EUROPEAN COMMISSION
DIRECTORATE-GENERAL
CLIMATE ACTION
Directorate C - Climate strategy, governance, and emissions from non-trading sectors
CLIMA.C.2 - Governance & Effort Sharing

EU ETS Monitoring and Reporting –
Training on Unreasonable costs

M&R Training Event of 27 November 2019

This document comprises training material for competent authorities and verifiers for the checking of unreasonable costs according to Commission Regulation (EU) No. 601/2012 of 21 June 2012 on the monitoring and reporting of greenhouse gas (GHG) emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council (the **MRR**)[1].

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[1] **https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1574681890853&uri=CELEX%3A02012R0601-20190101**

Table of content

1. LEGAL BACKGROUND

At several occasions, the MRR refers to "unreasonable costs" for possible derogation from required monitoring methodologies, in particular the application of certain tiers. Article 18 MRR sets out rules as to how any incurrence of unreasonable costs can be demonstrated.

2. OBJECTIVE

The M&R training event of 27 November 2019 aimed at:

- Providing technical support to the participants in performing their day-to-day tasks when assessing unreasonable costs involved in the approval of MPs;
- Provide hands-on training with the "unreasonable cost tool".

An additional objective for the training was to allow for further cascade to other MS audiences based on the case studies and this document.

3. SET-UP OF THE TRAINING EVENT

The training was set up in the following two sessions:

- **A theoretical part** covering the principles of unreasonable costs in EU ETS monitoring and reporting.
- **A practical part** with MS representatives sharing their experiences in unreasonable costs and a discussion of case studies in discussion groups.
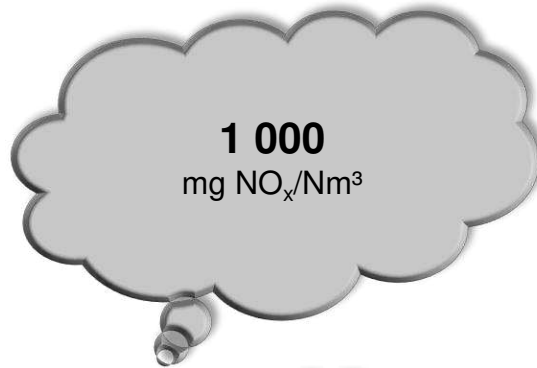
Annex I: Introductory presentation

Unreasonable costs

Christian HELLER

EU ETS Compliance Forum Training Event 2019
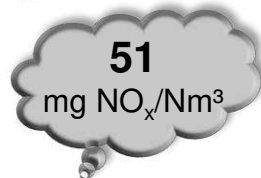**Brussels, 27 November 2019**

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Emitter and emissions

Emission limit value (mg/Nm³)

Large power plant

1 000
mg NO_x/Nm³

50

*Would you consider installing a **NO_x abatement system** (**10 000 € per year**) reasonable?*

Small factory

51
mg NO_x/Nm³

50

*Would you consider installing a **NO_x abatement system** (**500 000 € per year**) reasonable?*

Medium industrial installation

70
mg NO_x/Nm³

50
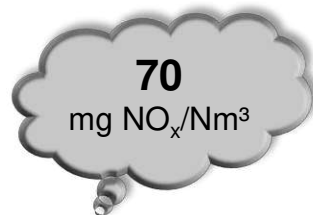
*Would you consider installing a **NO_x abatement system** (**50 000 € per year**) reasonable?*

Measures "reasonable"?

- ***No economic values*** *to balance costs and benefits*
- *Might be **good reasons** for that*
    - Environmental damage quite localised (few might be considerably harmed while many see no effects)
    - Moral reasons: who's to judge the price of one's health!?

- ***Different for GHG emissions*** *in the EU ETS → one common price signal, effects independent from geographical location of emission*

- ***Still to be clarified:***
    - How to quantify the improvement?
    - How to monetise the improvement?

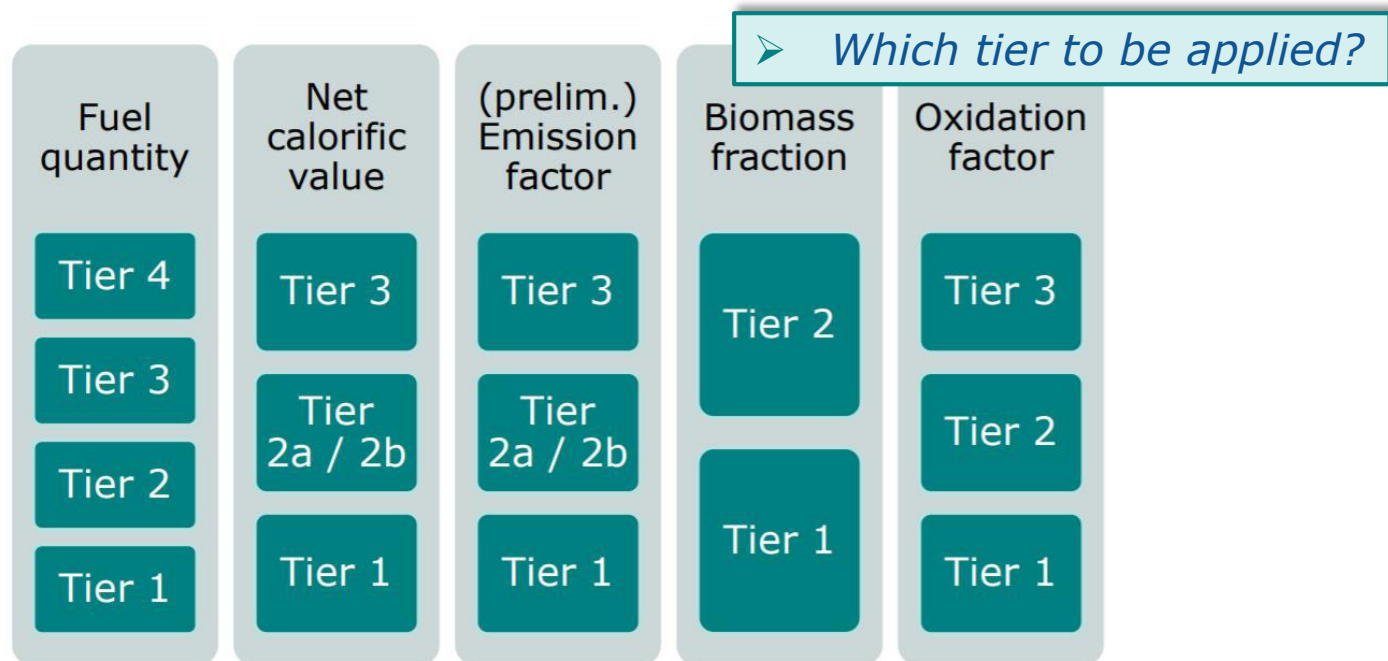> *Stay until the rest of the training to know the answers* ☺

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MRR - monitoring of emissions

- **Calculation-based approach**
  - *Standard methodology*
  - *Mass balance methodology*

- **Measurement-based approach** *(CEMS)*

- **Fall-back approach**

- **Combinations of the above**

MRR - monitoring of emissions

emissions	=	fuel quantity	•	net calorific value	•	emission factor	•	oxidation factor
t CO_2		t		GJ / t		t CO_2 / GJ		%

> ➢ *Which tier to be applied?*

Fuel quantity	Net calorific value	(prelim.) Emission factor	Biomass fraction	Oxidation factor
Tier 4	Tier 3	Tier 3	Tier 2	Tier 3
Tier 3	Tier 2a / 2b	Tier 2a / 2b		Tier 2
Tier 2			Tier 1	
Tier 1	Tier 1	Tier 1		Tier 1

Picture by ENVIRONMENT AGENCY AUSTRIA **umwelt**bundesamt

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Which tier to be applied?

Installation category	Source stream category	Tier required**
Cat. C* **(> 500kt)**	**Major**	*highest tier in Annexes II & IV*
	Minor	*highest tier in Annexes II & IV*
	de-minimis	*conservative estimates unless tier is achievable without additional effort*
Cat. B* **(50 < x ≤ 500kt)**	**Major**	*highest tier in Annexes II & IV*
	Minor	*highest tier in Annexes II & IV*
	de-minimis	*conservative estimates unless tier is achievable without additional effort*
Cat. A (≤ 50kt)	**Major**	*tier in Annex V*
	Minor	*tier in Annex V*
	de-minimis	*conservative estimates unless tier is achievable without additional effort*
Inst. with low emissions (< 25kt)	**Major**	*tier 1 unless higher tier is achievable without additional effort*
	Minor	*tier 1 unless higher tier is achievable without additional effort*
	de-minimis	*conservative estimates unless tier is achievable without additional effort*

* for calculation factors (emission factor, net calorific value,..) of source streams that are commercial standard fuels the same tier requirements as for category A installations apply

** for oxidation and conversion factor the minimum requirement is to apply the lowest tier in Annexes II & IV (normally tier 1 = 100%)

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Reasons for derogation

What if the required tier is not applied?

- *Carry out corrective action, OR*
- *Demonstrate either*
    - Article 17: Technical infeasibility
    - Article 18: Unreasonable costs (focus of this training)

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Which tier to be applied?

Installation category	Source stream category	Tier required**	Minimum tier (tier required technically not feasible or unreasonable costs)	Absolute minimum tier (technically not feasible or unreasonable costs for transitional period of up to three years)	If not at least tier 1 is possible
Cat. C* (> 500kt)	Major	*highest tier in Annexes II & IV*	*highest tier in Annexes II & IV minus 1 (minimum tier 1)*	*tier 1*	*Fall-back approach*
	Minor	*highest tier in Annexes II & IV*	*tier 1*	*n.a.*	
	de-minimis	*conservative estimates unless tier is achievable without additional effort*			*n.a.*
Cat. B* (50 < x ≤ 500kt)	Major	*highest tier in Annexes II & IV*	*highest tier in Annexes II & IV minus 2 (minimum tier 1)*	*tier 1*	*Fall-back approach*
	Minor	*highest tier in Annexes II & IV*	*tier 1*	*n.a.*	
	de-minimis	*conservative estimates unless tier is achievable without additional effort*			*n.a.*
Cat. A (≤ 50kt)	Major	*tier in Annex V*	*tier in Annex V minus 2 (normally tier 1)*	*tier 1*	*Fall-back approach*
	Minor	*tier in Annex V*	*tier 1*	*n.a.*	
	de-minimis	*conservative estimates unless tier is achievable without additional effort*			*n.a.*
Inst. with low emissions (< 25kt)	Major	*tier 1 unless higher tier is achievable without additional effort*			*Fall-back approach*
	Minor	*tier 1 unless higher tier is achievable without additional effort*			
	de-minimis	*conservative estimates unless tier is achievable without additional effort*			*n.a.*

* for calculation factors (emission factor, net calorific value,..) of source streams that are commercial standard fuels the same tier requirements as for category A installations apply

** for oxidation and conversion factor the minimum requirement is to apply the lowest tier in Annexes II & IV (normally tier 1 = 100%)

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Unreasonable costs

> ➤ *Costs are considered unreasonable, where the "costs exceed the benefit"!*

> ➤ *Costs to be taken into account:*

- *Investment costs*
- *O&M costs*
- *Other costs, e.g. costs for analyses*
- *IMPORTANT! Only costs which are <u>additional</u> and can be <u>clearly attributed</u> to the improvement measures can be taken into account → <u>no double counting</u>*

> ➤ *"Unreasonable costs" rule provides objective calculation procedure to achieve cost-efficient flexibility*

Parameters of costs

- *Depreciation period:*
  - this period should be based on the economic lifetime of the equipment.
  - The annual costs of the investment will consider the time value of money by calculating the annuity using the interest rate entered.
  - General: linear depreciation

- *Interest rate:*
  - The operator may base the calculation on a reasonably attributable interest rate, i.e. the rate the operator applies to other investments

Parameters of costs (2)

- *Operating & Maintenance (O&M):*
  - Includes any out-sourced calibration or maintenance
  - Any internal labour costs related to O&M → only which the operator can demonstrate to be clearly attributable to the improvement

- *Any other costs:*
  - External analysis by an accredited laboratory
  - Costs related to changes in operations, e.g. if the installation of measurement equipment requires a temporal shutdown of operations.
  - If a shutdown was planned anyway it shall not be taken into account (costs not additional).

> *Consideration of unreasonable costs is not relevant regarding an accumulated amount of up to 500 € for installations with low emissions, or 2 000 € in the case of other installations*

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Benefit

> ➤ *How is the benefit determined?*

$$Benefit = P \cdot AEm \cdot IF$$

P   specified allowance price = 20 € / t $CO_2(e)$
AEm   Average emissions from related source stream(s) [t $CO_2(e)$/year]
IF   Improvement factor

Improvement factor:

- *for AD: "Uncertainty achieved – Uncertainty required"*

- *for improvements not related to AD: 1%*

Benefit for activity data

$$Benefit = P \cdot AEm \cdot \left(U_{curr} - U_{new\,tier} \right)$$

Improvement factor

U_{curr} Current uncertainty (not the tier) [%]
$U_{new\,tier}$ Uncertainty threshold of the new tier to be reached [%]

Example:
- Current measuring instrument's uncertainty: 2.8%
- Uncertainty required by MRR: 1.5%
- Source stream's annual emissions: 760 kt CO_2 / year

→ **Benefit:** 20 €/t CO_2 x 760 kt CO_2 x 1.3% = **197,600 €**

➢ *Costs (e.g. investment, O&M, etc. costs for new equipment) up to 197,600 € per year not considered unreasonable!*

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Benefit for other cases

$$Benefit = P \cdot AEm \cdot 1\%$$

Improvement factor

- *Benefit for:*
  - a switch from default values to analyses for the determination of calculation factors;
  - an increase of the number of analyses per source stream
  - shortening of calibration and maintenance intervals of measuring instruments;
  - improvements of data flow activities and control activities reducing the inherent or control risk significantly
  - Etc.

- *Example:*
  - Source stream's annual emissions: 760 kt CO_2 / year
    → **Benefit**: 20 €/t CO_2 x 760 kt CO_2 x 1.0% = **152,000 €**

> ➢ *Costs up to 152,000 € per year not considered unreasonable!*

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Example from GD1

- *Old measuring instrument is found to not function properly any more, and is to be exchanged for a new one.*
- ***Instrument A (similar to old one)***
  - Uncertainty achievable: 2.8%
  - Costs: 40,000 €
- ***Instrument B***
  - Uncertainty achievable: 2.1%
  - Costs: 70,000 €
- *Other costs (e.g. O&M) considered equal in both options*

Example from GD1 – cnt'd

$$Benefit = 20 \cdot 120\,000 \cdot (2.8\%\text{-}2.5\%) = 7\,200€ \text{ per year}$$

$$Costs = \frac{30\,000}{5} = 6\,000€ \text{ per year}$$

→ *Costs are in this case not unreasonable*

➢ *Demonstration of this example in the* **"unreasonable cost tool"**

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The "theory of relative improvement"

- *There are cases where more than one methodology exists which does not incur unreasonable costs*
- *Example: Installation has to apply sampling & analysis (Art. 32 to 35 MRR) for a specific source stream*
  - Calculations suggest that the operator can either reduce the frequency or use a non-accredited laboratory without incurring unreasonable costs, but not both
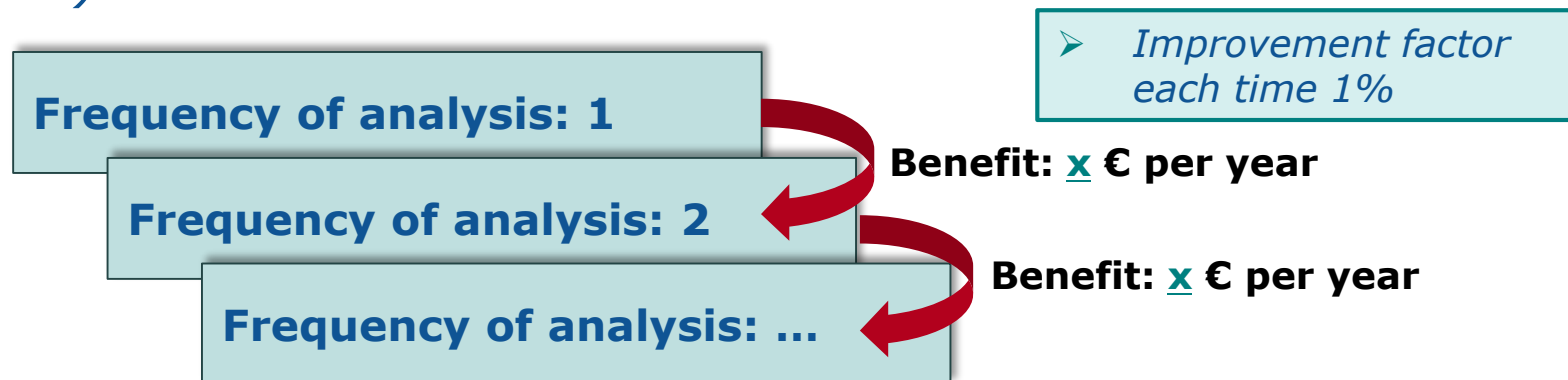 - Which approach should the installation choose?

Recommended approach

How to proceed if Articles 32 to 35 incur unreasonable costs?

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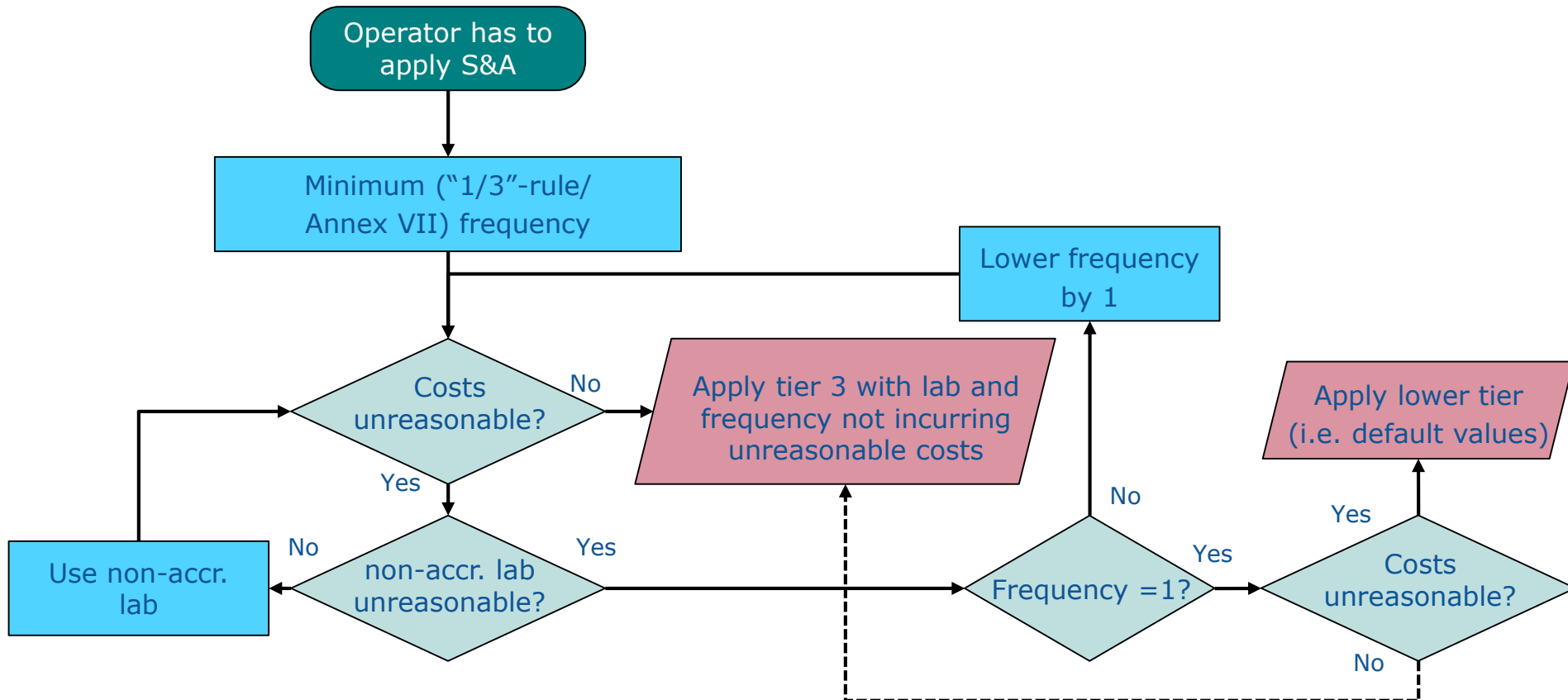
The "vicious" improvement cycle

- *Once an improvement is made, further improvements might no longer incur unreasonable costs in the future as well*

- *Example: Frequency of analysis (same costs for each analysis)*

> *Improvement factor each time 1%*

Frequency of analysis: 1

Benefit: x € per year

Frequency of analysis: 2

Benefit: x € per year

Frequency of analysis: ...

> *Situation might occur where the operator can improve every year until achieving the highest tier → continuous improvement (Art. 9)*

Methodologies not based on tiers ("fall-back" approach)

- *If achieving at least tier 1 for any parameter (activity data, calculation factor,..) is technically not feasible or would incur unreasonable costs, the operator may apply a fall-back approach*

- *Operator has to perform extensive uncertainty assessment annually*

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How to demonstrate evidence?

- *MRR does not prescribe specific evidence, documents, etc.*
- *Some recommendations:*
  - **Depreciation period**: cross-check with fiscal law tables (e.g. depreciation periods of measuring instruments, industrial equipment)
  - **Staff costs**: require split of total costs to person-days and costs per day, compare with sector peers, or even your own (full) labour costs
  - **External expertise**: request information from measuring instruments supplier, laboratories,..
  - Always make sure the **ADDITIONALITY** is demonstrated to your satisfaction
  - Etc.
- *Verifier checks evidence of underlying assumptions for the calculation of unreasonable costs*
  (basis: Art. 10(1) and 17 AVR)

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Consequences

- *If the required tiers are not met for any major or minor source stream, an improvement report is needed pursuant to Article 69*
  - Category C: every year
  - Category B: every two years
  - Category A: every four years
  - As of 2021, CA may extent these periods to 3, 4, 5 years, respectively
- *Same timelines apply if fall-backs applied*

Case studies

- **Case 1***: New meter for natural gas*

- **Case 2***: Calculation factors for heavy fuel oil*

- **Case 3***: Fall-back approach for organic solvents*

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Thank you for your attention

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Annex II:

Experience from CA representatives

Overview – installations and emissions (2018)

Total annual emissions from fuel (t CO₂)

Installations	Number	Emissions in %
Installations with low emissions	28	
Category A installations	36	8
Category B installations	7	11
Category C installations	3	79
Total number of installations	46	

Other fossil fuels 3%

Natural gas 15%

Coal 82%
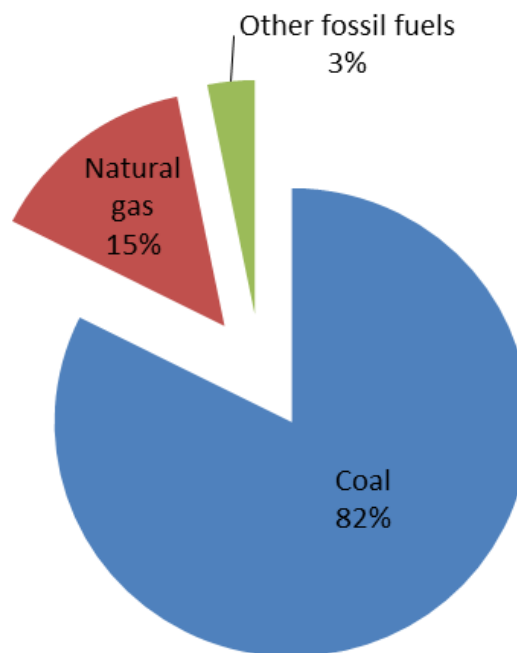
Overview – unreasonable cost case

- One case with the unreasonable cost for coal analysis

/installation with low emissions and about 5.000 t coal per year/

- the operator provided documentation and proved that the costs for coal analysis were higher than 500 € per reporting period so…

- the CA approved the use of lower tiers (default values) for EF and NCV.

Experience and observations –
MP (emissions) and MMP (free allocation) connection

- The calculation based method requires several measurements of the quantity of fuels and materials.

- Higher tiers are in general, more difficult and costly to meet than lower ones.

- The highest emissions are monitored most accurately, while less ambitious methods are applied for lower ones.

  - *…emission allowance price of 20 € vs current market price…..*

  - *…the more accurate meters in fact can't bring the operator any real monetary savings because the unreasonable costs are directly linked to 20 € price for an emission allowance……*

  - *…the benefit is considered to be proportionate to an amount of allowances……*

- Now the CA is again facing with unreasonable costs cases in the received MMPs applications ….. and will in all cases require the operators to use the Commission's unreasonable cost tool ….. so this will be the part of MMP approval process in next year.

REPUBLIC OF SLOVENIA
MINISTRY OF THE ENVIRONMENT AND SPATIAL PLANNING

Thank you for your attention!

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MINISTERO DELL'AMBIENTE
E DELLA TUTELA DEL TERRITORIO E DEL MARE

Unreasonable costs assessment for installations

Matteo Girovasi

EU ETS expert
at Italian Ministry for Environment Land and Sea

Training Event, Brussels, 27 November 2019

Context

- EU Reg. 601/2012 (MRR, now 2066/2018) **tiered approach**

- Requirements for uncertainty thresholds on **activity data** and **calculation factors**

- Between reasons for not complying with tiers requirements, unreasonable costs are foreseen by Art. 18 MRR

- $$C < P * AEm * (U_{curr} - U_{new\ tier})$$ $$C < P * AEm * IF$$

  $P = 20\ euro/tCO_2$

  $AEm = average\ annual\ emissions$

  $IF = 1\%$

Situation in Italy

- 2013-2014: 45 installations out of 1051 used unreasonable costs justification

- 2019: 21 installations out of 997 uses unreasonable costs justification

- Between them: ~90% related to calculation factors and ~10% on activity data

- Calculation factors: in almost all cases **tier 3 approach** not applied (analysis frequency not met and/or analysis not performed at all)

2013-2014
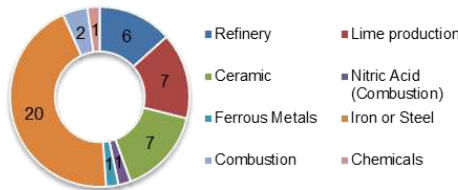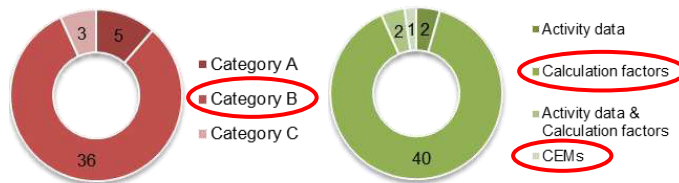
2019
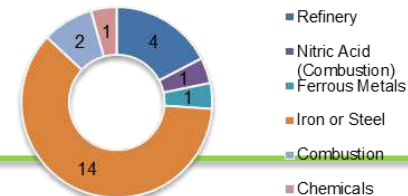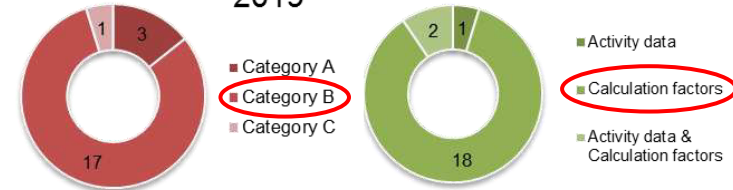
Approach and assessment

Step 1: analyse the installation situation, the source stream directly interested and why MRR requirements can not be met

Step 2: check completeness of documentation and information provided by the operator for *unreasonable costs* demonstration. **Unreasonable costs tool** is suggested, but not mandatory. It is very useful in cases where activity data are involved, not the same for calculation factors

Step 3: check **parameters** considered in the calculation and **values** used by the operator. For certain data, a **price quotation** is requested to be presented to the CA as proving the values used (analysis costs, instruments and installation costs, etc.)

Step 4: interaction with operators where some parameters are missing or data are not clear or not adequately supported by documentation, until the questions are positively closed

Step 5: **approval** of unreasonable costs justification within the approval of the MP or **rejection** of the justification and MP adjusted in appropriate way and aligned to MRR requirements

Step 6: the operator is requested to verify and **update** unreasonable costs justification with a certain frequency (in most cases every year). This is linked also to requirements in art. 69 MRR and IR

Main findings and assessment

- All unreasonable costs justifications are analysed in detail

- Assessment is done by the CA experts

- Unreasonable costs justification is analysed together with MP

- Time consuming (1h for simple cases, more discussion and deep analysis over one day for more complex cases)

- Need for specific technical expertise in some cases

- More complexity where calculation factors are involved

Difficulties and limitations

Difficulties:

- Difficult to discuss values used (depreciation period, Operating&Maintenance, other costs)
- Sampling and analysis: significant number of samples and representative number of analysis in the reporting period are points of discussion → Costs related to external sampling and analysis

Limitations:

- Specific expertise needed in certain cases, due between others to the complexity of the installations, kind of analysis performed, sampling standards not existing, particular kind of materials or source streams involved, etc.

Thank you for your attention!

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Umwelt Bundesamt

DEHSt
Deutsche
Emissionshandelsstelle

EU ETS Compliance Forum
Training Event 2019
Brussels, 27th November

Unreasonable costs: examples

Rebeca Sahagún Martínez

Example 1

- Chemical installation category C
- two measures necessary to meet required tier 4 for a major source stream (average: 90,000 t CO2/a)
- Currently only tier 3 can be met.
- The two measures together lead to unreasonable costs.
- The operator asks if one of the two measures has to be implemented although the required tier cannot be met with only implementing one measure.

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Example 1

- The first measure would cost 6,800 €/a.
- The second measure would cost 16,200 €/a.
- According to Art. 18 MRR: benefit of a measure is reached if the next tier can be met by implementing a measure benefit = (1.9%-1.5%)* 90,000 t CO2/a * 20 € = 7,200 €/a
- What is a „measure"?
- A „measure" leads to meet the next higher tier → the two necessary changes would need to be considered **together**.

Example 2:

- An installation uses a non-accredited in-house lab
- The analyses of the parameters is carried out weekly
- According to Art. 34 MRR paragraph 2 an non-accredited lab can only be use when:
  - An accredited lab is technically not feasible or would incur unreasonable costs.
  - The non-accredited lab has to meet requirements equivalent to EN ISO/IEC 17025.
- How to prove unreasonable costs?

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Example 2

- Unreasonable costs for an accredited laboratory, example:
- accredited lab:
  - 250 € pro analysis * 52 weeks + 25 € transport * 52 weeks = 14,300 €
- non-accredited in-house lab:
  - 180 € pro analysis * 52 weeks = 9,360 €
- Additional costs: 14,300-9,360 = 4,940 € > 2,000 € ➔ It exceeds the threshold for costs
- With unreasonable costs and prove for equivalence to EN ISO/IEC 17025 the non-accredited in-house lab can be used according to Art. 34 paragraph 2

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Note to Example 2

- Art. 18 MRR paragraph 3:

When assessing the unreasonable nature of the costs with regard to measures increasing the quality of reported emissions but without direct impact on the accuracy of activity data, the competent authority shall use an improvement factor of 1 % of the average annual emissions of the respective source streams of the three most recent reporting periods.

- In our opinion this article doesn't apply, because the improvement is already given. However, we cannot say the same when comparing the equivalence of accredited to non-accredited laboratories (= equivalent measures on the same tier level).

- For unreasonable costs we focus on Art. 18 MRR paragraph 4

Measures relating to the improvement of an installation's monitoring methodology in accordance with Article 69 shall not be deemed to incur unreasonable costs up to an accumulated amount of EUR 2 000 per reporting period. For installations with low emissions that threshold shall be EUR 500 per reporting period.

Example 3 (special case)

- Refinery installation category C
- The parameters for different source streams are analysed.

non-accredited In-House Lab

	Formel	Q54004 24.10.2018 Mol%	24.10.2018 Mol%	Mittelwert TSL Mol%
Methan	CH4	1,51	1,5	1,51
Ethan	C2H6	5,62	5,65	5,64
Ethen	C2H4	0	0	
Ethin	C2H2	0	0	
Propan	C3H8	1,18	1,17	1,18
Propen	C3H6	0	0	
Propin	C3H4	0	0	
Propadien	C3H4	0	0	
n-Butan	C4H10	0,38	0,37	0,38
i-Butan	C4H10	0,23	0,23	0,23
tr-Buten	C4H10	0	0	
1-Buten	C4H8	0	0	
i-Buten	C4H8	0	0	
cis-Buten	C4H10	0	0	
1,3-Butadien	C4H6	0	0	
	C5H10	0	0	
n-Pentan	C5H12	0,16	0,15	0,16
i-Pentan	C5H12	0,23	0,23	0,23
C6+	C6H14	0,34	0,44	0,39
H2		26,32	26,33	26,33
O2/Argon		0,34	0,3	0,32
N2		2,72	2,54	2,63
CO		15,01	15,06	15,04
CO2		41,77	41,83	41,8
H2S		0		
DME		3,24	3,24	3,24
Methanol		0,97	0,99	0,98
Unknown				
Summe		100,02		100,03
CO2 Faktor	3,664 t CO2/ t C			
Heizwert U	kJ/100g	1072,78	1083,14	1077,96
Dichte	kg/m³	1,278	1,281	
C-Gehalt	g C/100g	35,8	36	35,9
CO2-Faktor	t CO2/t Heizgas			1,3154
EW				0,00122

accredited Lab EN 15984

	2607670_00 4 A 25.10.2018 Mol%	2607670_00 4 B 25.10.2018 Mol%	Mittelwert ASG
Methane	1,58	1,58	1,58
Ethane	5,72	5,71	5,71
Ethylene			
Propane	1,26	1,26	1,26
Propylene			
n-Butane	0,4	0,4	0,4
Isobutane	0,24	0,24	0,24
Trans-2-Butene			
1-Butene			
Iso-Butylene	0	0	0
2-methyl-2-Butene	0	0	0
1-Penten, Cis-Pentene			
n-Pentane	0,15	0,15	0,15
Isopentane	0,22	0,22	0,22
C6+ backflush	0,22	0,22	0,22
Hydrogen	27,24	27,26	27,25
Oxygen	0,37	0,37	0,37
Nitrogen	2,8	2,8	2,8
Carbonmonoxide	15,32	15,33	15,33
Carbondioxide	44,47	44,44	44,45
Unknown	0,02	0,02	0,02
Summe	100	100,01	100
	934,79	935,55	935,17
	1,2164	1,2161	1,2163
	34,54	34,54	34,54
	1,266	1,266	1,266
	0,00135	0,00135	0,00135

Net calorific value and carbon content are more accurate under the non-accredited in-house lab, because it analyses more substances in the installation than the accredited lab EN 15984 ➔ In this special case we accept the in-house non-accredited lab under the principle of "Accuracy" Art. 7 MRR.

Umwelt Bundesamt

DEHSt Deutsche Emissionshandelsstelle

Thank you for your attention!

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UNREASONABLE COSTS

AUSTRIAN PERSPECTIVE

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TABLE OF CONTENT

- Austrian structure for the EU ETS compliance cycle

- Checking tasks

- Results of the checking tasks

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AUSTRIAN STRUCTURE FOR THE EU ETS COMPLIANCE CYCLE

- Approx. 190 EU ETS installations

- Decentralized authority structure

- Local Competent Authorities (CA)
  - Checking of monitoring plans
  - Issuing permits for monitoring plans

- Federal Ministry for Sustainability and Tourism
  - Receives annual emissions reports and improvement reports
  - Checking tasks (e.g.: monitoring plans, improvement reports, emission reports)
    → performed by Environment Agency Austria (Umweltbundesamt)

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CHECKING TASKS

- Monitoring plans (MP)
  - In case of severe non compliances, the permit is withdrawn and MP must be changed accordingly
    - →Difficulties
  - Period of objection (6 weeks after permits are issued)
  - Missing support/supplement documents

- Annual emission reports (AER)
  - Spot checks: 20% of the installations are checked annually in detail
  - Checks include whether required tiers are met, categorisation of source streams, etc.

- Improvement reports
  - Tier approach
  - Fall-back
  - Non conformities (verification report)

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RESULTS OF THE CHECKING TASKS

- 4 cases of unreasonable costs
  - In 2 cases calculation was sent with the monitoring plan
  - In 1 case calculation was sent with an improvement report
  - In 1 case improvement report required an updated monitoring plan resulting in a fall-back approach in combination with the unreasonable cost calculation

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Annex III: Case Studies and Model Answers (Suggested Approaches)

- **Example 1:** New meter for natural gas

- **Example 2:** Calculation factors for heavy fuel oil

- **Example 3:** Fall-back approach for organic solvents

Disclaimer: *Each example is accompanied by a 'model' answer (approach) that aims to facilitate understanding for participants and to illustrate at least one possible solution for each case. As a consequence, it is not claimed that these 'model' answers show the only correct solution(s). Other approaches might be fully in line with the requirements in the M&R Regulation as well.*

Unreasonable costs, example 1:

New meter for natural gas

A category B installation is firing natural gas and its current combination of flow measurement instrument and electronic volume converter (EVC) achieves an uncertainty of 3.2 %. The set-up needs to be replaced soon by a new one due to regular malfunctioning. A similar equipment of flow meter – EVC achieving the same uncertainty would cost 45 000 € / 20 000 €, respectively, with annual O&M costs of 2 000 € / 250 €.

An alternative flow meter – EVC combination, which would allow to achieve 1.2% uncertainty, would cost 50 000 € / 25 000 €, respectively. O&M costs are 2 000 € / 500 €.

The operator argues that the better equipment would cost about 14 000 € per year and is therefore unreasonable to install.

QUESTION A) Is the operator's argument correct, assuming that the average annual emissions of the source stream are 6 000 t CO_2, the equipment has a depreciation period of 8 years and the operator applies an interest rate of 5 % for its investments?

QUESTION B) What kind of evidence would you request from the operator?

QUESTION C) Would the situation be different if it concerned:

- a minor or a major source stream, OR
- a category A installation, OR
- a small emitter

QUESTION D) What would the depreciation period or interest rate have to be to change the result of the unreasonable cost assessment?

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Unreasonable costs, example 1: model answer

New meter for natural gas

Ad Question a)

The operator just argues the cost without taking into consideration the benefits. When completing the unreasonable cost tool it becomes clear that the costs cannot be considered unreasonable and the operator would have to meet the higher tier.

(a)	**Direct impact on accuracy?**		WAHR
	Uncertainty currently achieved:		3,20%
	Uncertainty related to the tier required:		1,50%

i. Current or reference costs
Please enter here the costs related to your current methodology or equipment OR, when comparing two or more options, the costs related to the reference.

Brief description	Investment costs			O&M costs [€/year]	Other costs [€/year]	Annual costs [€]
	Investment costs [€]	depreciation period [years]	interest rate [%]			
Flow meter 1	45 000,00	8	5	2 000,00	0,00	8 962,48
EVC 1	20 000,00	8	5	250,00	0,00	3 344,44
					Sum =	12 306,92

ii. Costs of the new equipment or new measures

Brief description	Investment costs			O&M costs [€/year]	Other costs [€/year]	Annual costs [€]
	Investment costs [€]	depreciation period [years]	interest rate [%]			
Flow meter 2	50 000,00	8	5	2 000,00	0,00	9 736,09
EVC 2	25 000,00	8	5	500,00	0,00	4 368,05
					Sum =	14 104,14

(c)	**Annual costs (Sum of all "additional" costs)**				=	1 797,22

		EUA price [€/t CO2e]		Average annual emissions		Improvement factor			
(d)	**Annual Benefits**	20	x	6 000	x	1,70%		=	2 040,00

(e)	**Costs are unreasonable?**		FALSCH

Ad Question c)

The situation would not be different if it concerned either a minor or a major source stream. The result of the unreasonable cost assessment would be the same.

For category A installations, and in particular for small emitters, the situation would be different as they have to meet only tier 2 (5%) which the reference equipment would already allow to achieve.

Unreasonable costs, example 2:

Calculation factors for heavy fuel oil

A category B installation is firing heavy fuel oil accounting for 43 500 t CO_2 per year. It currently applies tier 2a (default values) for NCV and EF and argues that sampling and analysis would incur unreasonable costs:

- Sampling equipment: 20 000 €, depreciated over 10 years at 4 %
- Staff costs: 10 man-days per year, each 500 €
- Cost of each analysis by accredited laboratory: 300 €

QUESTION A) Would the operator have to switch to tier 3 and, if so, why and what would be the exact monitoring methodology for the NCV/EF to be applied (which laboratory, frequency, etc.)?

QUESTION B) What kind of evidence would you request?

QUESTION C) How would the situation change if the installation already performed internal analysis in its own non-accredited laboratory?

QUESTION D) How would you assess any further potential improvements in subsequent years?

PLEASE USE THE TOOL FOR "UNREASONABLE COSTS", TO THE EXTENT POSSIBLE.

Unreasonable costs, example 2: model answer

Calculation factors for heavy fuel oil

Ad Question a)

For heavy fuel oil, the operator would have to analyse at a minimum frequency of at least six times per year, according to Annex VII of the MRR. Tier 3 with that frequency would indeed incur unreasonable costs.

(a) **Direct impact on accuracy?**						FALSCH

Uncertainty currently achieved:
Uncertainty related to the tier required:

ii. Costs of the new equipment or new measures

Brief description	Investment costs			O&M costs [€/year]	Other costs [€/year]	Annual costs [€]
	Investment costs [€]	depreciation period [years]	interest rate [%]			
Sampling equipment	20 000,00	10	4			2 465,82
Staff costs				5 000,00		5 000,00
Analysis by accredited laboratory					1 800,00	1 800,00
					Sum =	9 265,82

(c) **Annual costs (Sum of all "additional" costs)**					=	9 265,82

	EUA price [€/t CO2e]		Average annual emissions		Improvement factor		
(d) **Annual Benefits**	20	x	43 500	x	1,00%	=	8 700,00
(e) **Costs are unreasonable?**		WAHR					

However, a frequency of analysis of four times per year would not incur unreasonable costs.

(a) **Direct impact on accuracy?**						FALSCH

Uncertainty currently achieved:
Uncertainty related to the tier required:

ii. Costs of the new equipment or new measures

Brief description	Investment costs			O&M costs [€/year]	Other costs [€/year]	Annual costs [€]
	Investment costs [€]	depreciation period [years]	interest rate [%]			
Sampling equipment	20 000,00	10	4			2 465,82
Staff costs				5 000,00		5 000,00
Analysis by accredited laboratory					1 200,00	1 200,00
					Sum =	8 665,82

(c) **Annual costs (Sum of all "additional" costs)**					=	8 665,82

	EUA price [€/t CO2e]		Average annual emissions		Improvement factor		
(d) **Annual Benefits**	20	x	43 500	x	1,00%	=	8 700,00
(e) **Costs are unreasonable?**		FALSCH					

It is furthermore also reasonable to argue that the improvements concerns both calculation factors, NCV and EF. Therefore, costs for sampling equipment, staff costs, etc. might only be half the costs for each factor in consideration. As a consequence, costs even for six analyses per year would no longer be unreasonable.

Ad Question c)

In that case, the operator may already have the relevant sampling equipment and staff costs would no longer be additional. If those costs are disregarded only the costs for the accredited laboratory would need to be considered in which case no unreasonable costs would be incurred.

Ad Question d)

Once any improvement is made (e.g. apply tier 3 at a frequency of four times per year) and subsequent improvement might no longer incur unreasonable costs. Increasing the frequency from four to six times per year would even be below the 2 000 € per year threshold, in which case the operator would have to improve anyway.

Unreasonable costs, example 3:

Fall-back approach for organic solvents

A category A installation is coating parts for the automotive industry using organic solvents. The volatile solvents are collected in a hood and fed into a post-combustion unit, as required by the relevant volatile organic compounds (VOC) regulation. The regulation also requires the installation to carry out a mass balance for each solvent.

As this methodology involves mixtures of solvents and only some measuring of amounts, it does, in itself, not allow compliance with the required tiers for each solvent and, therefore, the operator is using a fall-back approach, i.e. the results of the mass balance. The operator argues that meeting at least tier 1 for these approx. 13 000 t CO_2 per year would incur unreasonable costs and determines the uncertainty to be 14%.

The operator provides the following information:

4 of infrared gas chromatographs	72 000 €
Installation of the equipment	28 800 €
Data processing equipment (temperature, pressure,..)	20 400 €
4 flow meters	20 000 €
Measuring platform	28 000 €
Maintenance contract costs per year	7 200 €
Internal costs per year	4 800 €

QUESTION A) Would the operator have to apply any tier or can he continue to apply the fall-back approach?

QUESTION B) What kind of evidence would you request?

PLEASE USE THE TOOL FOR "UNREASONABLE COSTS" TO THE EXTENT POSSIBLE.

Unreasonable costs, example 3: model answer

Fall-back approach for organic solvents

Ad Question a)

Costs would be unreasonable and the operator can continue to apply a fall-back approach. However, this implies that he has to continue to submit improvement reports and carry out an uncertainty assessment each year, pursuant to Article 22.

(a)	Direct impact on accuracy?						WAHR
	Uncertainty currently achieved:						14,00%
	Uncertainty related to the tier required:						5,00%

ii. Costs of the new equipment or new measures

Brief description	Investment costs			O&M costs [€/year]	Other costs [€/year]	Annual costs [€]
	Investment costs [€]	depreciation period [years]	interest rate [%]			
IR equipment and installation	169 200,00	8	4			25 130,91
Maintenance contract				7 200,00		7 200,00
Internal costs					4 800,00	4 800,00
					Sum =	37 130,91

(c)	Annual costs (Sum of all "additional" costs)		=	37 130,91

		EUA price [€/t CO2e]	Average annual emissions	Improvement factor	
(d)	Annual Benefits	20	x 13 000	x 9,00%	= 23 400,00

(e)	Costs are unreasonable?	WAHR