CEIP activities 2018-2019 Present state of emission data

Fourth joint session of the Steering Body to EMEP and the Working Group on Effects

9-13 September 2019, Geneva

Katarina Mareckova, Robert Wankmüller, Sabine Schindlbacher, Marion Pinteris, Bernhard Ullrich

CEIP activities 2018/2019

- **2018-2019 workplan** for the implementation of the Convention on Long-range Transboundary Air Pollution (ECE/EB.AIR/140/Add.1, **items 1.1.2.1, 1.1.2.2, 1.3.3, 3.1, 3.2 and 3.4)**

- Tasks set out in the informal document submitted to the Executive Body for the Convention at its thirty-seventh session, "Draft revised **mandates for scientific task forces** and centres under the Convention".

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CEIP Key Activities 2019 (Summary)

CEIP Mandate

- ✓ **Processing and archiving of data reported by Parties**
- ✓ Maintenance and improvement of EMEP **emission database (WebDab)**
- ✓ **Review** of inventory data (initial, in-depth)
- ✓ Review of **Adjustments / support EMEP**
- ✓ Maintenance and improvement of "**Gridding tool**"
- ✓ **Emission data sets for modellers** (gap filling and gridding, documentation of the system)
- ✓ Develop tests and perform **checks of gridded data**
- ✓ **Support to Parties** (capacity building, online guidance, add hoc, trainings,…..)
- ✓ **Cooperation** with EMEP centres and TFs, organisations (JRC, AMAP, EEA, EC, …) and other projects (CAM, NECD review,…)
- ✓ **Outreach and Publications of findings** (review findings, technical reports, status reports, assessment reports …)

EMEP WP 2018-2019

- ✓ **Improvement of expert estimates and spatial distribution for selected countries**
- ✓ S**patial distribution** (0.1x0.1 long-lat) for selected **historical years**
- ✓ Support to UNECE secretariat and IC (compliance issues, adjustment review, add hoc..)
- ✓ Assessment **of BC emissions** (cooperation with AMAP)
- ✓ Reporting of condensable – first assessment
- ✓ Improving quality of the EMEP emission inventory: comparisons with other data
- ✓ Contribution to UNEP global mercury assessment in cooperation with AMAP (workplan item 1.1.4.2)

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Technical reports published by CEIP in 2019

- Methodologies applied to the CEIP GNFR gap-filling 2019. Part Ia: Main pollutants, Particulate Matter and (NOx, NMVOCs, SOx, NH3, CO, PM2.5, PM10, PMcoarse) and Part 1b: BC, Technical report CEIP 1/2019,

- Methodologies applied to the CEIP GNFR gap-filling 2019. Part II: Heavy Metals (Pb, Cd, Hg), Technical report CEIP 2/2019

- Methodologies applied to the CEIP GNFR gap-filling 2019. Part III: Persistent organic pollutants (Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Indeno(1,2,3-cd)pyrene, Total polycyclic aromatic hydrocarbons, Dioxin and Furan, Hexachlorobenzene, Polychlorinated biphenyls), Technical report CEIP 3/2019

- Inventory Review 2019. Review of emission data reported under the LRTAP Convention and NEC Directive, Stage 1 and 2 review, Status of gridded and LPS data, Technical report CEIP 4/2019

- Methodologies applied to the technical review of emission data , Technical report CEIP 5/2019

- Documentation of the new EMEP gridding system, Technical report CEIP 6/2019

- Emission chapter in Joint MSC-W & CCC & CEIP Report, Status report 20 : "Transboundary particulate matter, photo-oxidants, acidifying and eutrophying components" 2019

- 6 Stage 3 Review Country Reports,
- 1 Adjustment Country Report NL
-

Status of reporting

- http://www.ceip.at/status_reporting/2019_submissions/

- https://www.ceip.at/webdab_emepdatabase/

- **Present state of emission data, review process and data for modelers**
  Report of the Centre on Emission Inventories and Projections ECE/EB.AIR/GE.1/2019/7–ECE/EB.AIR/WG.1/2019/19

- **Interactive data viewers at**:
  http://www.ceip.at/data_viewers/official_tableau/

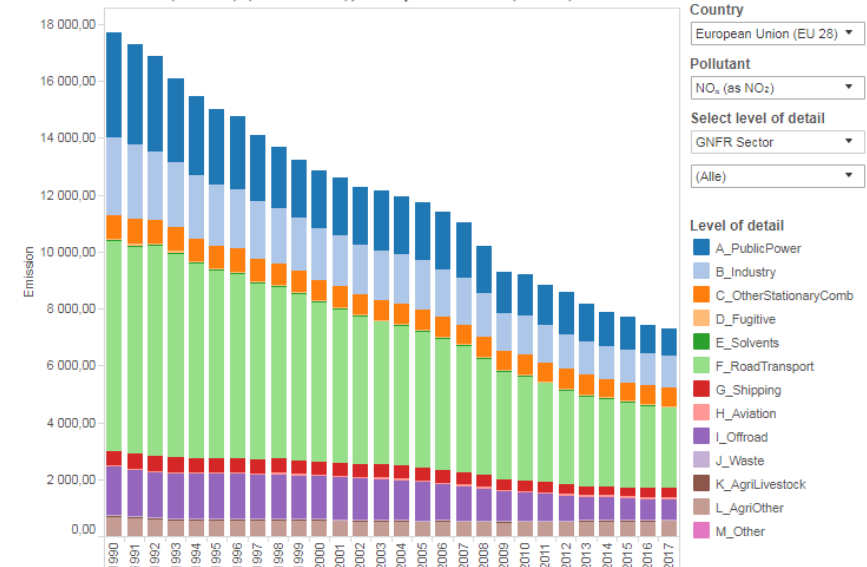Officially reported emission data

Emissions of NOₓ (as NO₂) (kilotonnes)
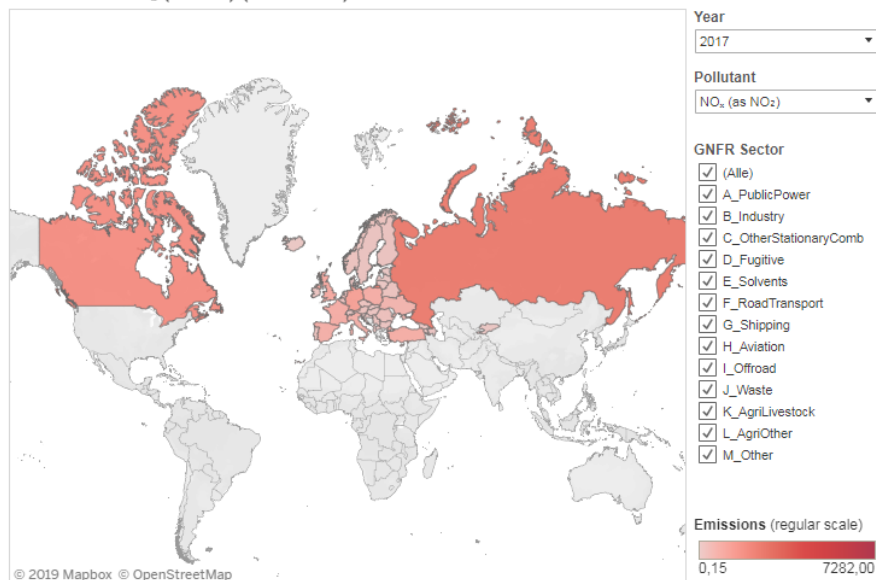
The data presented in this data viewer uses the GNFR14 nomenclature and is the officially reported data submitted up to 20 June 2019.


The data presented in this data viewer uses the GNFR14 and NFR14 nomenclature and is the officially reported data submitted up to 20 June 2019.

Review of inventories reported under CLRTAP in 2019

➢**Initial checks** cover: timeliness, completeness, consistency (years, Parties, reporting obligations), indicators

➢All inventories submitted on time have been reviewed (S1 & S2)

➢Findings provided 12 and 19 March and 5 April http://www.ceip.at/review_results/review_results_2019/

➢Summary in *EEA&CEIP joint* **Inventory review report, Technical report 4/2019,** Annexes

➢**Assessment of IIRs** - transparency and completeness – IIR Awards 2019 (TFEIP/EIONET meeting in Thessaloniki)

➢**CLRTAP inventories are not always considered priority by Parties** – limited feedback to the questions of CEIP

➢Checks of gridded data

➢**In depth review** of selected countries

Review results 2019

2019
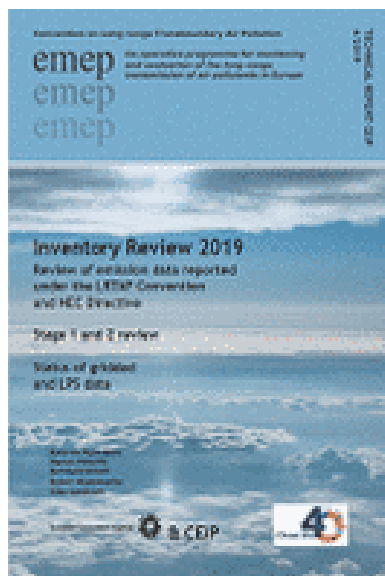
Technical report 2019/4; **Inventory review 2019** [PDF, 8.2MB] (EEA&CEIP)

Annexes
Annex A Completeness of reported data
Annex B Analysis of recalculations performed by countries
Annex C Recalculations of CLRTAP and NECD emission data in 2019
Annex D Emissions per capita and per GDP comparison of 1990 and 2017 (2000 and 2017 for $PM_{2.5}$ and PM_{10})

Annex E Comparison of share of sectors between countries for reported pollutants
Annex F KCA: Comparison EMEP West with EMEP East area
Annex G Inventory Comparisons between CLRTAP, UNFCCC and NECD data for 1990 and 2017
Annex H LPS reporting under CLRTAP from 2017-2019

https://www.ceip.at//review_results/review_reports/

Annexes as interactive data viewers

viewershttps://www.ceip.at/review_results/review_reports/annexes2019/

Status of reporting
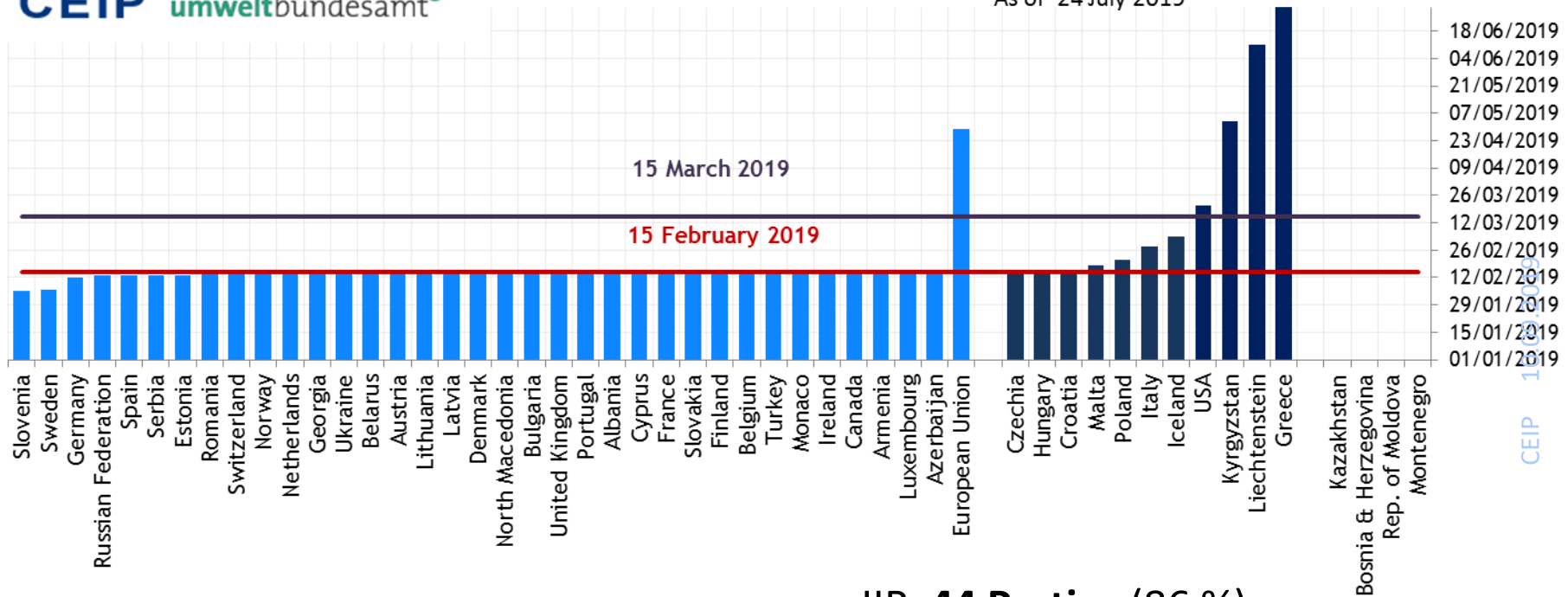
- **47 Parties** (92 %) reported data, **24 resubmissions** in 2019
  - Main Pollutants: **47** Parties
  - Main heavy metals: **46** Parties
  - PMs: **47** Parties
  - POPs: **45** Parties
- **40** Parties submitted Activity Data

- IIR **44 Parties** (86 %)
- Projections WM – 28 Parties
- Activity WM – 25 Parties
- Projections WaM – 17 Parties
- Activity WaM – 10 Parties

8

Emission trends in EMEP area (POPs reported data)

The high reductions of HCB from 2001 to 2002 are due to the strong drop of emissions reported by Germany and the peak in 2009 is mainly due the reporting of Albania. The high increase fro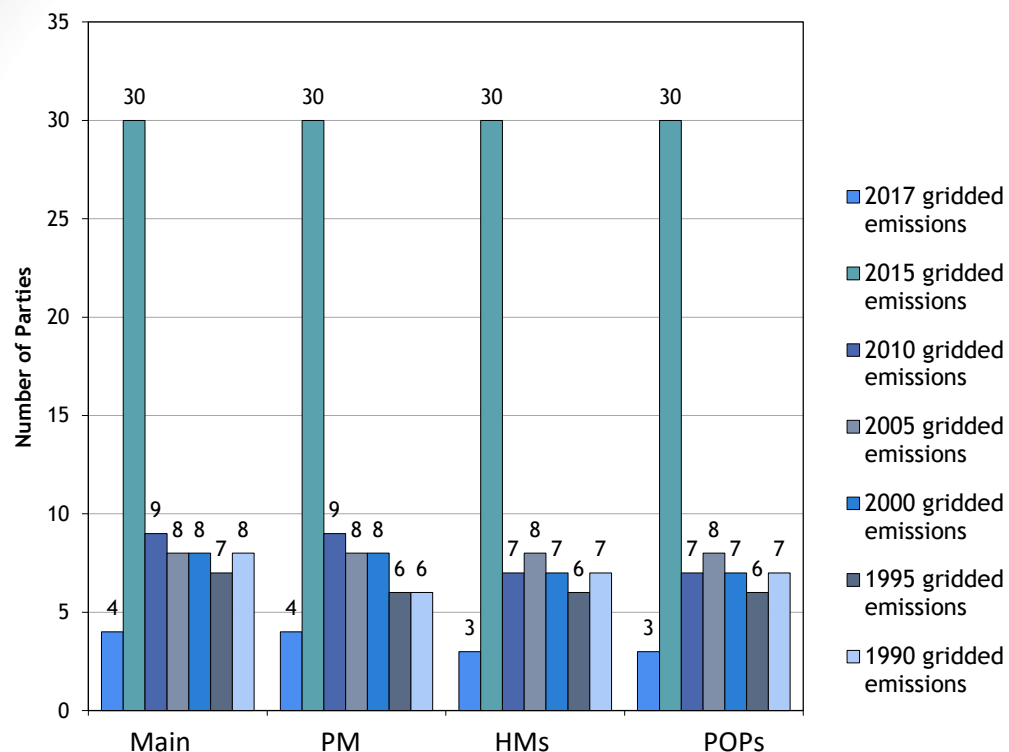m 2000 to 2006 and the strong drop in 2007 of PAHs and B(a)P is due to the reporting of Bulgaria whereas the trend of PAHs and B(a)P emissions in the period 2007-2017 is dominated by Portugal. The strong drop in 2017 PAH emissions and its four compounds is mainly due to the gap in reporting of Greece. The drop in PCB emissions for 2000 – 2002 is mainly due to the reporting of Portugal. The drop in B(k)F emissions for 2007-2008 is mainly due to the reporting of Poland. It has to be mentioned that Austria, Spain, Italy and Finland report total PAH emissions but do not report the four PAH compounds B(a)P, B(b)F, B(k)F and IP.

EMEP west

Russia reported some POPs for the years 2000 and 2005 only and Turkey did not report any POPs at all. Belarus did not report data for the year 2000 and incomplete data for 2001. Ukraine reported very high levels of POPs for the years from 2010 to 2013 (constant values) and 2017 only. The following figure shows 2002 to 2017 POPs emissions for EMEP East without emissions of Ukraine. The strong peak of PCDD/F and HCB emissions 2005 is mainly due to the reporting of Russia. The drop in PCB and PAH emissions 2017 is mainly due to missing data of Kazakhstan for this year.

EMEP east

Status of gridded emissions in 2019

Chart legend:
- 2017 gridded emissions
- 2015 gridded emissions
- 2010 gridded emissions
- 2005 gridded emissions
- 2000 gridded emissions
- 1995 gridded emissions
- 1990 gridded emissions

- **30 countries in total** reported sectoral gridded emissions in **0.1°x 0.1° long-lat** resolution until June 2019

- For about **56% (main pollutants and PM)** to **61% (HMs and POPs)** of the grid cells from 49 reporting Parties to the CLRTAP data on spatially distributed emissions had to be partly or completely estimated or adjusted by air pollutant emission experts in 2019.

42 Parties reported **LPS emissions** (Armenia, Belarus, Bosnia and Herzegovina, Kazakhstan, Kyrgyzstan, Liechtenstein and Montenegro did not report any LPS data yet.)
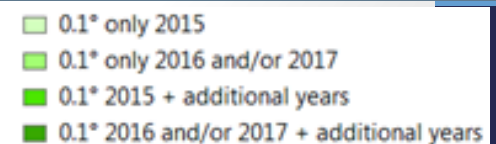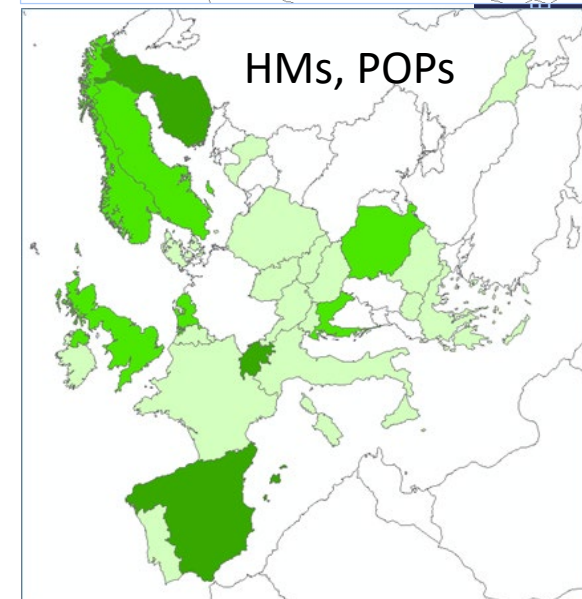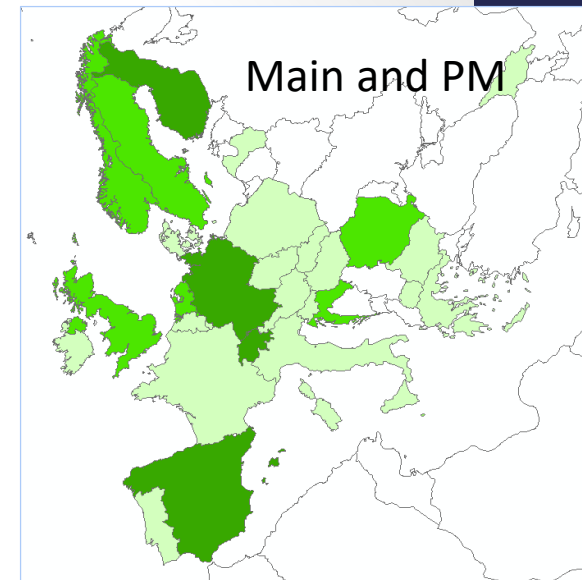
Status of data set for gridding is documented in 3 technical reports
Methodologies applied to the CEIP GNFR gap-filling 2019 Part I, II, III

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Data sets for modelers

Persisting challenges

- Completeness - non reporting of emission data

- Extended EMEP Domain - no reported gridded data

- Consistency across years, countries

- Recalculations > 30%

- Reporting deadline for gridded data 1 May – data set for modelers 1 June – not enough time for extensive QA/QC

- Transparency (IIRs)

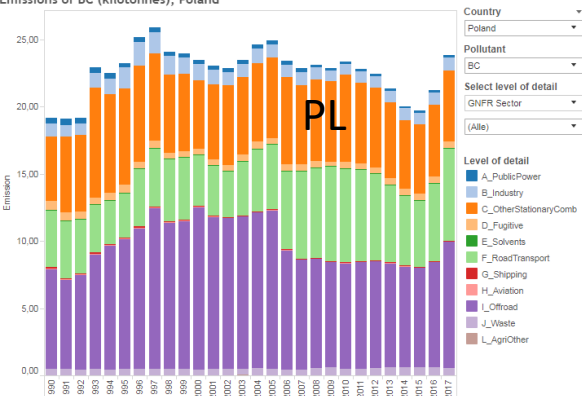- What is the sustainable frequency for full time series update *1990- 201x?

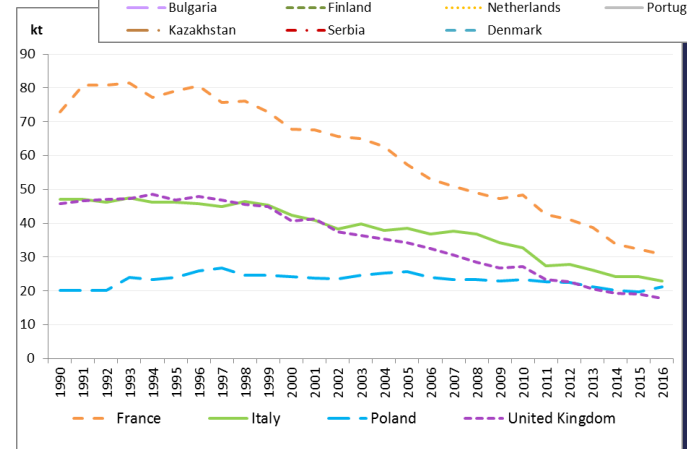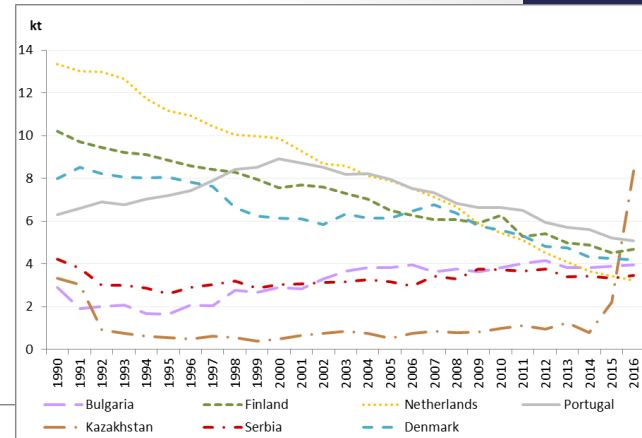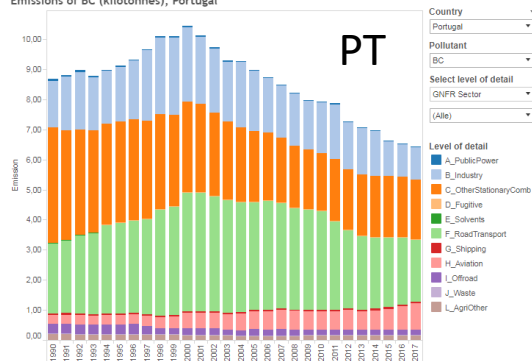→ See more in *Status report* and *Inventory review report 2019*

Main and PM

HMs, POPs

☐ 0.1° only 2015
☐ 0.1° only 2016 and/or 2017
☐ 0.1° 2015 + additional years
☐ 0.1° 2016 and/or 2017 + additional years

BC reporting 2019

41 Parties (80%) reported BC (37 in 2017)

36 Parties time series (at least 2000 onwards)
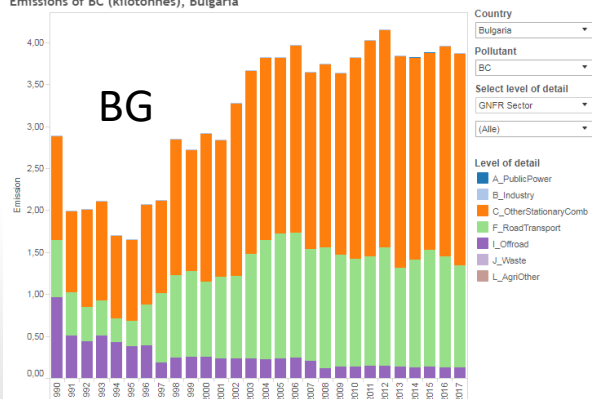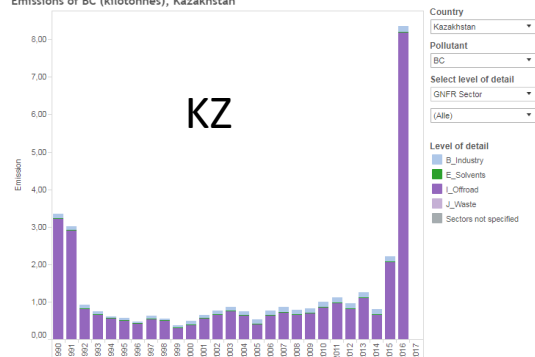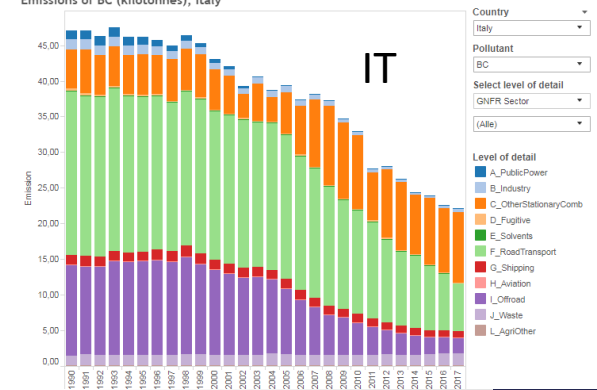
BC gap filling 2019

BC - National Total - 2017
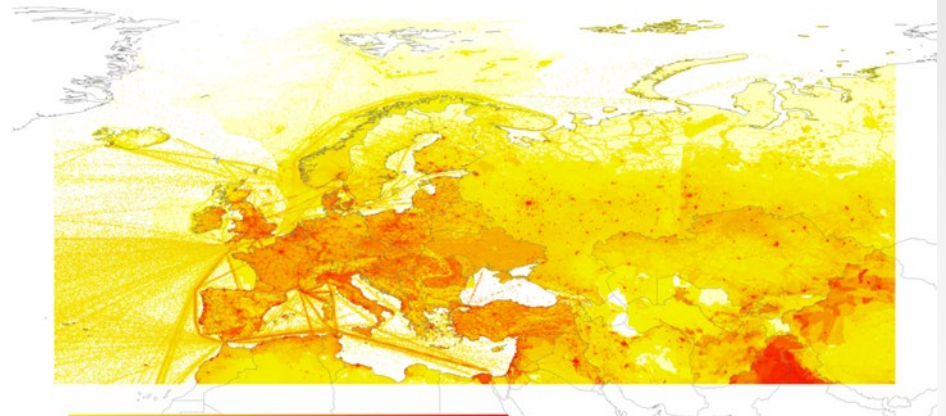
Reported sectoral distribution for 2017
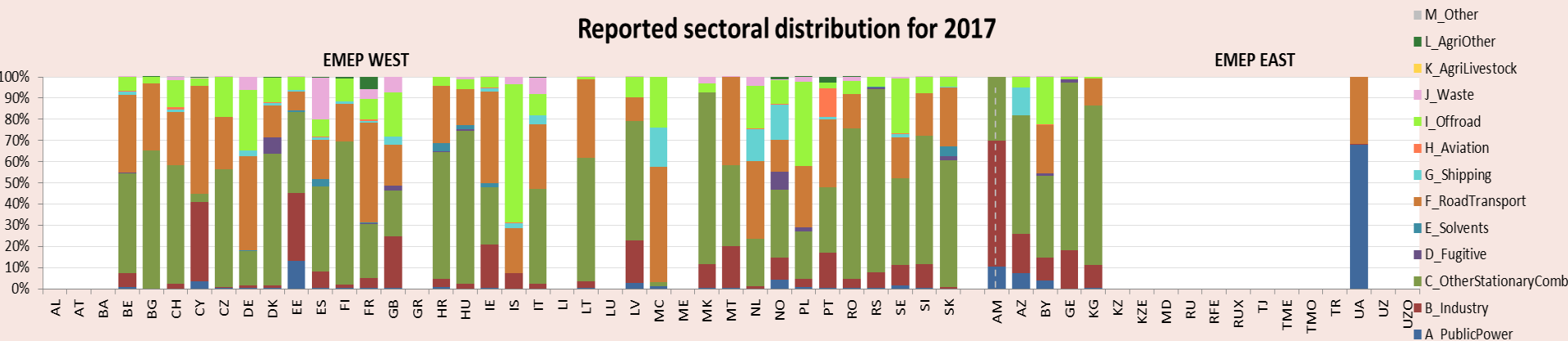
Gap-filled sectoral distribution for 2017
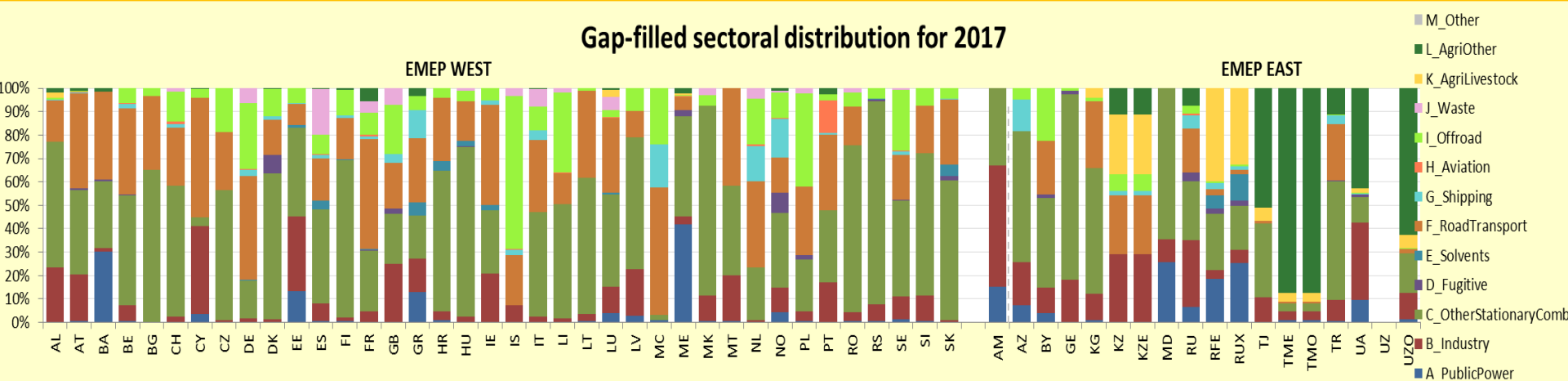
Black Carbon (BC)/Cooperation with AMAP

- There are currently **3 international fora where official national inventory estimates of BC are reported:**

- UNECE-CLRTAP

- NEC Directive

- *Arctic Council Framework on Enhanced Black Carbon and Methane Emissions Reductions.*

➢*EU Action on Black Carbon in the Arctic*

Review of Reporting Systems for
National Black Carbon Emissions Inventories:

https://eua-bca.amap.no/news/2019/eua-bca-technical-report-review-of-reporting-systems-for-national-black-carbon-emissions-inventories

This project is funded by
the European Union

The Action is implemented through the EU Partnership Instrument providing 1.5 million EUR of funding for Action implementation during 2018-2020

Review of Reporting Systems
for National Black Carbon
Emissions Inventories:
EU Action on Black Carbon in
the Arctic - Technical Report 2
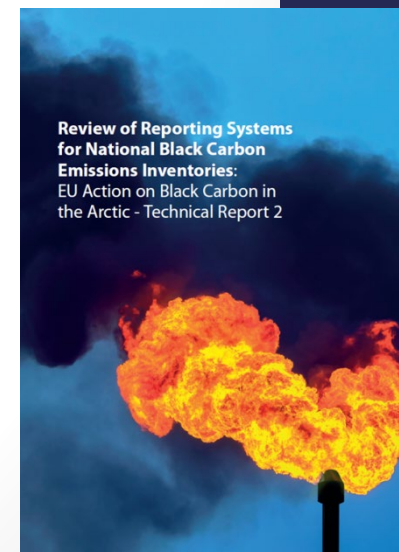
IIR awards 2010- 2019

2010
France
Germany
Netherlands
Croatia
Cyprus

2011
Finland
Estonia
Austria
Croatia
Switzerland

2012
UK
Germany
Netherlands
FYR
Macedonia
Ireland
Denmark

2013
Finland
Croatia
Estonia
Sweden
Poland
Spain
Turkey

2014
Norway
France
Latvia
Belgium
Denmark
Slovenia
UK

2015
Denmark
Portugal
Canada
Luxembourg
Italy
Turkey
Switzerland

2016
Germany
Sweden
Latvia
Iceland
Macedonia
Lithuania
Croatia

2017
Austria
Spain
Slovakia
Moldova
Azerbaijan
Hungary
Latvia

2018
Switzerland
Germany
Estonia
Slovenia
Bulgaria
UK

2019
Spain
Norway
Croatia
Romania
Denmark

Emisia (GR)

In-depth review (S3)

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- **History: 2 cycles completed**
  - 2008 - 2013 , **44 Parties** reviewed
  - 2014 – 2017 ; **45 parties** reviewed, 4 outstanding *(Armenia, B&H, Montenegro, Finland)*
  - Montenegro and BiH did not provide any data since 2011

2018 completed	2019 completed	2020 plan
Moldova	Turkey	Liechtenstein Iceland
Armenia	Albania	Switzerland
Finland	Norway	Kyrgyzstan
Belarus	Serbia	Kazakhstan
Ukraine	Russian Fed	Monaco
		North Macedonia
Azerbaijan	Georgia	EU

Red font indicates countries with irregular reporting of data, insufficient completeness and or limited feedback to ERTs

Review 2018-2020 is focusing on non EU MS,
Strategy for years 2021 – 2023   planed for EMEP SB meeting 2020

CEIP   10.09.2019
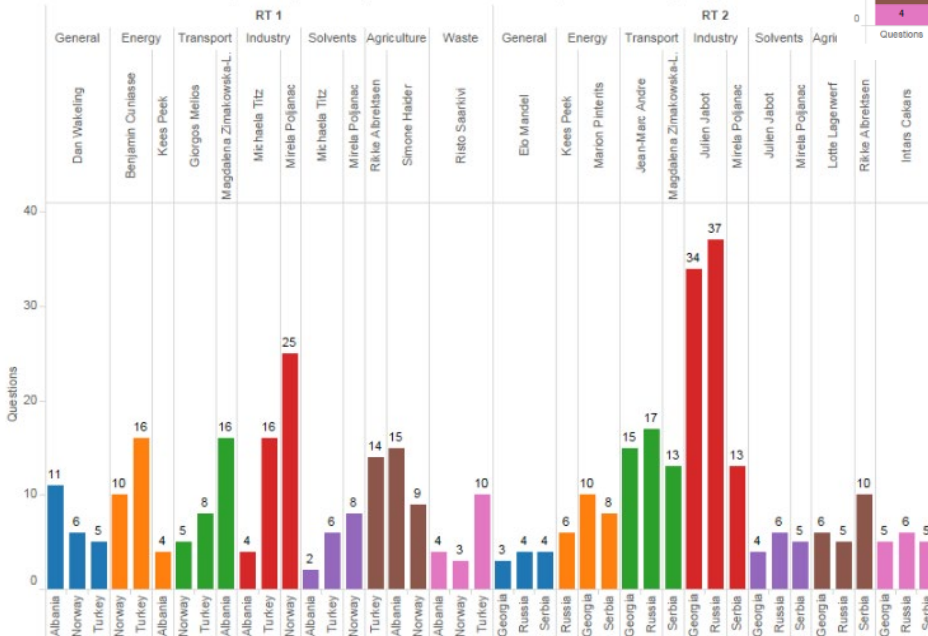
R3 2019 Progress

CEIP **umwelt**bundesamt

55 - 80 questions/answers per Party

Review of 6 Parties completed

➢Rather late feedback from most countries

➢ RR completed by teams

10-71 questions/answers per reviewer

S3 Lessons learned

- **CLRTAP inventories are not always considered priority by Parties** => *limited resources for national inventory teams* to follow up recommendations of ERTs

- **Technical corrections**
  - An **additional** task **not easy to manage** given the **same deadline and time budget** than before
  - For some countries (generally not EU MS), **there are many not estimated emissions**, it is time consuming for ERT to identification of cases above the threshold and estimate emissions for most of all these missing categories in the frame of the TC process / rather often TC can be not calculated due to the lack of data

- Process is resource demanding and requires regular **support of Parties**
  - management (set-up of review teams, communication with Parties,…)
  - Website , DB, tools , data for reviewers,
  - Country reports (proofreading, editing,…)

S3 Lessons learned cont.

- In-depth review is an important element in the process of verification of inventories and efficient **capacity building for country experts**

- ERTs (about 20-22 reviewers a year needed)

- **CRITICAL - No inventory experts nominated to EMEP roster from EMEP east region - action needed – EMEP SB, EB…..?**

- EMEP /CLRTAP should invent **procedures to cover travel costs for developing countries/countries** with economies in transitions (like IPCC does)

- **Reporting requirements** /formats   (UNECE Guidelines) does not really support review process (e.g. AD, EFS not in standardised formats, missing emissions per fuel,….)

- **2020 evaluate experience** from cooperation with EC (NECD review) and in cooperation with experienced reviewers propose **strategy for next 3-5 years (2021 onwards…)**

Roster:

25 Parties

101 experts

In depth review strategy 2021 – 2023 ?

- **Continue in-depth reviews keeping main principles as in cycles before** and aim to limit overlap with review under NECD to the extent possible, **streamlining of the process should be advantage for all**

- In-depth review 2018 – 2020 **focus on non EU MS** 6-8 Parties a year

- *EU MS might be included in the package if requested by IC or review teams*

  - **Continue with in-depth review of non EU MS**

Revised *Annex_I_v2019*

- **Extended Annex 1 was tested in 2019**
  - No problems reported by users and during import into DB system
  - To be approved by SB/EB meetings and used 2020 onwards

- **Extended reporting guidance will be updated after approved**
- **CEIP DB system is updated accordingly**

Inclusion of the condensable component in PM emissions

- In **the EMEP/EEA Guidebook** the condensable fraction is not consistently included or excluded in the emission factors.

- **Parties were asked to include a table** with information on the inclusion of the condensable component in PM_{10} and $PM_{2.5}$ emission factors for the reporting under the CLRTAP convention in 2019. (table IIR)

- **18 Parties provided information** on the inclusion of the condensable component in PM_{10} and $PM_{2.5}$ emission factors (Austria, Belgium, Croatia, Estonia, Germany, Finland, France, Latvia, Luxembourg, Netherlands, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom)

- Currently, **the condensable component is not included or excluded consistently in PM emissions r**eported by Parties of the LRTAP Convention.

- For the majority of the source categories of PM emission Parties either indicated that it is **"unknown"** if the condensable component is included in the PM emissions, or they provided **no information** or the provided **information was not clear**.

Suggested activities for 2020/21

- **Collect information for small scale combustion**
  - For all Parties that reported $PM_{2.5}$ emissions for "1A4bi Residential: Stationary" for the year 2017 the mean contribution to this source category was 44% to the National Total $PM_{2.5}$ emissions
  - Small-scale combustion is one of the sources where the inclusion of the condensable component has the largest impact on the emission factor.
  - Proposed action:
    - contact Parties directly if the information provided in the IIR 2019 is not clear
    - Offer help to identify if the condesable component is included in the used PM emission factors in cooperation with other institutions like MSC-w, IIASA/CIAM TFIAM and TFMM and TNO (to be agreed)

- **Collect information for road transport**
  - Clarify with EMISIA the status of inclusion of the condensable component in the COPERT model (in co-operation with MSC-w and TFMM)
    - 26 Parties use or mainly use the COPERT model
  - contact Parties that do not use the COPERT model directly if the information provided in the IIR 2019 is not clear
  - Offer help to identify if the condesable component is included in the used PM emission factors in cooperation with MSC-w and TFMM

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- ✓ Management/support of **Adjustment review**
- ✓ Maintenance and improvement of "**Gridding tool**"
- ✓ **Emission data sets for modellers** (gap filling and gridding, documentation of system)
- ✓ Develop more tests and perform **checks of gridded data**
- ✓ **Support to Parties** (capacity building, online guidance, add hoc, trainings,…..)
- ✓ **Cooperation** with EMEP centres and TFs, organisations (JRC, AMAP, EEA, EC, …) and other projects (CAMS, NECD review,…)
- ✓ **Outreach and Publications of findings** (review findings, technical reports, status reports, assessment reports …)

- ✓ **Further improve <u>gridding tool</u> and <u>gridded data</u> (0.1x0.1 long-lat) for selected historical years /pollutants**

- ✓ Assessment **of BC emissions cont.** (cooperation with AMAP)
- ✓ Support work on **condensable and semi-volatile compounds (depending on budget)**

- ✓ **Support to UNECE secretariat and IC** (compliance issues, adjustment review, add hoc..)