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 Data Gaps**

M&R Training Event of 28 November 2019

This document comprises training material for competent authorities and verifiers for the checking of data gaps 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].

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

Table of content

1. LEGAL BACKGROUND

Article 65 MRR requires the operator to close any data gaps conservatively. In addition to that Article 23 MRR sets out rules where a temporal deviation from the required tier occurs.

2. OBJECTIVE

The M&R training event of 28 November 2019 aimed at providing technical support to the participants in performing their day-to-day tasks when assessing temporary deviations of tiers and data gaps.

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 parts:

- **An introductory presentation on data gaps**: this part followed the structure and content of the guidance paper[2] prepared by the Task Force Monitoring & Reporting
- A couple of **case studies** discussed with the training participants
- An introductory presentation on the **verifiers' tasks**
- A brief overview of **CAs having to conservatively estimate emissions** pursuant to Article 70 MRR

[2] https://ec.europa.eu/clima/sites/clima/files/ets/monitoring/docs/cf_tf_monitoring_workingpaper_datagaps_en.pdf

Annex I: Presentation

Data gaps

Christian HELLER
Machtelt OUDENES

EU ETS Compliance Forum Training Event 2019
Brussels, 28 November 2019

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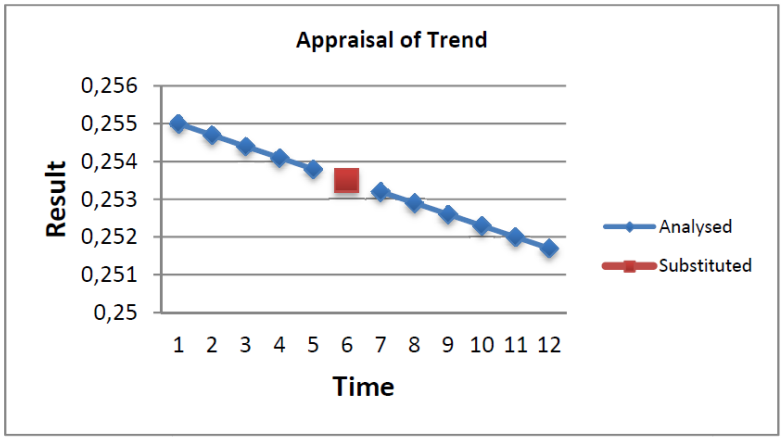
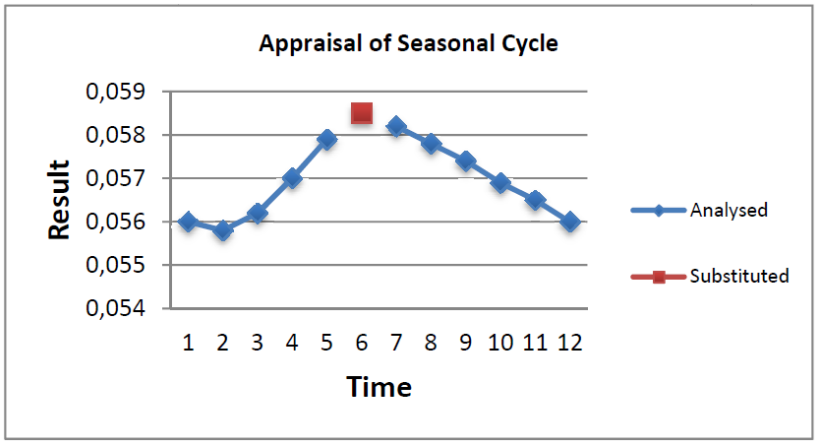
Background

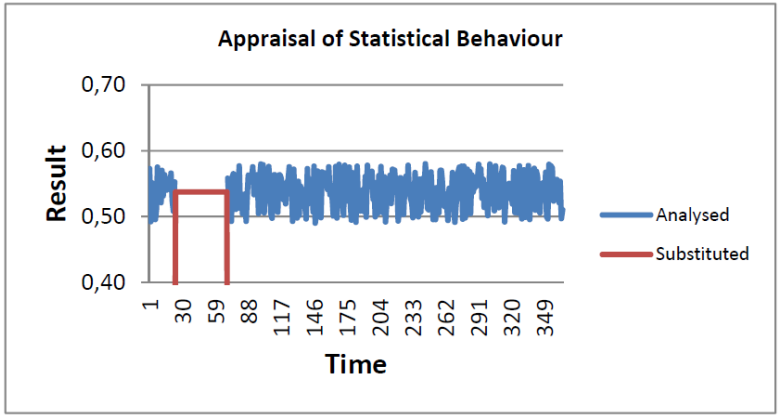
- *Even with well-defined MP it may happen that data gaps occur*

- *Operator should not have "benefits" from such occurrence → substitute missing data with "conservative" methods*

Examples







Values to close the gaps should be "conservative".

Typical ways of closing data gaps

- *Using readings of other (redundant) instruments of same or lower "quality" (=uncertainty / tier)*
- *Use calculation algorithm for correcting data (e.g. for drift)*
- *Use a correlated parameter for calculating the required parameter*
- *Use historical data (average where appropriate)*
- *Interpolate in a trend*
- *Etc.*

In order to make the values "conservative", a suitable "safety margin" should be added.

Legal background (1)

- ***Art. 23**: temporary deviation from approved tier*
  - Use highest achievable tier
  - Notify CA (reasons for deviation, interim methodology,..)
- ***Art. 63**: Corrective action ("avoiding underestimation of emissions")*

Legal background (2)

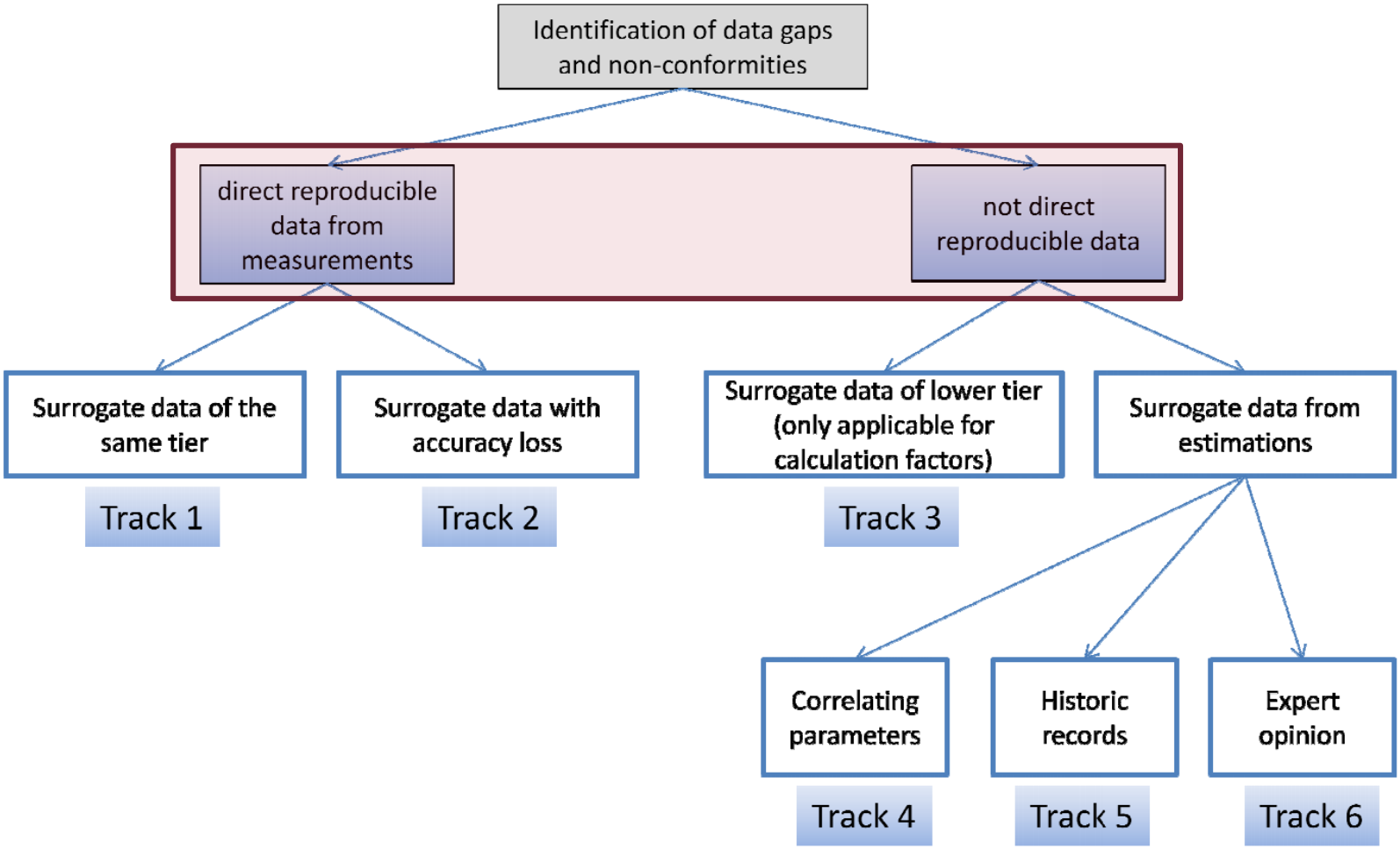
- ***Art. 65**: Data gaps*
  - use **"appropriate estimation method"** for determining conservative surrogate data
  - Establish written procedure laying down the used methodology (add to MP) for future re-use.
- ***Art. 70**: Determination of emissions by CA*

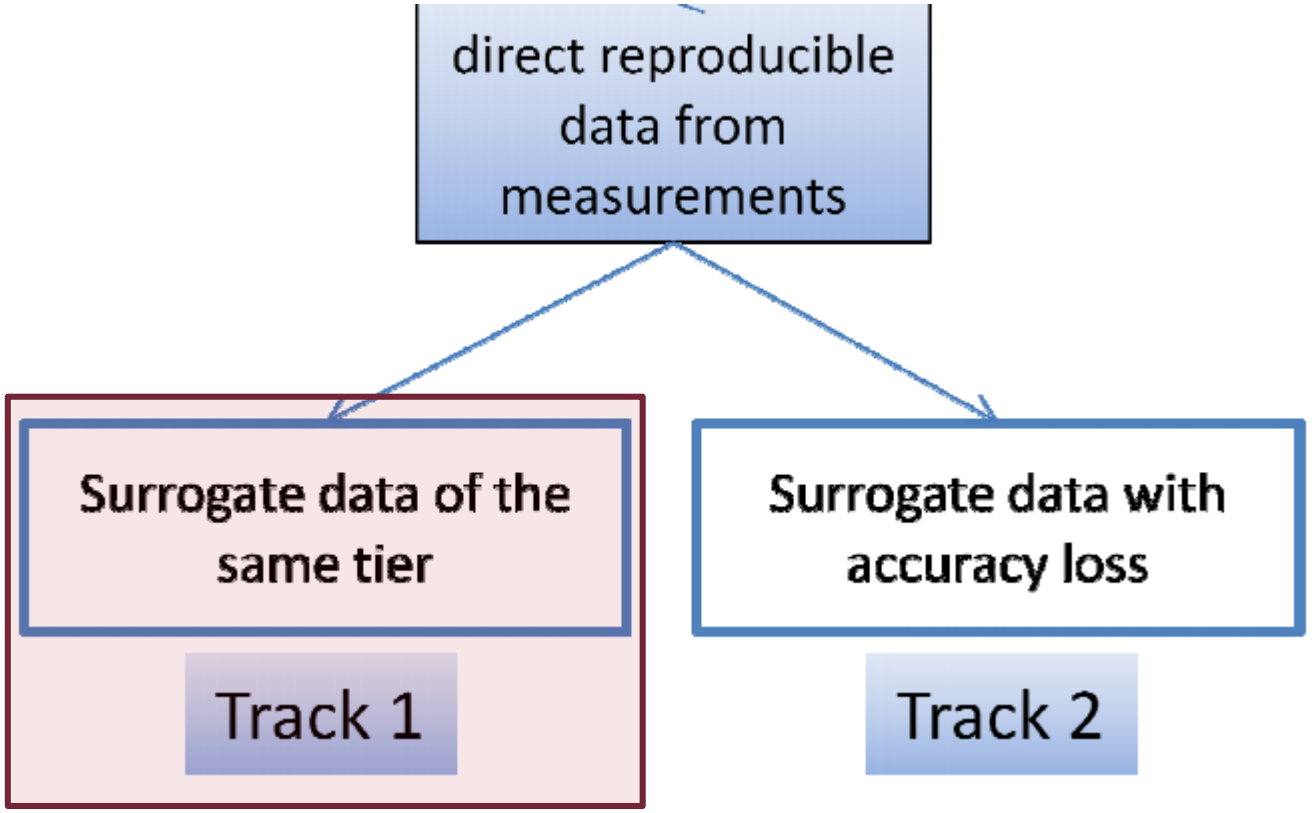
Legal background (3)

- ***Art. 3(19):*** *'conservative' means that a set of assumptions is defined in order to ensure that no under-estimation of annual emissions […] occurs*

- ***Spirit of the MRR:*** *Application of a 95% confidence level (see e.g. uncertainty assessment)*

Decision tree




direct reproducible data from measurements
Surrogate data of the same tier
Surrogate data with accuracy loss
Track 1
Track 2

Track 1

Reproducible data of the same quality

- Example AD: Redundant metering system delivering data at the same quality (e.g. subject to NLMC) is installed
- Example CF: Installation and the supplier have established procedures to S&A the carbon content by accredited laboratories

$$D_r = S \text{ (no safety margin)}$$

D_r = data to be used in emissions reporting
S = surrogate data derived from a redundant system/process

Track 2

Reproducible with quality loss

- If data can be replaced by surrogate data of lower quality then a safety margin is required.

2-1: Activity data: $D_r = S + S * (U_s - U_t)$

2-2: Calculation Factor: $D_r = S + S * (U_s - U_P)$

2-3: If not quantifiable: $D_r = S + S * x\%$

D_r = data to be used in emissions reporting
S = surrogate data derived from a redundant system/process
U_s = quantified uncertainty of the secondary system including corrective measures
U_t = uncertainty of the approved tier
U_p = quantified uncertainty of the undisturbed primary system
x %= individually demonstrated safety margin

Track 2 (2)

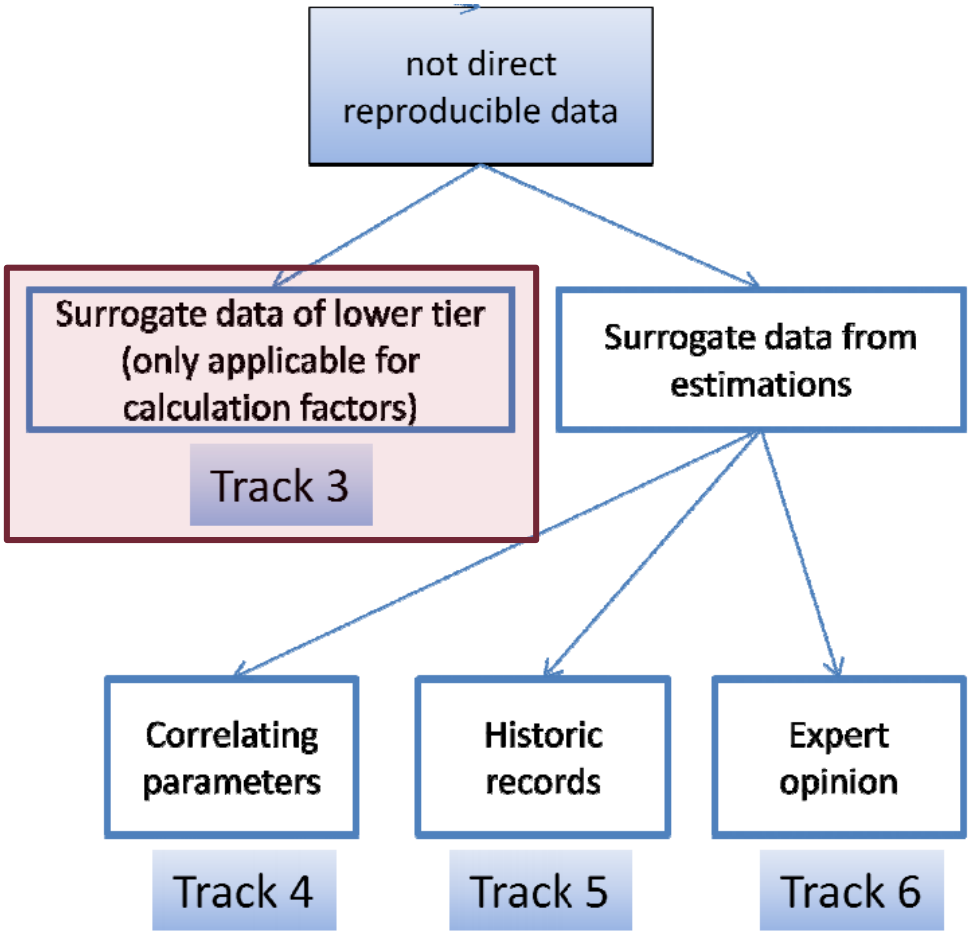
- *Examples for case 2-1:*
  - A secondary metering system delivering data at a lower level of accuracy (e.g. not undergoing regulator calibration) is installed for the same material or fuel stream and was in operation when a data gap for the primary system was reported
  - Corrective measures need to be applied retroactively as the result of a calibration has shown that the calibration function (slope or zero point) has drifted 2 %.

- *Example for case 2-2:*
  - Results of accr. laboratory lost or invalid but values available from regular control performed by own laboratory (and no retained samples available).

Track 2 (3)

- *Example for case 2-3:*
  - Results of an accredited laboratory have been lost or have been considered invalid, whereas additional values are available from regular control performed by the operator's own laboratory

Decision tree (2)



Track 3 (1)

Lower tier approach (only for Calc. factors!)

Applicable when missing data has to be replaced by default values as usually requested by tier 1 or tier 2 approaches

Case 3-1a: Surrogate data given by regulation or literature

$D_r = S + U_L$ or $D_r = S_U$

D_r = data to be used in emissions reporting
S = default value taken from regulation / guideline / literature
U_L = uncertainty as indicated by the same data source
S_U = default value from regulation / guideline / literature in case uncertainty already included

Track 3 (2)

Lower tier approach (only for Calc. factors!)

Applicable when missing data has to be replaced by default values as usually requested by tier 1 or tier 2 approaches

Case 3-1b: Surrogate data given by regulation or literature when missing information on uncertainty

$D_r = S + x\ \%^* S$

D_r = data to be used in emissions reporting

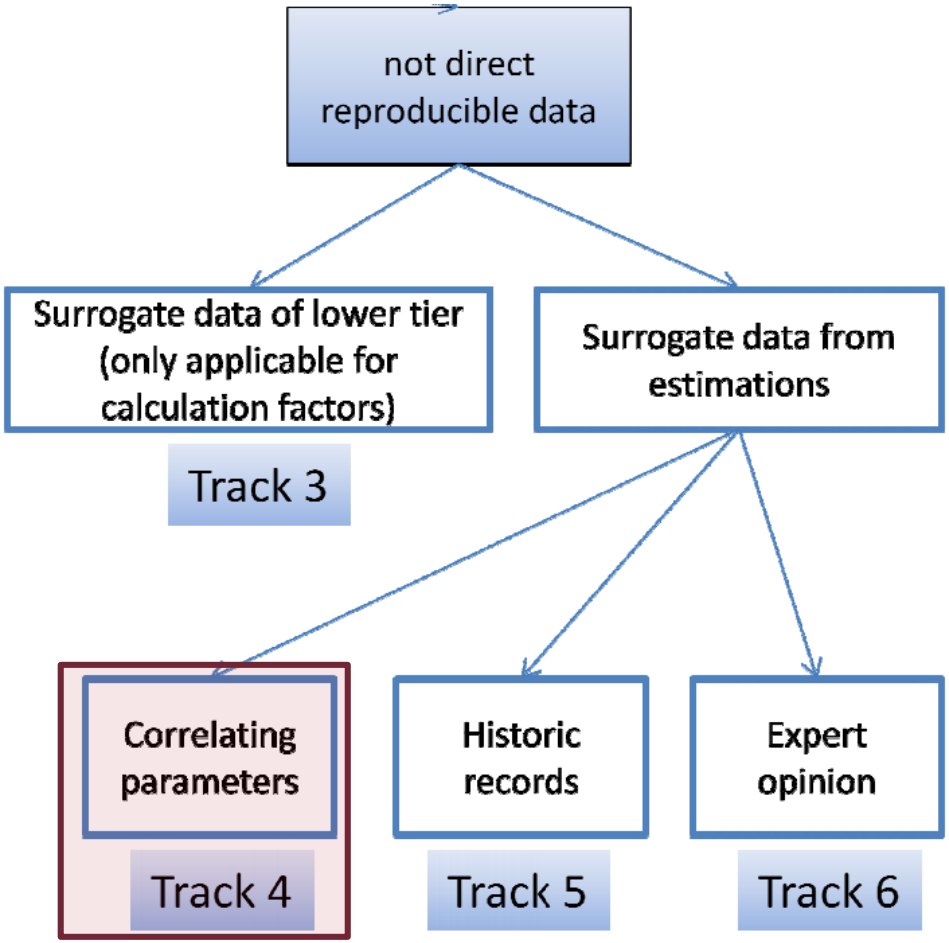
S = default value taken from regulation / guideline / literature

x %= individually demonstrated safety margin

Track 3 (3)

- *Example for 3-1a:*
  - A data gap caused by missing/invalid analyzes compared to the required minimum amount is filled by default values after proofing that these default values deliver a good estimate (e.g. low variability, standard commodity) e.g. from IPCC guidelines

Decision tree



Track 4 (1)

Estimation: correlating parameters

- Careful assessment of the rationale behind the identified correlations required (e.g. R_2).
- Case 1: Gap between surrogate data and real data obtained by primary systems can be assessed.
- Case 2: No primary data but scientifically proven facts (e.g. heating degree days and energy consumption of a district heating plant)
- **Example AD**: Fuel input to energy output, energy demand to air temperature, waste streams to production
- **Example CF**: Heat value to net calorific value, density to heat value, density and emission factor, net calorific value to emission factor

Track 4 (2)

Estimation: correlating parameters

Case 4-1: Installation-specific surrogate data based on correlating parameters

$D_r = S + 2 * \sigma$

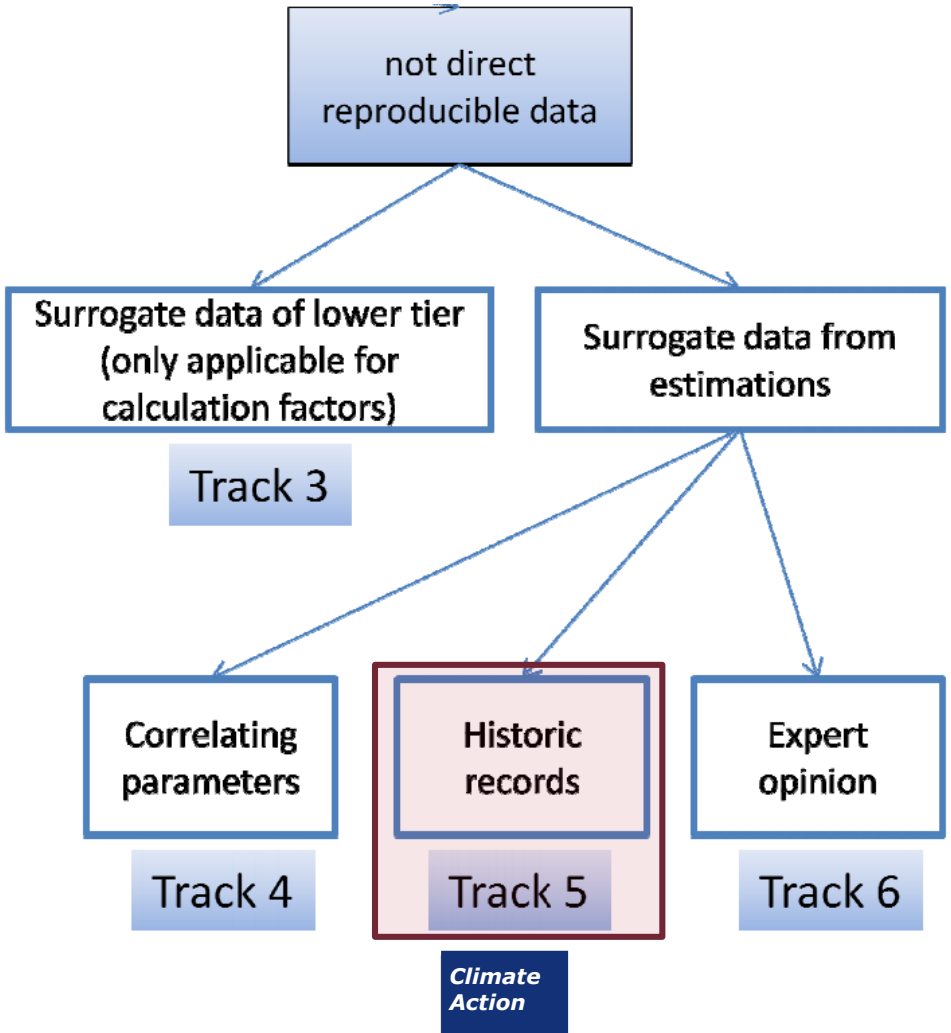
D_r = data to be used in emissions reporting
S = surrogate data delivered by correlation function
σ = standard deviation of historic simultaneous monitoring

Case 4-2: Installation-specific surrogate data based on proven correlation without records of simultaneous monitoring

$D_r = S + x\ \%* S$

D_r = data to be used in emissions reporting
S = surrogate data derived from correlating parameter
x %= individually demonstrated safety margin

Decision tree



Track 5 (1)

Estimation: Historic records

- Applied when an estimation to fill a data gap can be derived from long-term historic records (e.g. trends or seasonal behaviour) while no other information is available for a proper estimate.
- It needs to be demonstrated that conditions did not change and therefore the historic trend or behaviour delivers a reasonable estimate.
- In most cases track 3 for calculation factors is applicable, but if e.g. the amount of available historical data is not high enough or "exotic" material streams are used not enabling any comparison to other installations a standard deviation as in track 3 cannot be reasonably determined.

Track 5 (2)

Estimation: Historic records

Case 5-1a: Surrogate data derived from statistical behaviour

$D_r = S + 2 * \sigma$

D_r = data to be used in emissions reporting
S = surrogate data derived from statistics of historic records
σ = standard deviation of historic records

Case 5-1b: Installation-specific surrogate data based on historic records with limited data set (<20 data points) → only valid for calculation factors

$D_r = S\ (max)$

D_r = data to be used in emissions reporting
S = Maximum value of historic data set

Track 5 (2)

Estimation: Historic records

Case 5-2: Surrogate data where a standard deviation cannot be reasonably determined

$D_r = S + x\% * S$

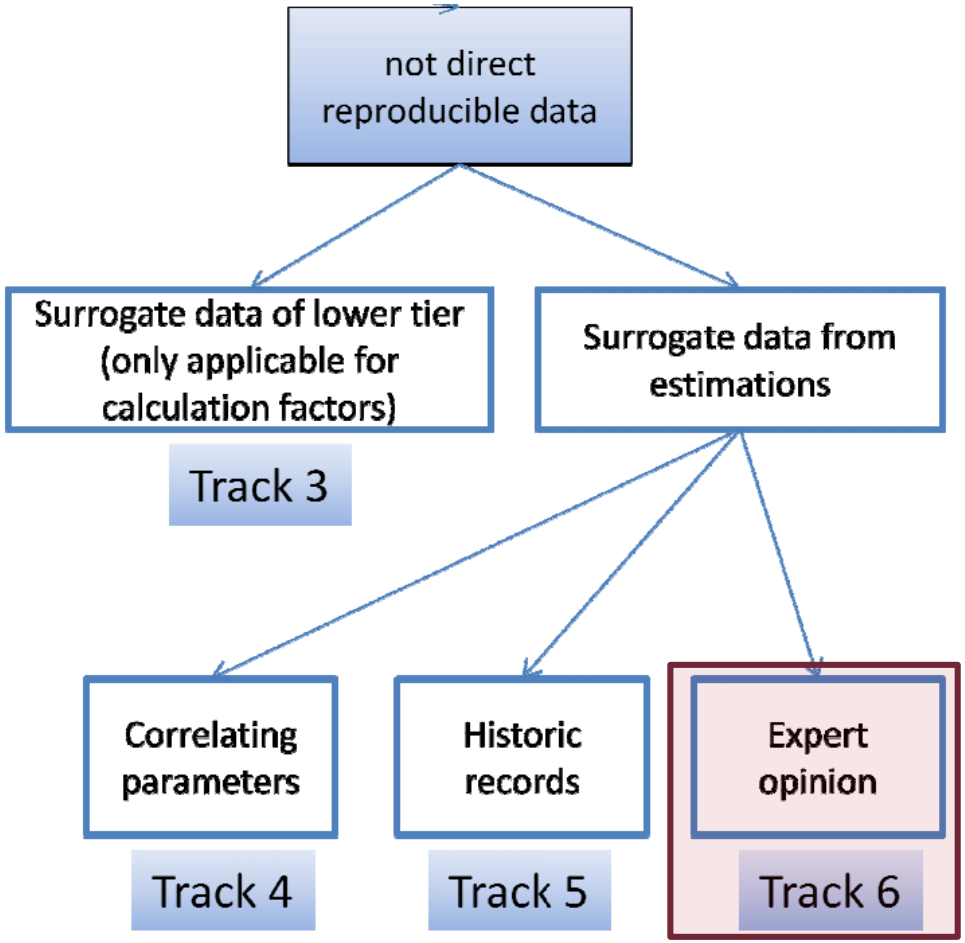
D_r = data to be used in emissions reporting
S = surrogate data derived from statistics of historic records
x % = individually demonstrated safety margin by the operator

Track 5 (2)

Estimation: Historic records

- **Example AD**: Installation has regular maintenance shut-down during summer. Auxiliary installations are fuelled by a neighbouring installation (outside ETS). The consumption is always within the same range. During a reporting period it is not recognized that the meter is not functioning and no other records are available.
- **Example CF**: The carbonate content of clay taken from a single mining area shows a constant increase over time following the exploitation of a geological structure. The analysing of samples failed for some months, leaving a data gap, while the continuation of the concentration curve has been observed before and after that gap.

Decision tree (2)



Track 6 (1)

Estimation: Expert opinion

- Tracks presented above are not applicable
- Estimates shall be made by engaging independent professional experts (other than the verifier)
- Expert opinion should be prepared including the aspect of conservativeness and needs to justify why no higher emissions can be expected

- **Example**: *An operator is missing activity data from a flare source stream. The data gap took place during an unplanned shutdown where varying amounts of gas was flared. Historical values from a similar shut down could be looked at, but differences in process conditions have to be taken into account. Data from other parts of the process can be used for additional information.*

Annex II: Case studies

Case 1

- *The main meter malfunctions and needs to be replaced. Until replaced, the operator replaces the data with data from a secondary meter which achieves an uncertainty of 3.7% instead of tier 4 achieved by the main meter.*

- *How should the operator close the data gap?*

Case 1

- *How should the operator close the data gap?*

$D_r = S + S * (U_s - U_t) = S + S * (3.7\%-1.5\%)$

Surrogate data with accuracy loss

Track 2

- *Alternative: If there is also metering at the supplier's site, gap might be closed based on the invoices (commercial transaction → meter under NLMC)*
  - This might achieve tier 4
  - Note that evidence (NLMC certificate, etc.) would be needed

Case 2

- *Operator has to apply tier 3 (sampling & analysis) for the carbon content of a material with a frequency of analysis of 4 times per year*

- *One sample sent to the accredited laboratory has shown to be contaminated making results invalid*

- *What should the operator do to close the data gap?*

Case 2

- *What should the operator do to close the data gap?*

1. *Are there retained samples?*

$D_r = S$

Surrogate data of the same tier

Track 1

2. Are there results from the own laboratory

$D_r = S + S * (U_s - U_P)$

Surrogate data with accuracy loss

Track 2

U_s = quantified uncertainty of the secondary system including corrective measures

U_t = uncertainty of the approved tier

U_p = quantified uncertainty of the undisturbed primary system

Case 2

- *What should the operator do to close the data gap?*

3. Is a default value available (e.g. tier 2a)

$D_r = S + U_L$

S = default value taken from regulation / guideline / literature

U_L = uncertainty as indicated by the same data source

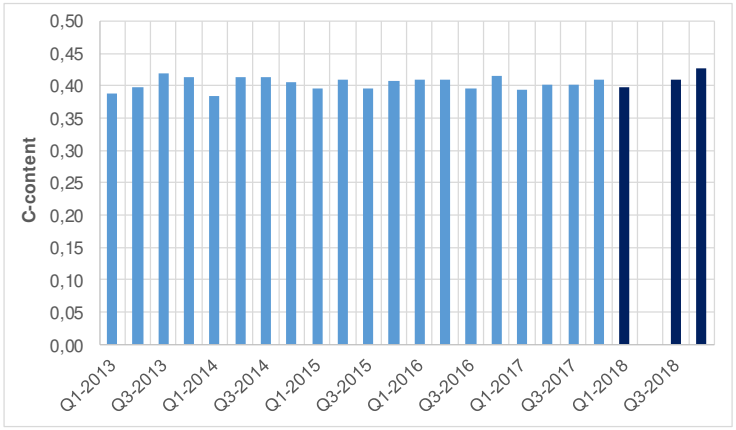
Surrogate data of lower tier (only applicable for calculation factors)

Track 3

4. Use historic records

Historic records

Track 5



$D_r = S + 2 * \sigma$

D_r = data to be used in emissions reporting

S = surrogate data derived from statistics of historic records

σ = standard deviation of historic records

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Case 3

- *A small peak-load district heating plant is exporting hot water to the district heating network provider. It measures the natural gas consumption and the heat exported (commercial transaction).*

- *The gas meter broke down and data for two weeks in December was lost.*

- *How should the operator close the data gap?*

Case 3

- *How should the operator close the data gap?*

1. Are there measurements by the gas supplier?

$D_r = S$

Surrogate data of the same tier

Track 1

2. Can the correlation "heat-fuel input" be used?

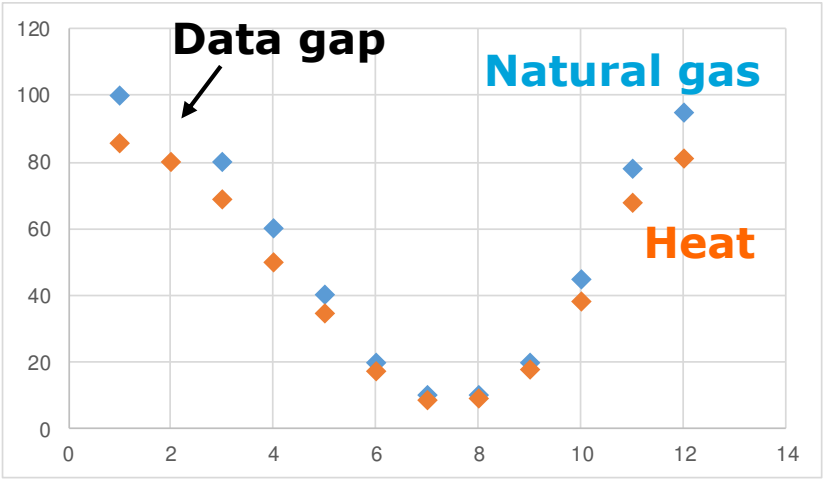
$D_r = S + 2 * \sigma$

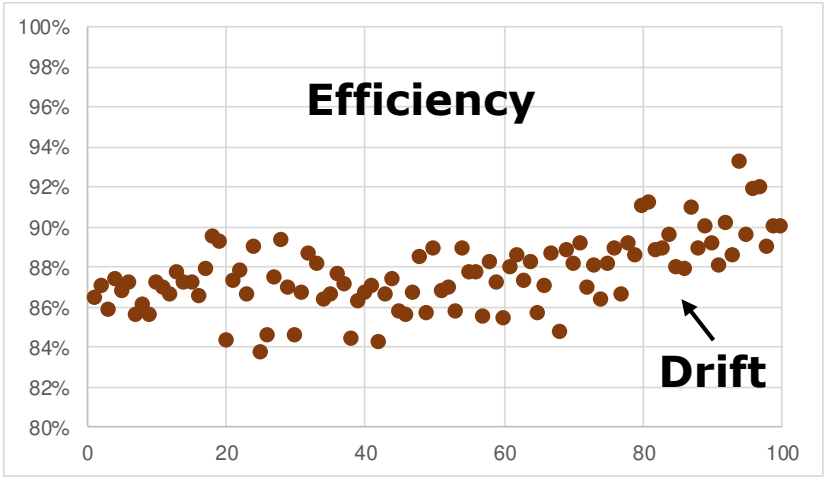
Correlating parameters

Track 4

D_r = data to be used in emissions reporting
S = surrogate data delivered by correlation function
σ = standard deviation of historic simultaneous monitoring

Case 3



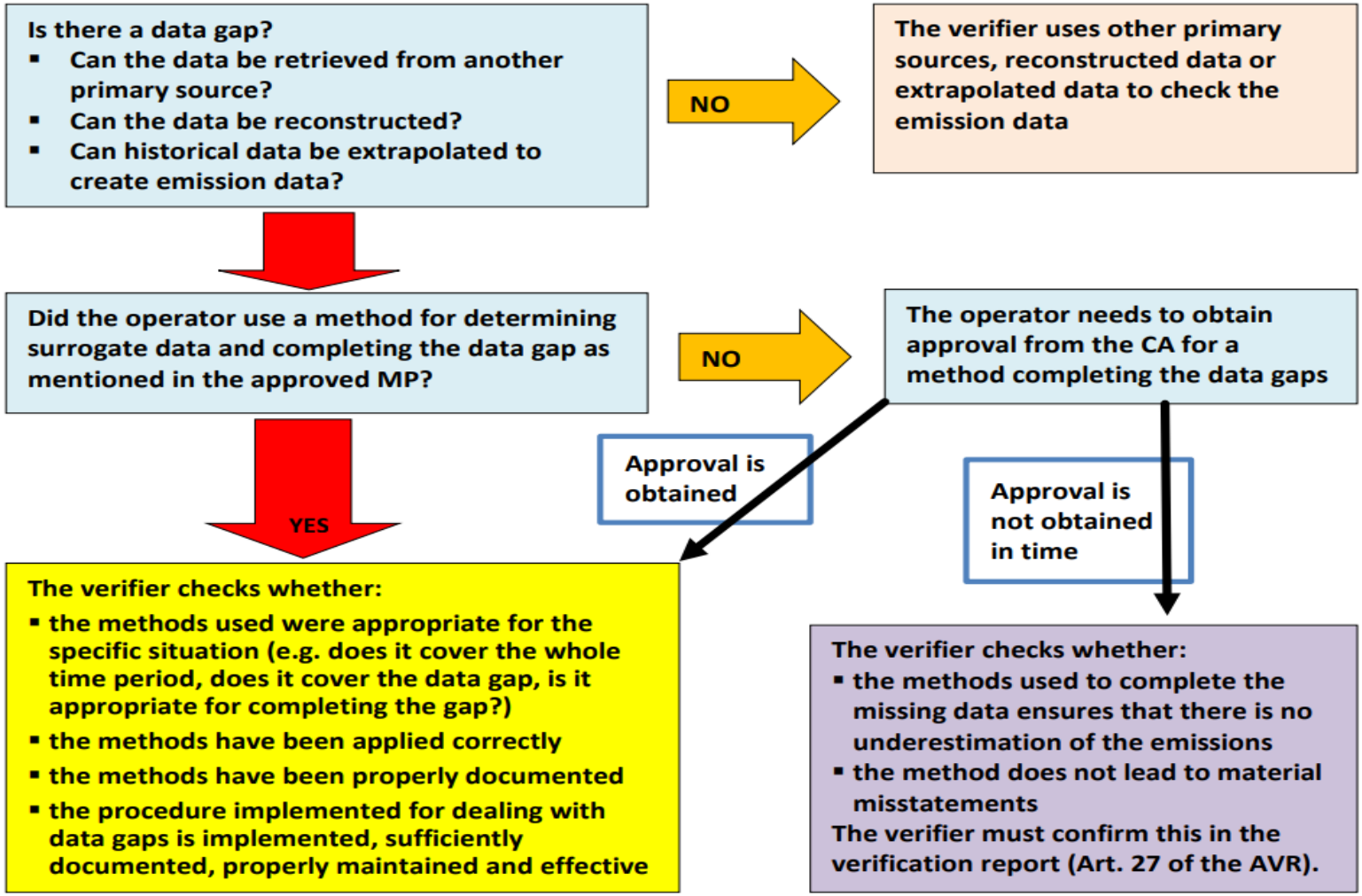


$$D_{r,NG} = \frac{S_{heat}}{S_{eff} - d - 2 * \sigma_{eff}}$$

$D_{r,NG}$ = data to be used in emissions reporting (natural gas)
S_{heat} = surrogate data for heat (during the data gap)
S_{eff} = surrogate data for efficiency (other than during data gap)
d = the drift of the efficiency
σ_{eff} = the standard deviation of historic efficiency

Annex III: Verifier’s tasks

Role of the verifier



Role of the verifier

- *The verifier uses similar principles to assess whether there is a data gap (as shown in previous slides)*
- *Key questions are: can the data be retrieved, reconstructed or extrapolated to create emission data*
- *Even if there is no data gap: the verifier may still have to report non-conformities or recommendations for improvement (e.g. in-effective control activities)*
- *If there is a data gap, the verifier assesses whether there is a method approved by the CA to close the data gap*
- *The verifier should be aware of MRR and guidance to evaluate the appropriateness of the methods*

How to report on data gaps?

Data gap method used that is approved by CA

- *It is important to analyse how the method is described in the MP*
- *If a particular method described in the MP is not implemented correctly, this is a non-conformity*
- *Non-compliance issues can arise if:*
  - There are no control activities to avoid data gaps
  - The method approved by the CA does not lead to conservative surrogate data and is not in line with 65 MRR (Art 7(5) AVR)
- *The verifier can make recommendations for improvement: e.g. regarding control activities*

How to report on data gaps?

No data gap method at all

- *Is there a material misstatement?*
  - Quantitative aspect: does the misstatement exceed the materiality level (individually and aggregated with other misstatements)
  - Qualitative aspect: does it influence CA decision/does it have material impact taking into account the size, nature and individual circumstances. Relevant factors:
    - Whether the data gap can be corrected
    - Willingness to correct the error in timely manner
    - Likelihood of re-occurrence and duration of data gap
    - Is data gap result of act with or without intent
    - Is there non-compliance with MRR

How to report on data gaps?

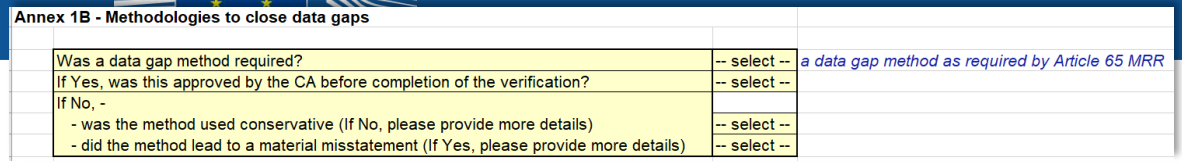
Method is used but not approved by CA

- *Is the method conservative? Does it lead to underestimation of emissions?*
- *Does the method lead to material misstatement? (see the previous slide)*
  - Quantitative aspect: application threshold
  - Qualitative aspect: considering the size, nature and circumstances taking into account several factors:
    - Similar factors apply

How to report on data gaps?

In both situations the verifier checks for:

- *Non-conformities: e.g. if the analysis of emission factors is not carried out according to the frequency listed in the MP and data was missing*
- *Non-compliance: e.g.*
  - Method is not conservative according to Article 65 MRR
  - There is no procedure or control activities for avoiding data gaps or proper documentation/ internal review of data
- *Recommendations for improvement: e.g.*
  - Recommendations to improve procedures or control activities: e.g. manual check to check data transfer in IT system



How to report in the VR template?

- *Fill in the data gap section in Annex I – Compliance Review showed that in some cases verifiers forgot to complete this*
- *List the issues identified by the verifier in Annex I as described in Article 27(4) AVR*
  - Size and nature of the issue
  - Material impact of misstatement
  - To which element in the AER the misstatement refers
  - To which element in the MP the non-conformity refers
  - The article with which there is non-compliance
  - The detail needs to be sufficient so that the CA can understand the issue

Annex IV:
CA making conservative estimates

Art. 70 – CA makes conservative estimates

- *The competent authority shall make a conservative estimate of the emissions*
  a) no verified annual emission report has been submitted by the operator or aircraft operator by the deadline required pursuant to Article 67(1);
  b) the verified annual emission report referred to in Article 67(1) is not in compliance with this Regulation;
  c) the emission report of an operator or aircraft operator has not been verified in accordance with Regulation (EU) No 600/2012.

Recommended step-by-step approach

- *Identify the size of the data gap*
- *Request information from the (aircraft) operator*
- *Risk assessment by the CA*
- *Decide on site visit*
- *Select an appropriate method for filling the data gap & safety margin → make use of the "toolbox"/"decision tree" shown earlier*

Further guidance can be found in the GD "Making conservative estimates for emissions in accordance with Article 70"

https://ec.europa.eu/clima/sites/clima/files/ets/monitoring/docs/guidance_conservative_estimates_ca_en.pdf

Thank you for your attention

Consultant core team contacts:

- **Christian.Heller@Umweltbundesamt.at (project lead)**
- **Hubert.Fallmann@Umweltbundesamt.at**
- **M.Voogt@SQConsult.com**
- **M.Oudenes@SQConsult.com**

Commission contact:

Guillaume.Coron@ec.europa.eu

→ *Task Force paper "Data gaps and non-conformities"*

https://ec.europa.eu/clima/sites/clima/files/ets/monitoring/docs/cf_tf_monitoring_workingpaper_datagaps_en.pdf

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