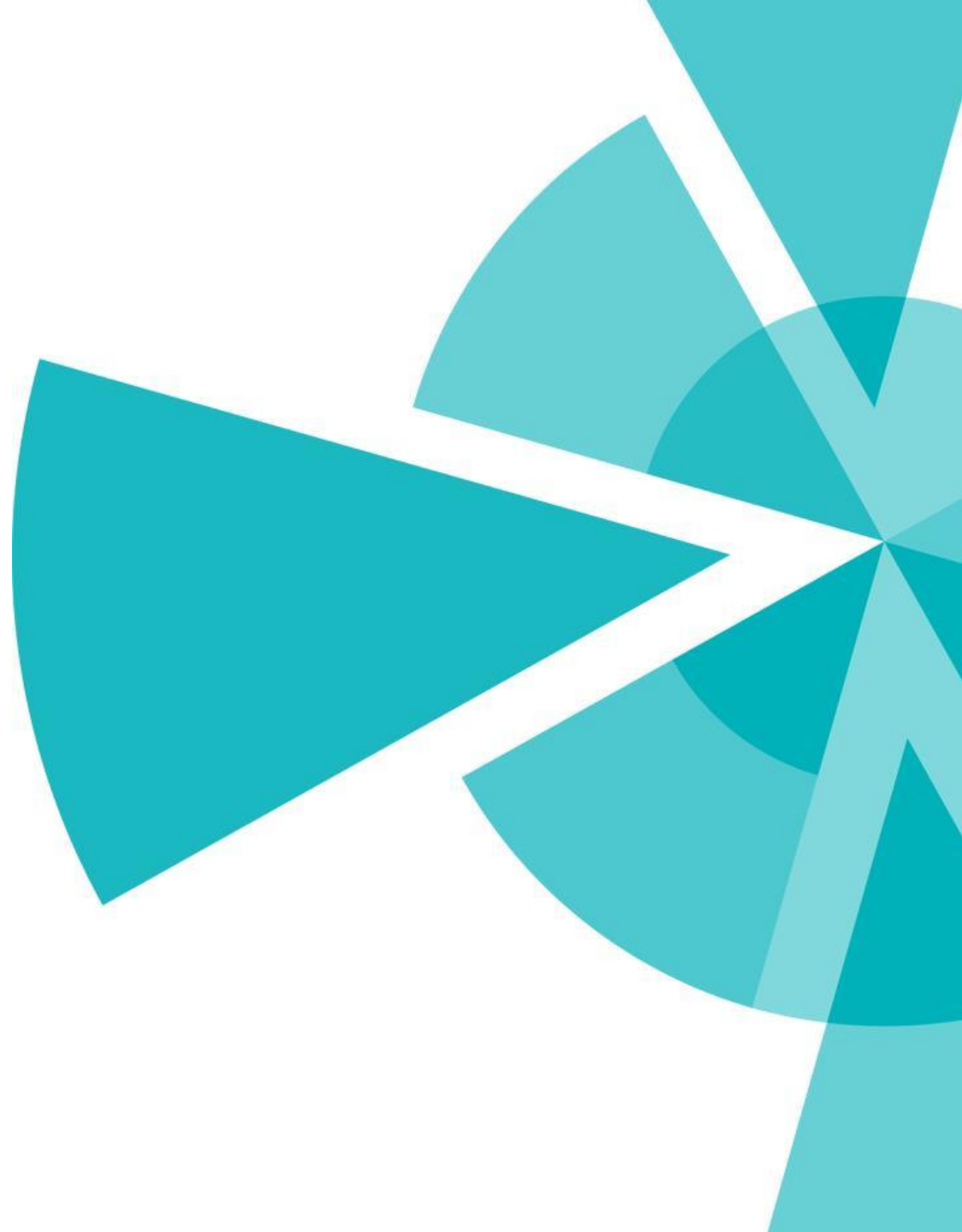
## Presentation structure

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- ▶ Methodology
- ▶ Input data
- ▶ Results
  - ▶ Effectiveness
  - ▶ Efficiency
  - ▶ Coherence
  - ▶ Relevance
  - ▶ EU-added value
- ▶ Conclusions

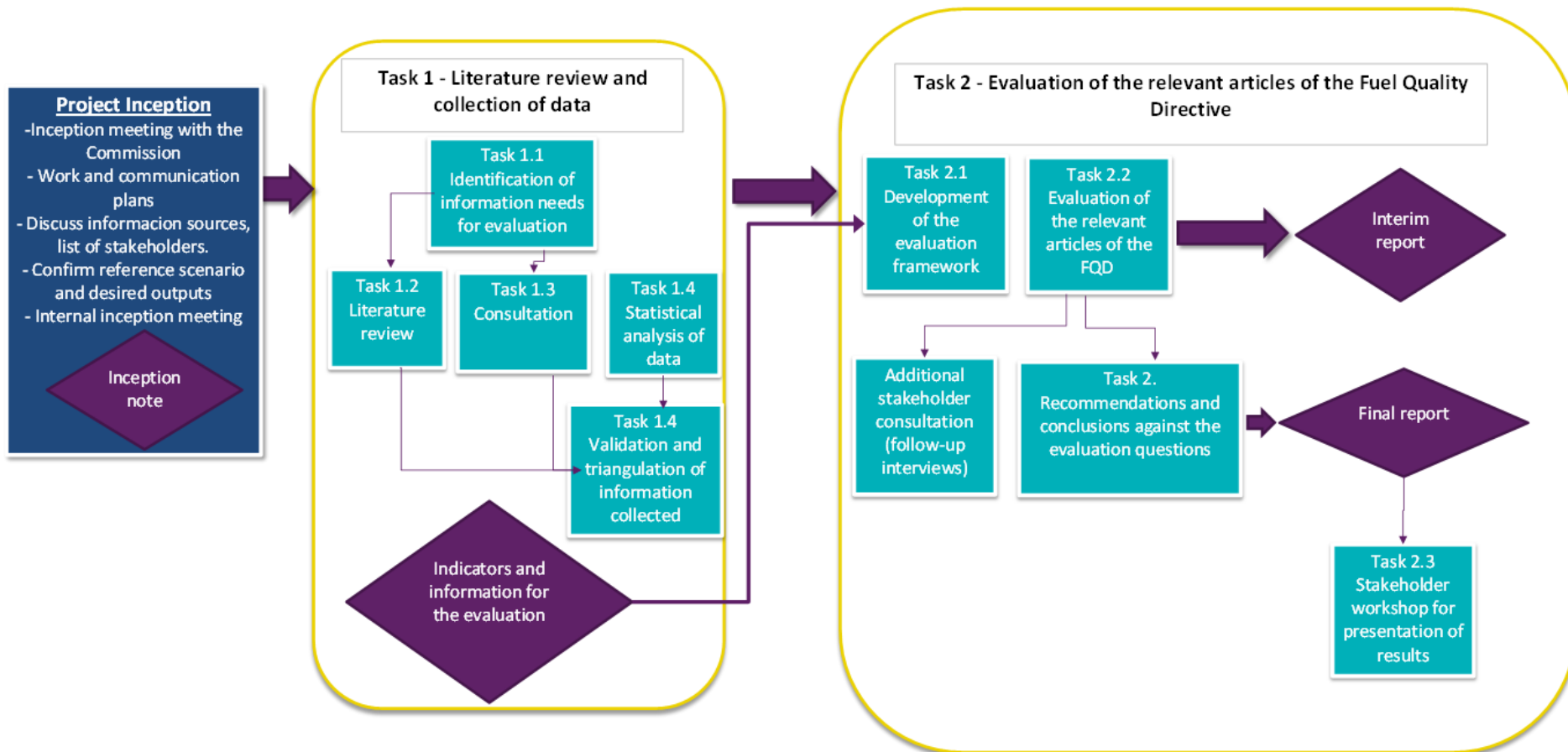
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- ▶ Presenter:
    - ▶ Chris Green (Amec Foster Wheeler)
  - ▶ Experts present:
    - ▶ Rob Cuelenaere (TNO)
    - ▶ Anouk van Grinsven (CE Delft)

# Methodology



# Evaluation of Directive 98/70/EC

## Methodology



# Evaluation of Directive 98/70/EC

## Methodology – Intervention logic

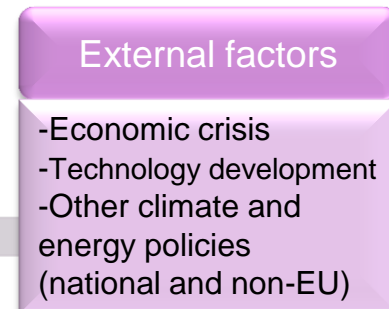
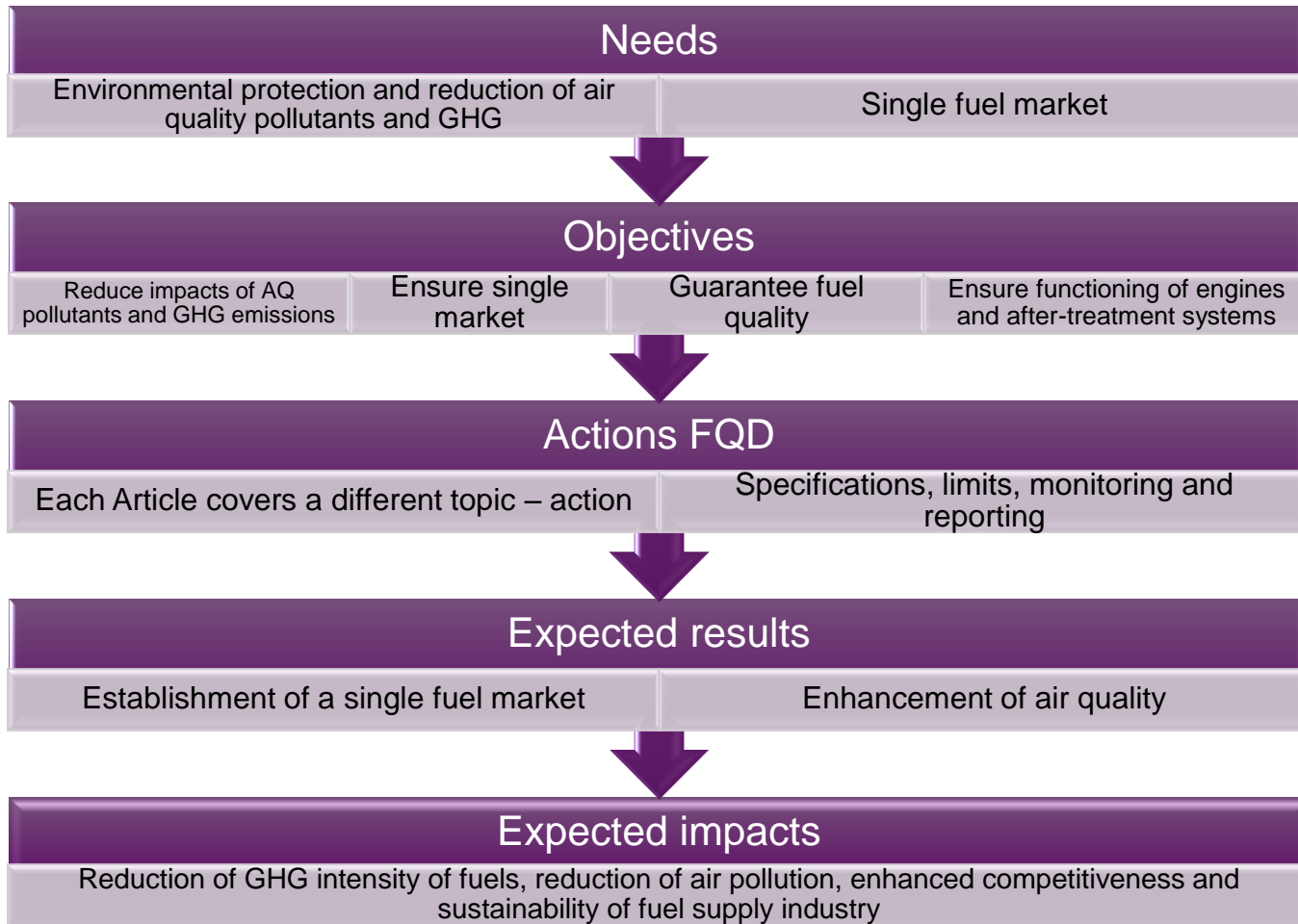
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- ▶ Basis for the analytical framework
- ▶ It provides an overview of the key areas, objectives, actions, expected outputs and impacts to be evaluated
- ▶ The analysis is undertaken on an Article-by-Article basis, covering articles 1, 2, 3, 4, 5, 6, 7, 8, 8a, 9 and 9a

# Evaluation of Directive 98/70/EC

## Methodology – Intervention logic

### Intervention logic



# Evaluation of Directive 98/70/EC

## Methodology – Analytical framework

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- ▶ Evaluation questions and/or sub-questions
- ▶ Success/ judgment criteria
- ▶ Qualitative and quantitative indicators
- ▶ Methods and tools to be used to gather and assess the necessary evidence
- ▶ The following slides contain all the evaluation questions

# Evaluation of Directive 98/70/EC

## Methodology – Analytical framework

### Effectiveness

- EQ 1 How well does progress towards the objectives of the Fuel Quality Directive match the initial expectations for this directive?
- EQ 1.1 Has the FQD been effective in reducing transport emissions?
- EQ 1.2 Does the FQD ensure a single market? Are there potential improvements if the scope was changed?
- EQ 1.3 Does the FQD ensure the proper functioning of engines and emissions after treatment systems?
- EQ 1.4 Does the use of CN-codes contribute to establishing a single fuel market? Should additional definitions or codes be used? (Article 2)
- EQ 1.5 Is the petrol fuel placed on the market in compliance with the specifications of Annex I of the Directive?
- EQ 1.6 Have the derogations in Article 3 been effective?
- EQ 1.7 Is the diesel fuel placed on the market in compliance with the specifications of Annex II of the Directive?
- EQ 1.8 Were there any cases of MS States prohibiting, restricting or preventing marketing of fuels complying with the Directive? (Article 5)
- EQ 1.9 What environmental gains have been achieved by this Article (which allows MS to require some fuels to meet more stringent environmental specifications) (Article 6)
- EQ 1.10 Has the application of Article 7 ensured a supply of fuel following exceptional events which would otherwise have led to the loss of supply? (Article 7)
- EQ 1.11 Have Member States resumed compliance with lower limits after the 6 month derogation periods? (Article 7)
- EQ 1.12 What are the impact on health and the environment of this Article? (Article 7)
- EQ 1.13 Has the reporting of MS been useful to reduce health and environmental impacts from fuels used in transport? (Article 8)
- EQ 1.14 Would the use of MMT be any different without this Article, and which would be the impacts of this? (Article 8a)
- EQ 1.15 Has the reporting and proposal as required by this Article resulted in a better understanding of the impacts of the Directive and how it could be further developed?( Article 9)
- EQ 1.16 Have penalties for not meeting the Directive have been imposed by Member States? (Article 9a)
- EQ 1.17 Have penalties for not meeting the Directive have been imposed by Member States?



# Evaluation of Directive 98/70/EC

## Methodology – Analytical framework

### Efficiency

EQ 2.1 Has the Directive delivered its objectives in an efficient manner?

EQ 2.2 Have the definitions contributed to the clear implementation of the FQD?

EQ 2.3 What are the costs arising from the restrictions on petrol and diesel fuel that can be placed on the market? (Articles 3 and 4)

EQ 2.4 What are the benefits arising from the restrictions on petrol and diesel fuel that can be placed on the market? (Articles 3 and 4)

EQ 2.5 Are the costs arising from the restrictions of petrol and diesel fuel that can be placed on the market justified in light of the benefits? (Articles 3 and 4)

EQ 2.6 What are the costs arising from the application of the derogations? (Articles 3 and 4)

EQ 2.7 What are the benefits arising from the application of derogations? (Articles 3 and 4)

EQ 2.8 Have the costs outweighed the benefits in the application of derogations? In particular with regards to the derogation for the Outermost Regions? (Articles 3 and 4)

EQ 2.9 Could the environmental gains achieved by this Article have been met against lower costs? (Article 6)

EQ 2.10 Has the authorisation to use higher limits in case of change in supply of crude oils been justified in terms of costs? (Article 7)

EQ 2.11 Are the monitoring and reporting obligations included in the FQD cost efficient? (Article 8)

EQ 2.12 Could the Directive be effectively enforced against lower costs? (Article 9a)

# Evaluation of Directive 98/70/EC

## Methodology – Analytical framework

### Coherence

EQ 3.1 Is the Directive coherent with other Directives and EU policies? (General)

EQ 3.2 Is the scope of the Directive clear? Is it coherent with other Directives in terms of fuels covered in each of them? (Article 1)

EQ 3.3 Is the limitation to health and environment in the scope of the FQD coherent with long term ambition on climate policy and air quality?(Article 1)

EQ 3.4 Are the definitions in line with those included in other legislation? (Article 2)

EQ 3.5 Are the specifications in Annex I coherent with the rest of the Directive and with other legislation or standards in the EU and beyond? (Articles 3)

EQ 3.6 Are there interactions between Annex I requirements and vehicle standards? (Article 3)

EQ 3.7 Is the derogation for the Outermost Regions coherent with the approach taken by other Directives? (Article 3)

EQ 3.8 Are the specifications in Annex II coherent with the rest of the Directive and with other legislation or standards in the EU and beyond? Article 4)

EQ 3.9 Are there interactions between Annex II requirements and vehicle standards? (Article 4)

EQ 3.10 Is the derogation for the Outermost Regions coherent with the approach taken by other Directives? (Article 4)

EQ 3.11 Is the free circulation of fuel compliant with the requirements of the FQD coherent with other EU legislation?

EQ 3.12 Is the provision of the Article coherent with the rest of the Directive? (Article 7)

EQ 3.13 Are the monitoring and reporting obligations aligned with other related monitoring and reporting obligations? (Article 8)

EQ 3.14 Do the requirements related to the review process contradict other legislation? (Article 9)

EQ.15 Do the penalties established by the Article contradict or contribute to the objectives set by other legislation? (Article 9a)

# Evaluation of Directive 98/70/EC

## Methodology – Analytical framework

### Relevance

EQ 4.1 Is the FQD still relevant?

EQ 4.2 Does the scope bring unwanted restrictions? If so, what should be changed? (Article 1)

EQ 4.3 Are the definitions still adequate? (Article 2)

EQ 4.4 Is the limitation of petrol fuel placed on the market still necessary? (Article 3)

EQ 4.5 Are the specifications in Annex I adapted to the latest technical and scientific progress? (Article 3)

EQ 4.6 Are the derogations still relevant? (Article 3)

EQ 4.7 Is the limitation of diesel placed on the market still necessary? (Article 4)

EQ 4.8 Are the derogations still relevant? (Article 4)

EQ 4.9 In the absence of this Article, would any Member State prohibit, restrict or prevent marketing of fuels complying with the Directive? (Article 5)

EQ 4.10 Have any Member States used this Article since 2009? (Article 6)

EQ 4.11 Are more stringent environmental fuel specifications still relevant in some cases? (Article 6)

EQ 4.12 Is the safeguard to prevent disruptions to fuel supply still necessary? How often were MS authorised to use this Article? (Article 7)

EQ 4.13 Is the use of metallic additives still regarded as relevant option? (Article 8a)

EQ 4.14 Was this Article necessary for the reporting and preparation of a proposal by the EC? (Article 9)

EQ 4.15 Are penalties necessary for meeting the objectives of the Directive? (Article 9a)

EQ 4.16 Is this Article necessary for Member States to set penalties? (Article 9a)

# Evaluation of Directive 98/70/EC

## Methodology – Analytical framework

### EU-added value

EQ 5.1 What is the overall perception of the Directive among stakeholders? (general)

EQ 5.2 Could a single market be ensured by repeal of the FQD? (in the absence of the FQD)

EQ 5.3 Does the scope as defined justify EU intervention? (Article 1)

EQ 5.4 Does the FQD give the fuel and car industry a strong home-market?  
Does this bring competitive advantages over non-EU industries? (Article 1)

EQ 5.5 Are the definitions chosen advantages to the EU industry?  
Would the EU benefit from adoption of definitions used in other regions? (Article 2)

EQ 5.6 How has this Article been perceived by stakeholders? (Article 3 and 4)

EQ 5.7 Has the fact that some Member States have stricter limits reduced the added value of the Directive? (Article 3 and 4)

EQ 5.8 How has this Article been perceived by stakeholders? (Article 6)

EQ 5.9 How has this Article been perceived by stakeholders? (Article 7)

EQ 5.10 Is action at EU level still prescribed? (Article 7)

EQ 5.11 How has this Article been perceived by stakeholders? (Article 8)

EQ 5.12 Would MS monitor and centrally report this information without EU intervention? (Article 8)

EQ 5.13, 5.14, 5.15 How have various Articles been perceived by stakeholders? (Articles 8a, 9, 9a)

# Input data



# Evaluation of Directive 98/70/EC

## Input data

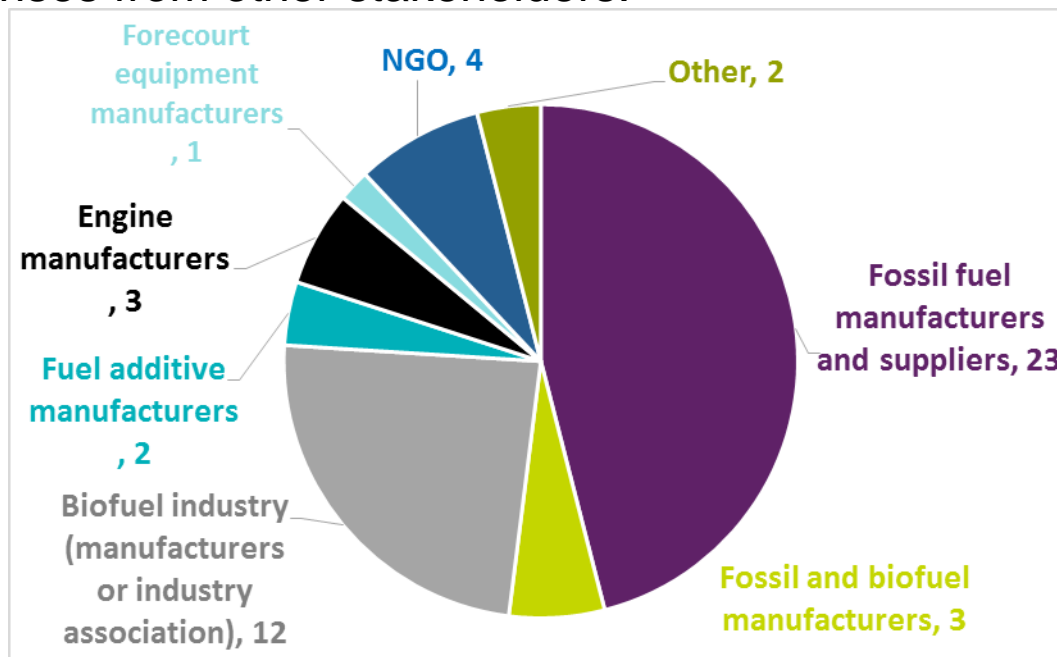
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- ▶ The input data for the indicators and criteria has been based on evidence collected via:
  - ▶ **Stakeholder consultation**
  - ▶ **Desk-based study**
    - ▶ **Literature review**
    - ▶ **Data analysis**

# Evaluation of Directive 98/70/EC

## Input data - Consultation

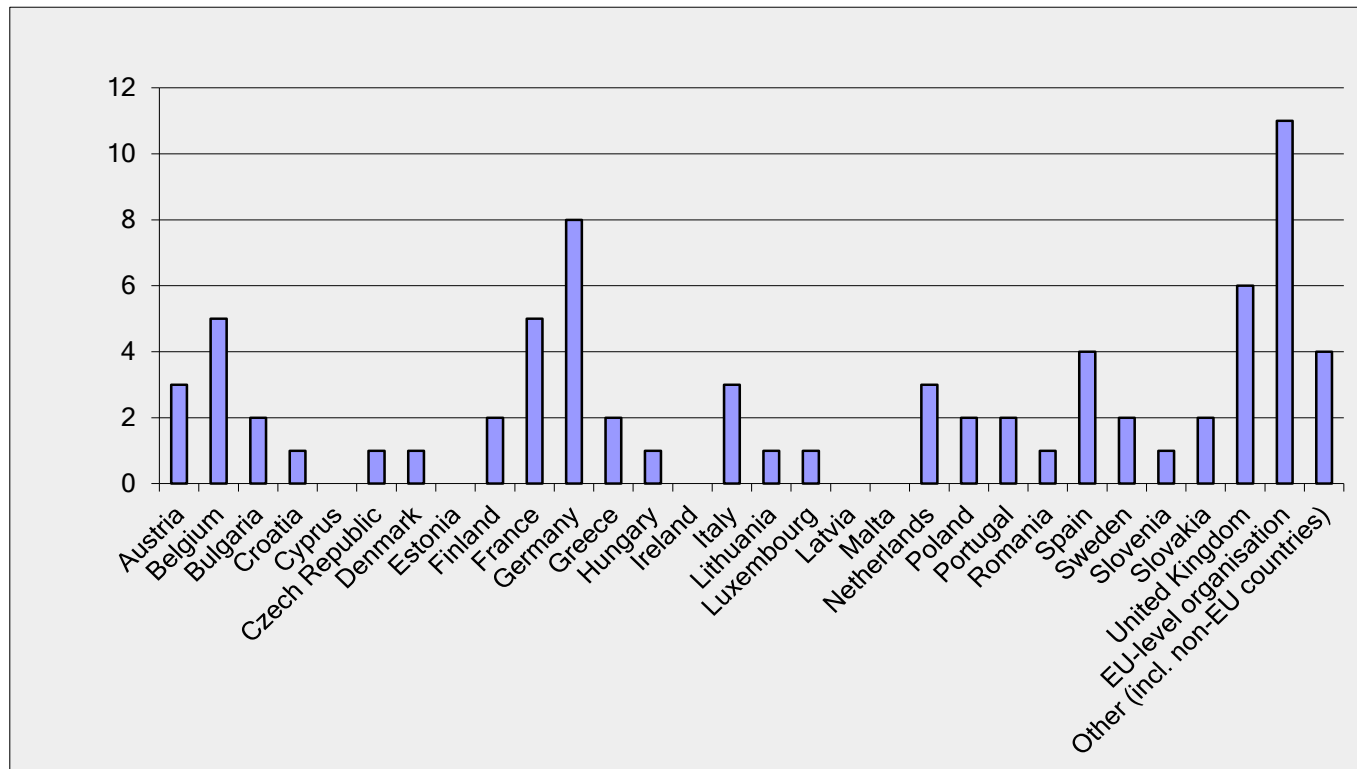
- ▶ 2 questionnaires (Member State authorities and other stakeholders)
- ▶ Online platform to collate responses.
- ▶ Duration: 4 weeks (initially), extended to improve response rate
- ▶ 17 responses from MS authorities
- ▶ 50 responses from other stakeholders:



# Evaluation of Directive 98/70/EC

## Input data - Consultation

### ► Geographical coverage of responses (Other stakeholders):





# Evaluation of Directive 98/70/EC

## Input data - Consultation

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- ▶ Limitations
  - ▶ Single coordinated responses
  
- ▶ Follow-up interviews
  - ▶ Member States (8 interviews)
  - ▶ Industry / other (5 interviews)
  
- ▶ Overall good coverage of EU Member States and representation of the views from industry and other stakeholders

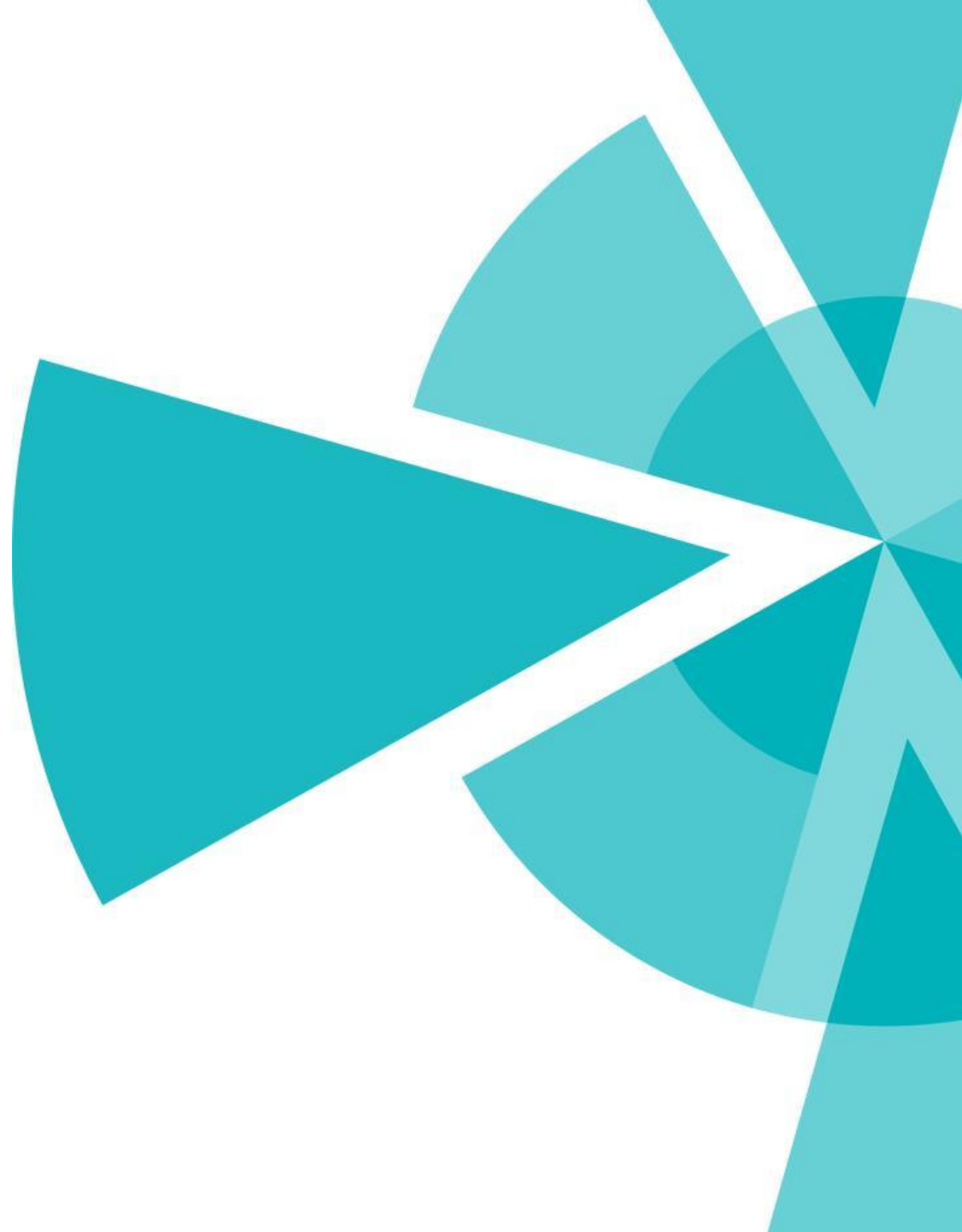
# Evaluation of Directive 98/70/EC

## Input data – Desk-based study

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- ▶ Relevance, reliance and independence
  
- ▶ Resources used:
  - ▶ Annual summary reports for the FQD, and Member State submissions
  - ▶ Reports commissioned by the EU
  - ▶ EU Communications in relation to e.g. derogations
  - ▶ General published information on the implementation of the FQD
  - ▶ Publications and position papers from industry associations
  - ▶ Worldwide Fuel Charter
  - ▶ Reports from ICCT

# Results



# Evaluation of Directive 98/70/EC

## Results - Effectiveness

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### General

- ▶ FQD is succeeding in promoting a single market, but does not lead to full harmonisation.
- ▶ FQD has contributed to reductions in pollutant emissions from the transport sector, and therefore delivered associated health and environmental benefits.

### Article 1 - Scope

- ▶ Appropriate scope. It does not create a barrier for complying with targets for GHG reductions and renewable energy in transport by 2020. It ensures the proper functioning of engines
- ▶ The FQD has reduced NO<sub>x</sub>, lead, SO<sub>x</sub>, PM and PAH emissions from transport significantly.

### Article 2 - Definitions

- ▶ Member States and stakeholders consider that the definitions could be changed to no longer refer to CN codes. This does not obstruct the EU fuel single market

### Article 3 - Petrol

- ▶ Generally effective: The majority of petrol placed on the market in the EU is compliant with Annex I specifications (almost 100%)

# Evaluation of Directive 98/70/EC

## Results - Effectiveness

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### Article 3 – Petrol (cont.)

- ▶ Minimum standards are clear but do not ensure that the petrol placed on the market in all Member States will be homogeneous.
- ▶ Bioethanol content uneven across the EU (E0, E5, E10).
- ▶ Member State authorities are somewhat unclear on the detailed meaning of Article 3 and Annex I, leading to a small number of non-compliance cases and to the reporting of some fuels which are out of the scope of the FQD in the official FQD annual reporting.

### Article 4 – Diesel fuel

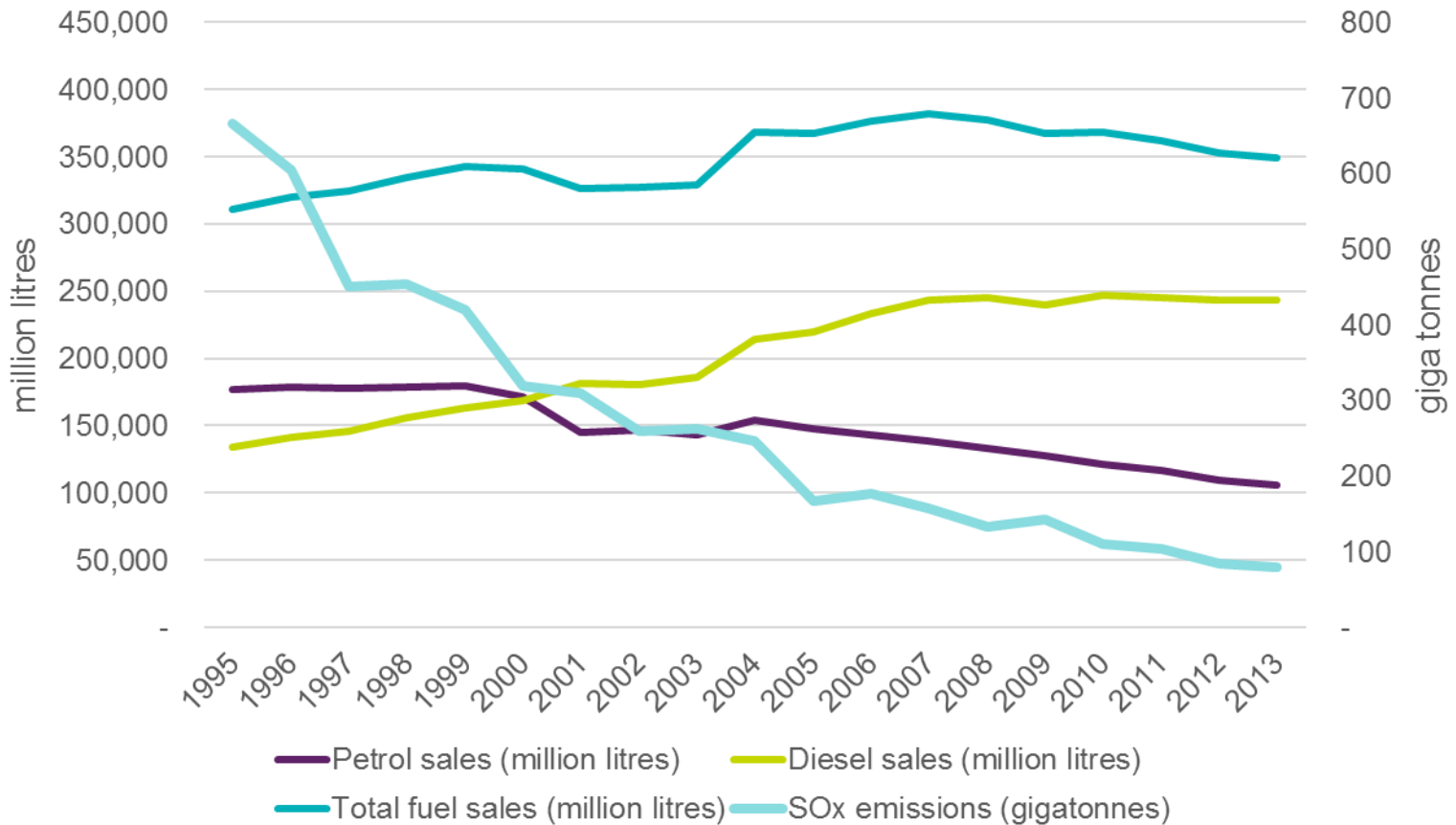
- ▶ Generally effective: the majority of diesel is in accordance with Annex II
- ▶ FAME: while Annex II sets an upper limit of 7% in diesel fuel, Article 4 indicates that FAME levels greater than 7% may be permitted. Very limited use of this derogation.

### Derogations under Articles 3 and 4:

Well implemented. No negative impacts on health, the environment or on the single market

# Evaluation of Directive 98/70/EC

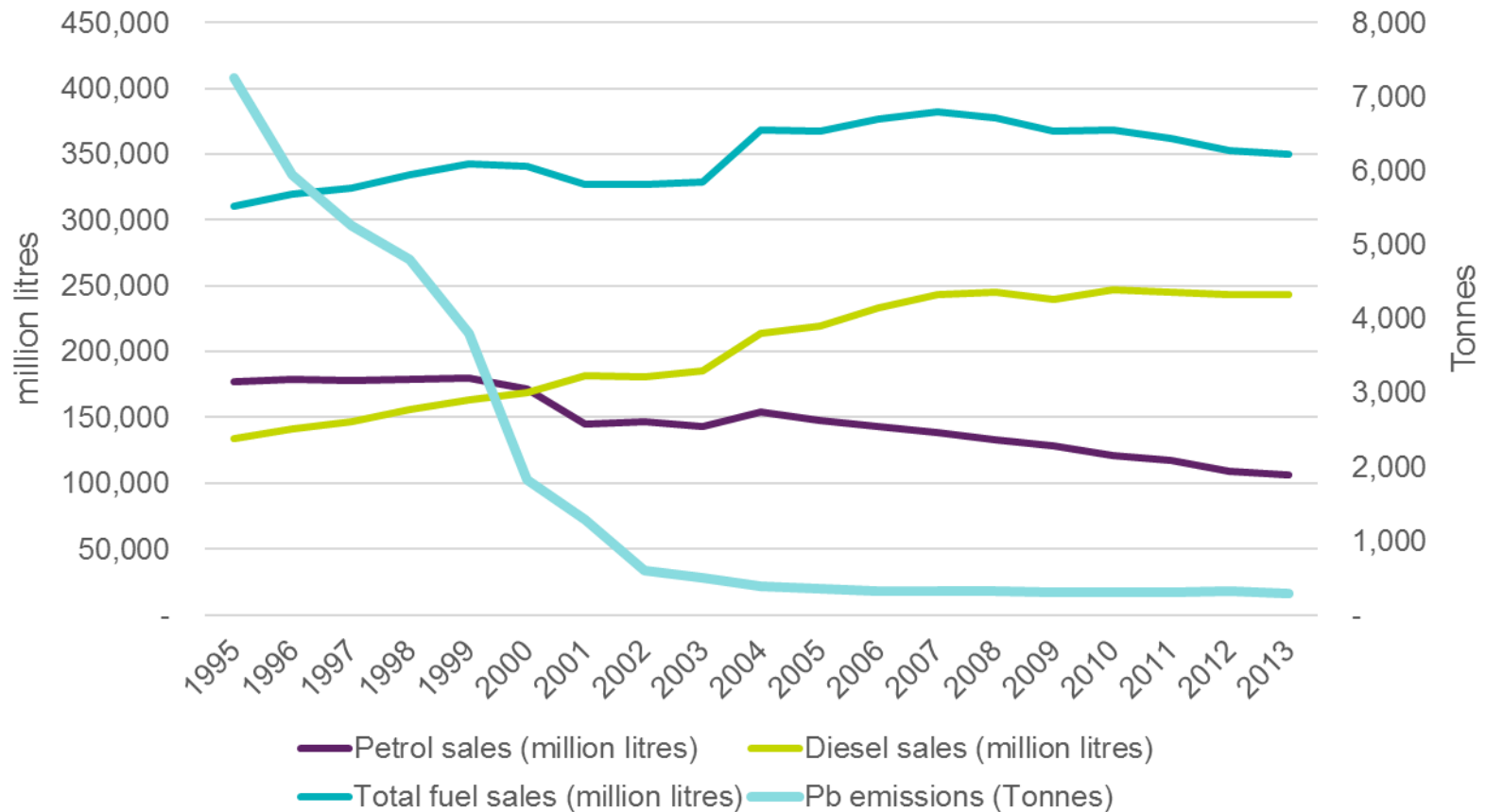
## Results - Effectiveness



SOx emissions from transport sector compared to fuel sales in the period 1995-2013 (CLRTAP, EEA)

# Evaluation of Directive 98/70/EC

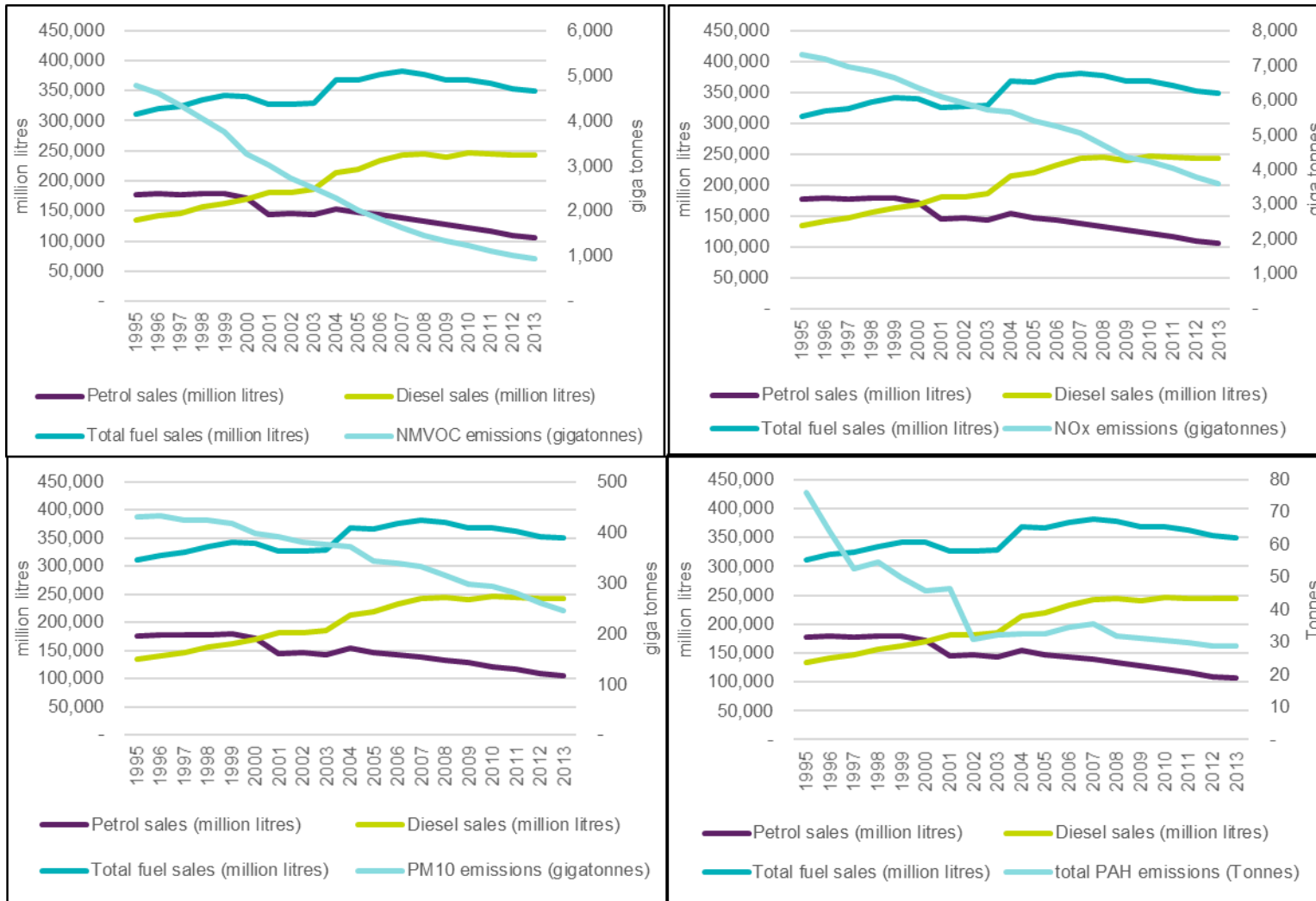
## Results - Effectiveness



Pb emissions from transport sector compared to fuel sales in the period 1995-2013 (CLRTAP, EEA)

# Evaluation of Directive 98/70/EC

## Results - Effectiveness

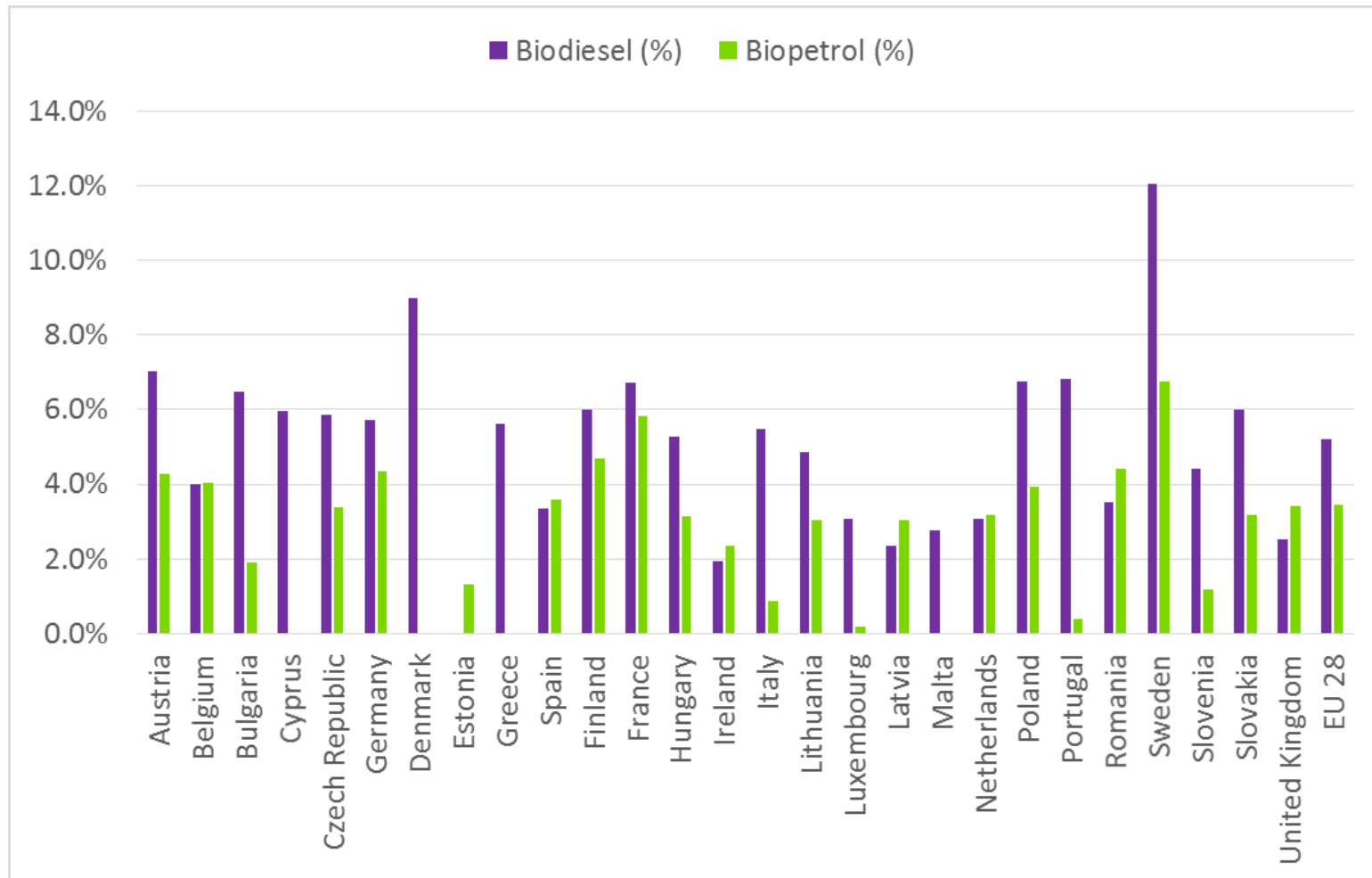


NMVOC, NOx, PM10 and PAH emissions from transport sector compared to fuel sales in the period 1995-2013 (CLRTPAP, EEA)



# Evaluation of Directive 98/70/EC

## Results - Effectiveness



Shares of biodiesel and biopetrol in total diesel and petrol sales (% energy), respectively, in 2013 (source: Eurostat via ICF, 2015)

# Evaluation of Directive 98/70/EC

## Results - Effectiveness

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### Article 5 - Free circulation

- ▶ Effective instrument for allowing suppliers market access in different MS. No evidence of intentional discrimination on the fuel market. However, differences in the implementation of biofuel mandates → Lack of full harmonisation

**Article 6 (Marketing of fuels with more stringent environmental specifications) and 7 (Change in supply)** have not been applied but considered necessary

**Article 8 – (Monitoring and reporting)** is effective in that all Member States have reported annually as required.

**Article 8a (Metallic additives)** is effective in that reported MMT levels show MMT either not being in use, or always being below the permitted levels (in those cases where it appears in samples)

**Article 9 (Review process)** cannot be conclusively evaluated in terms of effectiveness, because the report has not been published yet.

# Evaluation of Directive 98/70/EC

## Results - Efficiency

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### General

- ▶ The FQD has imposed costs on some (fuel suppliers and MS authorities). This is estimated to be outweighed by the environmental and health benefits.
  - ▶ Desulphurisation: 2001-2011 cumulative benefits of €197 million per refinery (JRC refinery fitness check)
  - ▶ Avoided damage cost: €695 million for reduction in SO<sub>x</sub>, and €8,611 million for reduction in NO<sub>x</sub> for EU28 over the period 2009-2013
  - ▶ Member States: Monitoring and reporting costs €173,000-650,000 per year
  - ▶ Fuel suppliers: €202 million cumulative costs per refinery over 2001-2011 (JRC refinery fitness check)

*A full cost-benefit assessment is not possible due to the limitations of available of data*

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# Evaluation of Directive 98/70/EC

## Results - Efficiency

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### **Article 1 - Scope**

- ▶ The single market could not be ensured without the FQD

### **Article 2 - Definitions**

- ▶ Member States and stakeholders disagree on the contribution of the definitions to the fuel single market. In the perception of Member States the definitions work well, whereas the position of many industry operators indicate the definitions are not fully clear

### **Articles 3 (petrol) and 4 (diesel fuel)**

- ▶ Environmental and health benefits
- ▶ Improved engine and after treatment systems performance
- ▶ Impact on market fragmentation is difficult to evaluate. Fuel suppliers indicate there may be barriers resulting from variable biofuel content, but no estimates of additional cost provided

# Evaluation of Directive 98/70/EC

## Results - Efficiency

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### Derogations under Articles 3 and 4

- ▶ Cost-efficient. Estimates of the cost savings of the vapour pressure derogations:
  - ▶ €637 million (total investment) and €247 million per year of operational costs savings

### Article 6 (Marketing of fuels with more stringent environmental

**specifications)** has not been applied to date. Its approach does not seem to be the most efficient (Urban access restrictions seem more effective)

**Article 7 (Change in supply)** has not been applied to date. It is considered efficient by Member States

**Article 8 (Monitoring and reporting)** is considered to be efficient, although some Member States consider the costs of monitoring and reporting to be high, however the benefits of improved air quality outweigh these costs.

**Article 9 (Review process)** cannot be assessed since the European Commission has not yet published the report and proposal.

**Article 9a (Penalties)** is difficult to evaluate. It seems to be already efficient.

# Evaluation of Directive 98/70/EC

## Results - Coherence

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### General

- ▶ The FQD is generally coherent internally and with other legislation, except with regard to certain aspects related to biofuels

**Article 1 (Scope):** No coherence issues

**Article 2 (Definitions):** Refers to CN codes therefore higher (>30%) biofuel blends are outside the scope and unregulated. However, such fuels represent a negligible share at present

### Articles 3 (petrol) and 4 (diesel fuel)

- ▶ Fully coherent with the PVR\* Directives (94/63/EC & 2009/126/EC)
- ▶ Flexibility in RON specifications has not led to market fragmentation
- ▶ Use of derogations coherent and ensures that no Member State is unduly penalised due to exceptional circumstances

# Evaluation of Directive 98/70/EC

## Results - Coherence

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### Articles 3 (petrol) and 4 (diesel fuel) (cont.)

- ▶ Not fully coherent with Annexes I and II:
  - ▶ Bioethanol content limited to 10%, but FAME content in diesel above 7% is possible
  - ▶ Gas-oil specifications for NRMM are not coherent with Annex II
- ▶ FQD and RED interactions:
  - ▶ RED: 10% target for energy from renewable sources in transport by 2020
  - ▶ FQD upper limits of bioethanol (10%) and FAME (7%), but other contributions allow reaching the target (e.g. double-counted biofuels, HVO, electricity, ED85, ...)
  - ▶ Most Member States are still far from these limits → There are other barriers

# Evaluation of Directive 98/70/EC

## Results - Coherence

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### Article 5 – Free circulation

- ▶ Flexibility under FQD (3, 4, 7a) and RED (biofuel mandates and sustainability criteria) leads to differences in national implementation, which is not fully coherent with the objective of Article 5

**Articles 6 (More stringent env. specifications), 7 (Change in supply), 8 (Monitoring and reporting), 9 (Review process) and 9a (Penalties)** are considered coherent

**Article 8a (Metallic additives)** is coherent in practical terms, although it refers to MMT in fuel (it should be MMT in petrol)



# Evaluation of Directive 98/70/EC

## Results - Relevance

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### General

- ▶ The FQD overall is still considered to be relevant

**Article 1 (Scope) and 2 (Definitions):** No additional issues

### **Articles 3 (Petrol) and 4 (Diesel fuel)**

- ▶ The specifications are still necessary to ensure environmental and health protection and to facilitate the functioning of engines
- ▶ Not enough evidence on whether Annex I is adapted to the latest scientific and technical progress
- ▶ Derogations relevant for Outermost Regions (disproportionate cost)
- ▶ Vapour pressure derogations:
  - ▶ Relevant providing an adaptation period to the FQD until 2020
  - ▶ Conditional on compliance with other air quality legislation

# Evaluation of Directive 98/70/EC

## Results - Relevance

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**Article 6 (More stringent fuels):** Relevance under question

**Article 7 (Change in supply):** Considered a safeguard

**Article 8a (Metallic additives)** Although Member States consider that MMT would not be used in the absence of the Article, it acts as a safeguard.

**Article 9 (Review)** is considered relevant but the report has not been published yet

**Article 9a (Penalties)** Some Member States question the need for an article at EU-level, however it is relevant to ensure the level of penalty setting is equivalent

# Evaluation of Directive 98/70/EC

## Results – EU-added value

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### General

- ▶ A single market could not be delivered in the absence of the Directive

### Article 1 - Scope

- ▶ The scope has added value to enable the single market
- ▶ Creates a strong intra-EU market for fuel suppliers and vehicle manufacturers with competitive advantages for EU and non-EU suppliers

### Article 2 - Definitions

- ▶ Some stakeholders have called for more harmonisation via inclusion of the specifications of the CN-codes directly

### Articles 3 (Petrol) and 4 (Diesel fuel)

- ▶ Needed to ensure minimum environmental compliance and fuel quality necessary for vehicles to comply with vehicle standards
- ▶ Successful in removing sulphur and lead
- ▶ Some Member States have transposed the FQD differently (introduction of different limits)

# Evaluation of Directive 98/70/EC

## Results – EU-added value

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### **Article 6 (More stringent fuels)**

- ▶ Not used, limited EU-added value
- ▶ Other policy measures and mechanisms would be more suitable

**Article 7 (Change in supply):** Considered a safeguard

**Article 8 (Monitoring and reporting):** Mixed opinions as to the EU-added value of reporting. Likely that some MSs would otherwise reduce monitoring frequency and removal of common reporting would make checks difficult. Article therefore promotes compliance and contributes to delivery of the aims of the Directive.

**Article 8a (Metallic additives):** ensures implementation by all Member States

**Article 9 (Review)** is considered to add value, with some suggestions offered for improvements

**Article 9a (Penalties)** considered by stakeholders to have limited added value with potential for increased harmonisation

# Conclusions



# Evaluation of Directive 98/70/EC

## Conclusions

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- ▶ **Effective** elements of the FQD:
  - ▶ Environmental and health protection
  - ▶ Compliance level
  - ▶ Minimum fuel requirements: A driver towards the EU single fuel market
  
- ▶ **Less effective** elements of the FQD:
  - ▶ Harmonisation in the EU single fuel market:
    - ▶ Upper limits in annex I and II for biofuels allows for variation in blends
    - ▶ Flexibility in upper limit of FAME (Art. 4)
    - ▶ CEN standards in some countries but not others

# Evaluation of Directive 98/70/EC

## Conclusions

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- ▶ The FQD is **efficient** in:
  - ▶ Providing cost effective environmental and health protection
  - ▶ Providing fuel specifications that are compatible with engine standards
  - ▶ Avoiding disproportionate costs via derogations
  
- ▶ **Less efficient** elements of the FQD:
  - ▶ Article 6. Other options are more effective

# Evaluation of Directive 98/70/EC

## Conclusions

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- ▶ **Coherent** elements of the FQD:
  - ▶ Use of derogations
  - ▶ Approach to monitoring and reporting by Member States (Art.8)
  - ▶ Provision of a safeguard in case of disrupted supply (Art.7)
  - ▶ Approach to penalties (Art.9a)
  - ▶ Relation with the PVR Directives
  
- ▶ **Less coherent** elements:
  - ▶ Biofuels >30% blends not captured
  - ▶ Flexibility in FAME limit
  - ▶ Specifications of NRMM gas-oil
  - ▶ -



# Evaluation of Directive 98/70/EC

## Conclusions

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- ▶ The FQD overall is still considered to be **relevant**, with only Article 6 possibly less relevant

# Evaluation of Directive 98/70/EC

## Conclusions

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- ▶ **Positively** evaluated elements (EU-added value):
  - ▶ Introduction of harmonised fuel specifications
  - ▶ Environmental and health protection
  - ▶ Article 7 as safeguard against disruptions in fuel supply
  - ▶ Article 8a as safeguard against use of MMT
  
- ▶ **Inconclusive** elements (EU-added value):
  - ▶ Some stakeholders have called for more harmonisation
  - ▶ Article 6: Other measures considered more suitable
  - ▶ Article 8: Benefits may not fully compensate the administrative burden

# Evaluation of Directive 98/70/EC

## Conclusions

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Further considerations:

- ▶ Including higher blends of biofuels into the scope of the FQD
- ▶ Introducing a protection grade for biodiesel
- ▶ Introducing relevant CEN standards into the FQD

However, currently no compelling evidence that national flexibilities provided by the FQD have led to severe market disruptions.

Higher blends of biofuels are produced for niche markets and limited to a few Member States.

Limited improvement is expected by a potential inclusion of CEN standards into the FQD.

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# Thank you for your attention

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