

FAIRMODE WG1 - Assessment

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Content – Work plan 2014

- » Current status Model Evaluation
- » Cross cutting activities
 - » Monitoring & modelling
 - » Forecasting
 - » Spatial representativeness
- » Databases
 - » Benchmark, MDS,...
- » Guidance document
- » eReporting

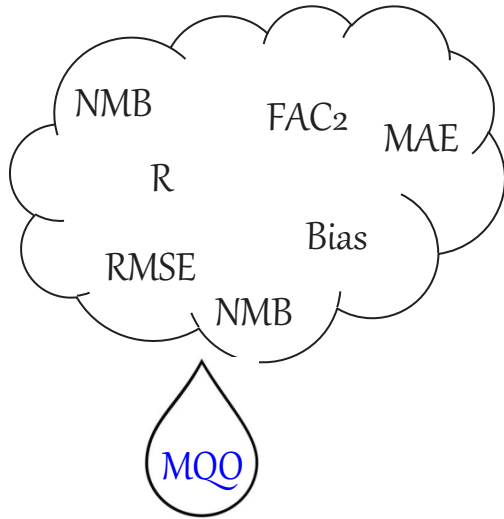
Current status Model Evaluation

BENCHMARKING

GUIDANCE

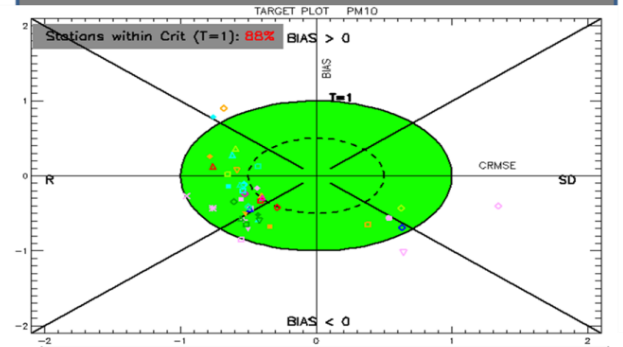
CAPACITY BUILDING

Common indicators



Common Methodology

Report Template for hourly/daily results



SUMMARY STATISTICS

Nb of stations/groups: 44 valid / 51 selected

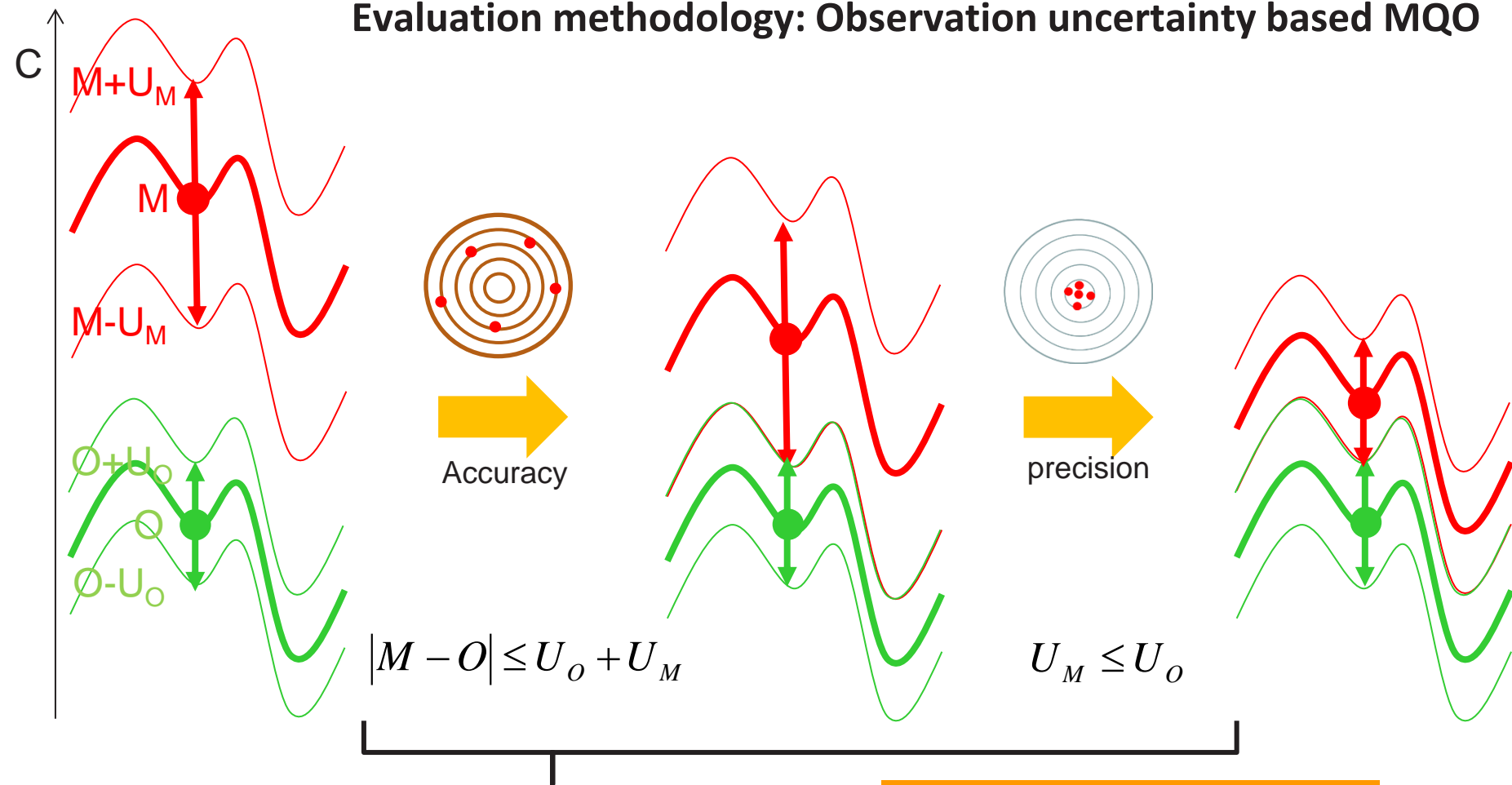
INDICATOR	Value
Obs	Mean
Obs	Exceed
	Exceed
TIME	Bias Norm
	Corr Norm
	StdDev Norm
SPACE	Corr Norm
	StdDev Norm
	StdDev Norm
A&D	RDE

- Birtz
- Koetic
- San_Pab
- Revin
- Kiskunne
- Vorberg
- Westert
- Nembro
- La_Terd
- Vredage
- Zandreb
- Weidhuf
- Complex
- Loug_H
- Dic_Zila
- Jungfra
- Schaub
- Cabule
- Harwell
- Dieblu
- Phayrene
- Hengsb
- Zarro
- Harwell
- Viedra
- Tarikon
- Schmuck
- Penzance
- Aushere
- Angret
- Chaymen
- Zigel
- Ede_Tor
- Montell
- Hoo
- Rigi
- Melplz
- D_Swin
- Ruovers
- Iskra
- Agria_Ma
- Indrena
- Donora
- Eberge

Common Tool



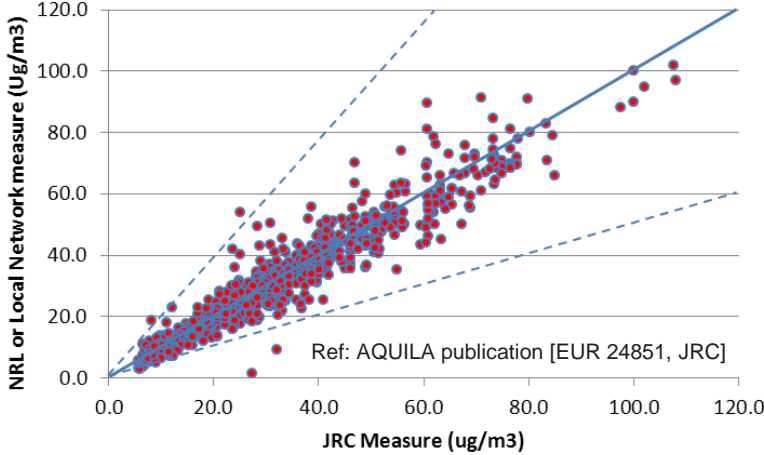
Evaluation methodology: Observation uncertainty based MQO



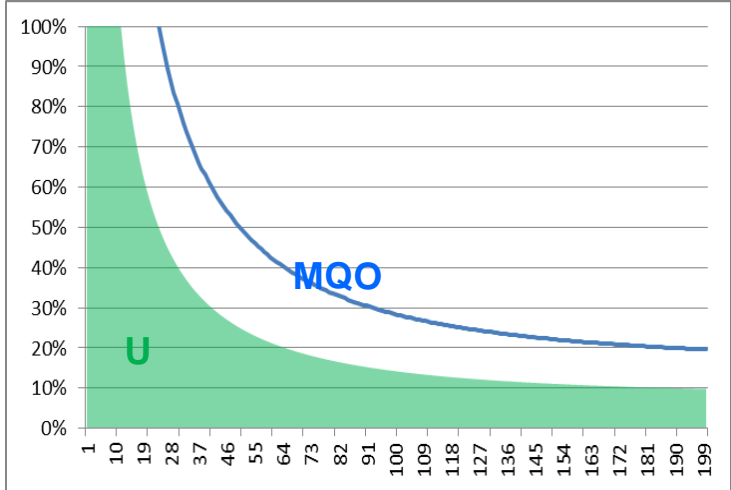
$$\frac{|M - O|}{2U_o} \leq 1 \quad \Rightarrow \quad \frac{\sqrt{\sum |M_i - O_i|^2}}{2\sqrt{\sum U_{o_i}^2}} = \frac{RMSE}{2RMS_U} \leq 1$$

Evaluation methodology: A value for the obs. Uncertainty

Intercomparisons



PM10



Uncertainty budget (GUM)



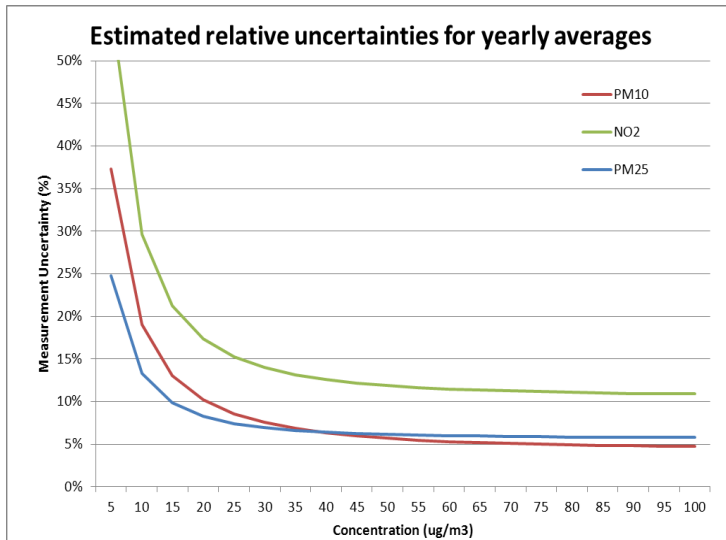
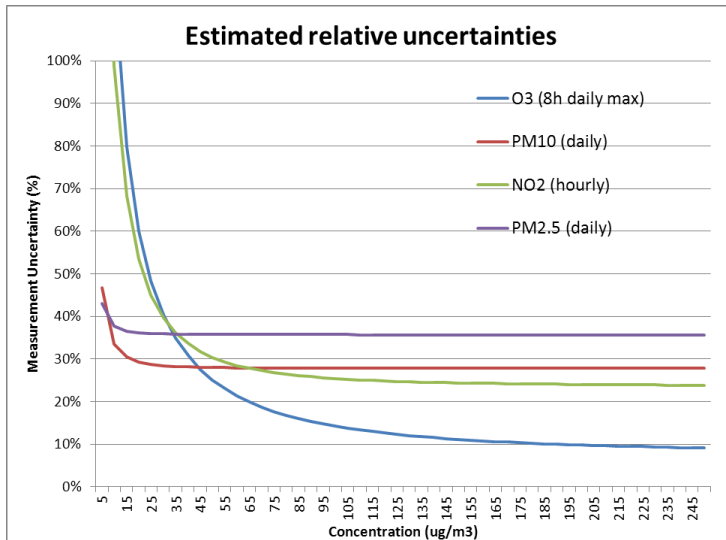
NO2



O3

$$U^2 = U_{RV}^2 (1 - \alpha) C^2 + U_{RV}^2 \alpha R V^2$$

Model quality objectives (MQO overview)



	Fixed		Measurement fit			
	k	LV	UrLV	alpha	Np	Nnp
O3	1.4	120	0.090	0.620	1	1
PM10	"robust parameters" – in testing phase					
NO2	2.0	200	0.120	0.040	5	12
PM25	2.0	25	0.180	0.018	40	1
WS	2.0 Preliminary parameters – To be tested					
TEMP	2.0	25	1.000	0.040		
SULF	2.0	7	0.150	0.018		
NITR	2.0	8	0.150	0.018		
AMMO	2.0	4	0.225	0.018		
EC	2.0	5	0.375	0.018		
TOM	2.0	10	0.375	0.018		

Expert – judgment
Estimates – to be tested

Workplan 2014 - MQO formulation

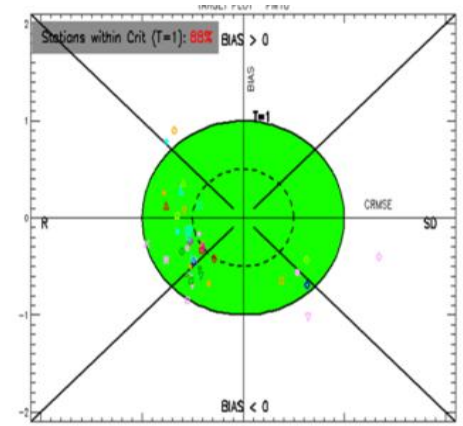
- » Review of the formulation and updated MQO (review note to be distributed)
[NO₂(h), NO₂(y), PM₁₀ (d), PM₁₀(y)] → AEA, RIVM...
- » Review of the new proposed MQO
[PM_{2.5}(d), PM_{2.5}(y), WS(h), TEMP(h)]
→ Met Croatia, AEA, UNIBS, RIVM...
- » 90-90 principle
[impact of excluding 10% outliers in each time series in addition of requiring 90% of the stations fulfilling the criteria]
→ UNIBS
- » NO₂ 1h vs. NO₂ 3h → Stringency of the NO₂ MQO
→ CERC, STMK
- » Other (?)

Cross cutting activities (CCA)

- » 3 CCA's with an important link to WG1
 - » Monitoring & Modelling (M&M)
 - » Review various M&M methodologies (data assimilation, data fusion...) → continuation of WG2-SG1 work
 - » Model evaluation of M&M applications
 - » Forecasting
 - » Specific model evaluation for forecast mode
 - » New / additional MQO
 - » Spatial representativeness (SR)
 - » Review various SR methodologies → continuation of WG2-SG1 work
 - » Improved MQO by:
 - » Assessment of SR “uncertainty” of monitoring stations
 - » Outlier detection in monitoring network

Workplan 2014 – Method & CCA's

- » DELTA application tests for various EU-MS/regions
→ ...
- » Generalize the approach to data-assimilated results (*CCA M&M*)
→ IRCEL, Univ. Aveiro, BSC...
- » Assessment of SR “uncertainty” of monitoring stations (*CCA SR*)
→ ...
- » Improve the station selection methodology by outlier screening (*CCA SR*)
→ ...
- » Adaptation to forecasting mode (*CCA FC*)
→ ...



BENCHMARKING

GUIDANCE

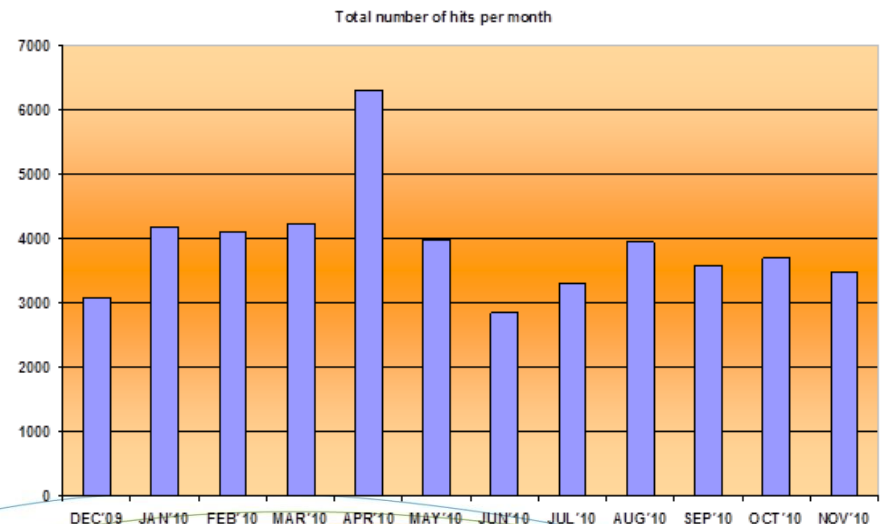
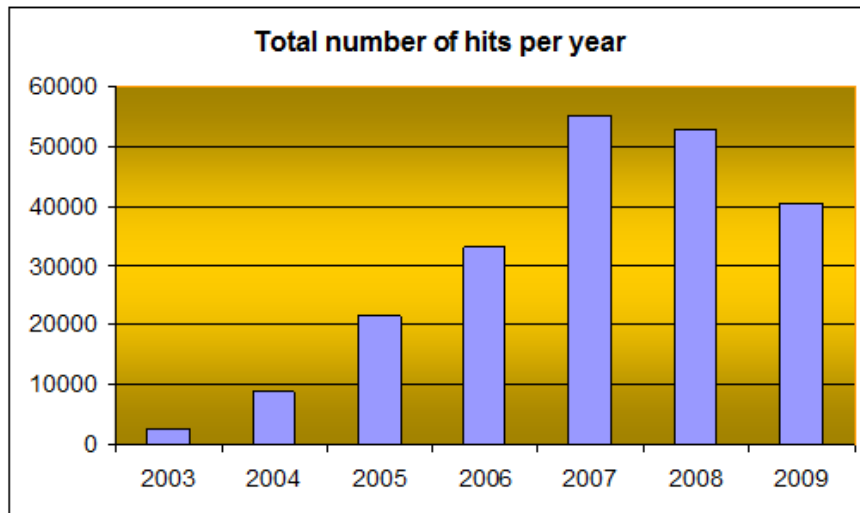
CAPACITY BUILDING

Guidance

- » Data bases
- » MQO & Benchmarking User's Guide
- » eReporting

Model Documentation System (MDS)

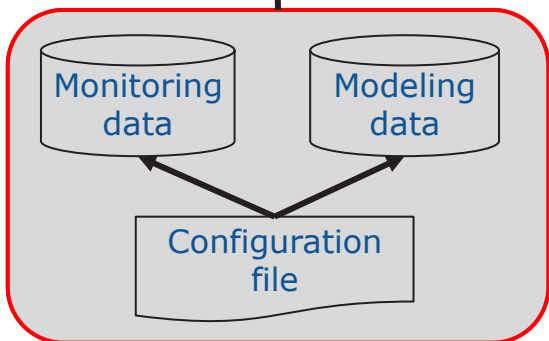
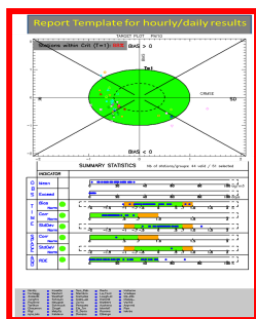
- » Developed by EEA-ETC for *model users*
- » Operational since 1997
- » 142 air quality & meteo models included after a review process
- » Long and short description of model and its applications
- » Statistics available until 2010
- » EEA will not maintain the MDS in the future...



Data bases – FAIRMODE needs?

FAIRMODE - WG1

MDS



- Basic information
- Intended field of application
- Model type and dimension
- Model description summary
- Model limitations/approximations
- Resolution, Schemes, Solution technique
- Input / Output quantities
- User interface availability
- User community
- Previous applications
- Documentation status
- Validation and evaluation
- Frequently asked questions
- Portability, Availability
- References

Data base - Open questions

- » MDS:
 - » How useful is the MDS for the community?
 - » Are your (most important) models included in the MDS?
 - » Is the amount of information in the MDS too much, too little?
 - » Are you happy with the review process before submission?
 - » Do you want to keep the MDS alive?
- » DELTA benchmarking data base:
 - » Would it be useful to have a centralized data base with DELTA application input/output data available?
 - » Are you willing to share the data of your application with FAIRMODE?
 - » Is a link to the MDS useful to provide meta info of the model application?

MQO & Benchmarking User's Guide

- » Already quite some information available on model evaluation
- » FAIRMODE Guides on modelling:
 - » *The application of models under the European Union's Air Quality Directive: A technical reference guide*
 - » *Guide on modelling Nitrogen Dioxide (NO₂) for air quality assessment and planning relevant to the European Air Quality Directive*
 - » *How to start with PM modelling for air quality assessment and planning relevant to the Air Quality Directive*

The application of models under the European Union's Air Quality Directive: A technical reference guide

5 Model quality assurance and evaluation	31
5.1 Review of activities addressing quality assurance and model evaluation.....	31
5.2 Review of protocols for model evaluation.....	34
5.3 The concept of model uncertainty	36
5.4 Model quality indicators (MQIs).....	38
5.5 Existing model evaluation documentation and datasets	40
5.6 Special topics.....	40
5.7 Recommendations on the framework for model quality assurance	42

Guide on modelling Nitrogen Dioxide (NO₂) for air quality assessment and planning relevant to the European Air Quality Directive

6 Quality control and evaluation	64
6.1 Directive related quality objectives.....	64
6.2 Validation of models.....	65
6.3 Dynamic evaluation and trend assessment.....	67
6.4 The model operator and user.....	68
6.5 Documentation.....	68

How to start with PM modelling for air quality assessment and planning relevant to the Air Quality Directive

6 Quality control and evaluation	51
6.1 Model quality objectives in the AQD.....	51
6.2 Evaluation of PM models.....	52
6.3 The Delta tool.....	54

MQO & Benchmarking User's Guide

- » Need for a Guide on model evaluation (and specifically on Benchmarking and MQO)
- » Information is scattered in papers and modelling guides
- » Possible content of a User's Guide:
 - » General introduction to the MQO
 - » DELTA tool
 - » “Real world” applications over Europe
 - » Contribution from FAIRMODE → Who?
 - » Check list for Quality Assurance of model application?
 - » Can FAIRMODE come up with something?

CEN/TC 264

- » Future work items/activities to be voted before 04/04/14 include “Modeling air quality: performance requirements, validation, QA/QC; relation with FAIRMODE”
- » Change of item title to: Model Quality Objective?
- » Is it of interest to the FAIRMODE community to have a CEN WG parallel to WG1?
- » Would a CEN standard facilitate model use in the AQD?
- » If so motivate CEN representatives to vote this item

eReporting

- » So far very little modelled data is used in official reporting to EU
- » Only examples in UK, NL
- » WG1 objective to find out obstructions in the (e-)reporting processes
- » Discussion → late on today (Arthur Gsella)