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Review of Reporting Systems for National Black Carbon Emissions Inventories

EU Action on Black Carbon in the Arctic - Technical Report 2

Fifth joint session of the Steering Body to EMEP and the Working Group on Effects
Joint thematic session – Black carbon in inventories, monitoring and modelling
11 September 2019, Geneva

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EU Action on BC in the Arctic

- **Funding:** EU Partnership Instrument at 1.5 million EUR over 3 years (2018-2020)
- **Main Objective:**
- **enhance international cooperation** on black carbon policy in the Arctic region
- contribute to the **development of collective responses to reduce black carbon emissions** in the Arctic and enhanced international cooperation **to protect the Arctic environment.**
- **Implementation Plan: 4 Work Packages**
 - Improved Knowledge Base
 - Increased Awareness and Shared Knowledge
 - Technical Advice Documents and Scenario Analysis
 - Roadmap for Enhanced International Cooperation

Technical Report 2

- Led by UBA and SYKE
- Contributions from IIASA, IVL, CEIP, AMAP as well as JRC, ICCL, UEF, ECCC, US EPA, Finnish Ministry of Environment and EC/DGE
- Published online 26 Aug 2019
<https://www.amap.no/documents/doc/eua-bca-technical-report-2/1780>



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

Main objective

- This technical report reviews the **status of black carbon emissions reporting**, with special emphasis on reporting systems applied under the United Nations Economic Commission for Europe (UN ECE) *Convention on Long-range Transboundary Air Pollution* and the *Arctic Council*, with the aims of **identifying gaps and proposing measures to fill these gaps**.
- Results of this work will be communicated to relevant bodies under these and other international organizations engaged in work to document emissions of black carbon affecting the Arctic.

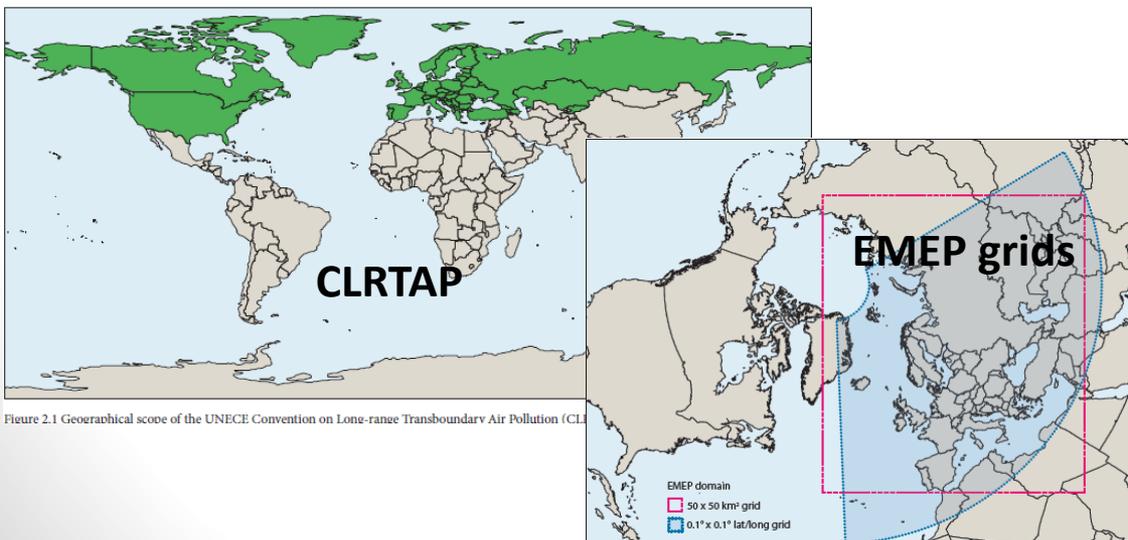


Figure 2.1 Geographical scope of the UNECE Convention on Long-range Transboundary Air Pollution (CLRTAP).

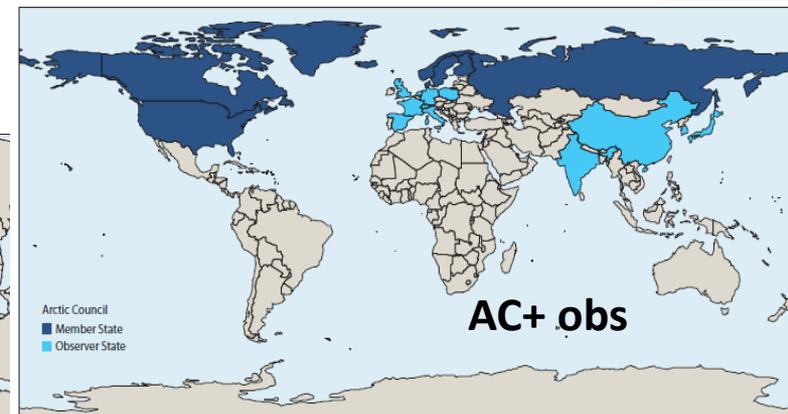


Figure 2.3 Geographical scope of the Arctic Council Enhanced Black Carbon and Methane Emissions Reductions: An Arctic Council Framework for Action. The graphic indicates Member States and Observer States of the Arctic Council.

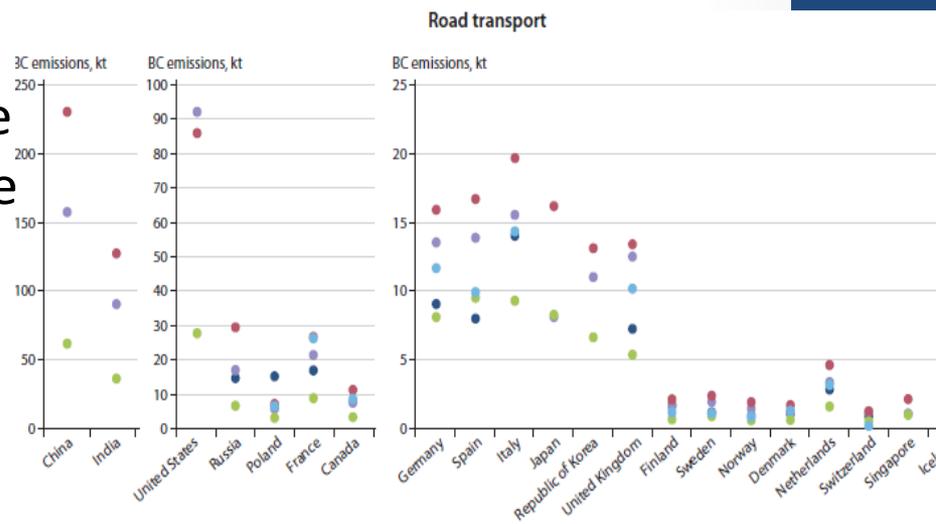
Figure 2.2 Geographical scope of EMEP. The new EMEP domain (0.1° x 0.1°) extends between 30°N and 82°N and between 30°W and 90°E. The previous EMEP domain (50 x 50 km) is also shown.

Report Content

- Mapping of the international frameworks for reporting national black carbon emissions inventories:
 - **Voluntary reporting** under UNECE-CLRTAP, Arctic Council, & EU NECD
 - Status of BC within UNFCCC-Paris Agreement
 - **Recommended inventory methods** - 2016 EMEP/EEA Guidebook
 - Key categories assessed: *Residential combustion, gas flaring, shipping, open burning of agricultural residues, and road transport*
- Review of reported **national BC emissions inventories**
 - Focus on CLRTAP and the five priority source sectors as well as reporting under the Arctic Council framework
 - Which countries have reported BC emissions so far
 - Which methods (Tiers) have been used to estimate emissions
 - Comparison of official emissions estimates with independent black carbon inventories
- Summary and Perspectives
 - Progress made and remaining limitations
 - Recommendations

Main Findings

- Considering BC reporting is voluntary, **the level of reporting is relatively high!**
 - 41 of 51 CLRTAP Parties
 - 26 of 28 EU Member States
 - All 8 Arctic Council Member States (plus 10 of 13 Observer States)
- **Significant limitations** in the reporting systems
 - Voluntary reporting of BC
 - Gaps and shortcomings in the 2016 EMEP/EEA Guidebook, definition of BC
 - Inconsistencies in no. source sectors reported, emissions time series, and inventory methods used
- Limitations and gaps in reporting systems highlight the importance of independent BC emissions inventories
- **Large deviations between independent estimates**



Availability of Tier 1 and Tier 2 BC Emission Factors in 2016 EMEP/EEA Guidebook

- Total of 56 sub-chapters (i.e. source categories) relevant in terms of BC:
 - 29 provide T1 EFs
 - 15 provide T2 EFs
 - **23 no EFs**
- **T1 & T2 EFs for 4 of the 5 priority sources**
- T1 only for *Venting & Flaring*

Table 2.1 Availability of Tier 1 and Tier 2 black carbon emission coefficients in the 2016 EMEP/EEA Guidebook (EEA, 2016) chapters and subchapters describing source-specific inventory methodologies for estimating air pollutant emissions from the sector *Energy*. Bold indicates the chapters and subchapters describing inventory methodologies for the five priority source sectors in this review.

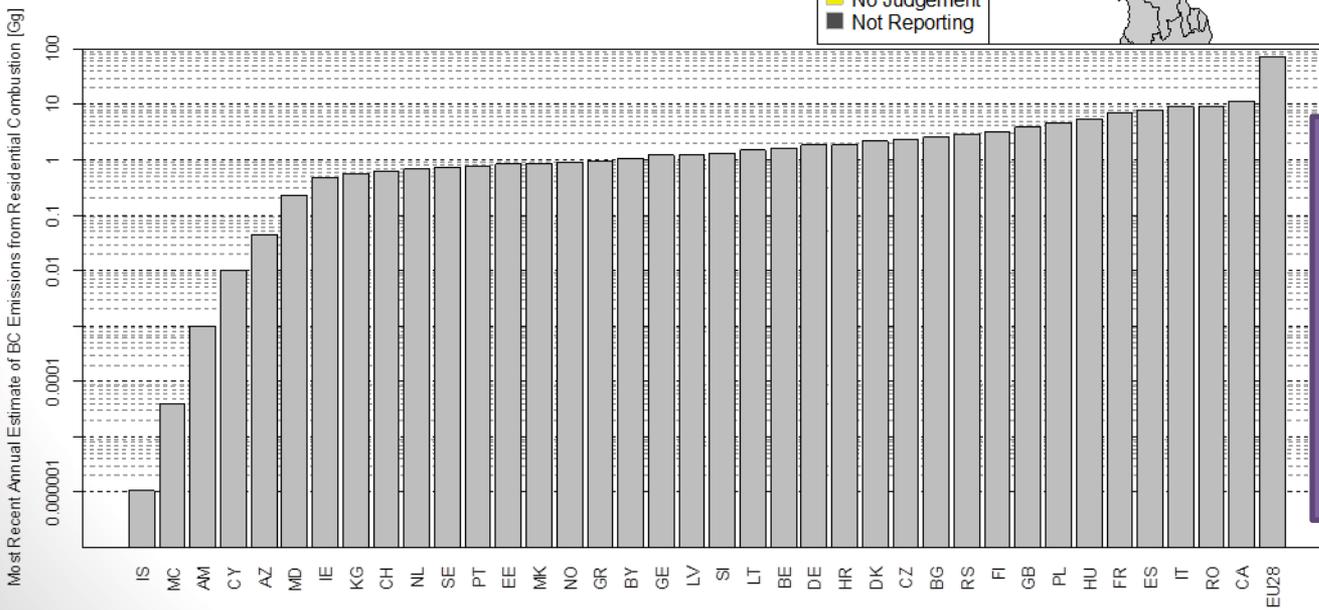
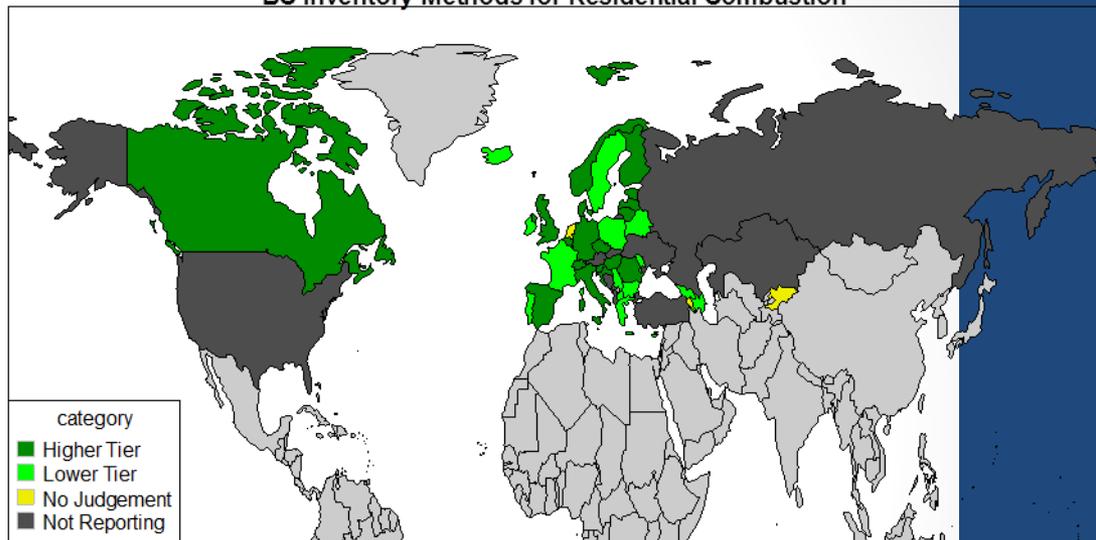
Chapter/subchapter	Tier 1	Tier 2
1.A Combustion		
1.A.1 Energy industries		
1.A.1.a Public electricity and heat production	Green	Green
1.A.1.b Petroleum refining	Green	Green
1.A.1.c Manufacture of solid fuels and other energy industries	Red	Green
1.A.2 Manufacturing industries and construction	Green	Red
1.A.3.a Aviation	Green	Green
1.A.3.b.i-iv Exhaust emissions from road transport	Green	Green
1.A.3.b.v Gasoline evaporation	-	-
1.A.3.b.vi-vii Road vehicle tyre and brake wear, road surface wear	Green	Red
1.A.3.c Railways	Green	Red
1.A.3.d Navigation (shipping)	Green	Green
1.A.3.e.i Pipeline transport	-	-
1.A.4 Small combustion	Green	Green
1.A.4 Other non-road mobile sources and machinery	Green	Green
1.B Fugitive emissions from fuels		
1.B.1.a Fugitive emissions from solid fuels: Coal mining and handling	Red	Red
1.B.1.b Fugitive emissions from solid fuels: Solid fuel transformation	Green	Red
1.B.1.c Other fugitive emissions from solid fuels	-	-
1.B.2.a.i & 1.B.2.b Fugitive emissions: Exploration, production and transport of oil and natural gas	-	-
1.B.2.a.iv Fugitive emissions oil: Refining and storage	Red	Green
1.B.2.a.v Distribution of oil products	-	-
1.B.2.c Venting and flaring	Green	Red
1.B.2.d Other fugitive emissions from energy production	Red	Red

Coloured cells show data available (green) and not available (red). A dash indicates that the respective sector is not a source of black carbon.

Reporting of BC emissions from residential combustion by CLRTAP Parties

- **38 (37 excl. EU) Parties** have submitted BC emissions estimates for *1.A.4.b.i. Residential: Stationary*

BC Inventory Methods for Residential Combustion



Inventory Methods:
Lower Tier - 16 Parties
Higher Tier - 18 Parties
No Judgement - 2 Parties

Recommendation



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- **Update of the EMEP/EEA Guidebook** to increase the extent to which relevant black carbon source sectors are provided with higher Tier emission coefficients
 - Further experimental work likely required to derive new emission factors/black carbon fractions and reduce uncertainties
 - Reassessment of the validity of the current methods *using black carbon fractions of PM_{2.5} should be considered.*
- **Mandatory BC reporting under CLRTAP ??**
 - Mandatory reporting status would stimulate countries to prioritise reporting of BC
 - Report supports **proposals made by the Policy Review Group** to consider mandatory black carbon reporting as part of an update of the 2012 Gothenburg Protocol Amendment; however...
 - Report furthermore argues that implementing mandatory BC emissions reporting could be accelerated through an updated or new EB Decision on Reporting of Emissions and Projections Data under the Convention and its Protocols in Force

Recommendations cont.



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- **Continued and enhanced cooperation between scientists** developing independent BC emissions datasets and the national inventory experts compiling official black carbon inventories.
- **Enhanced cooperation between CLRTAP and the Arctic Council** to expand and harmonise BC emissions reporting by countries whose black carbon emissions impact the Arctic.
- **Consider expanding CEIP DB system** to cover also BC emissions reported by AC observer countries outside CLRTAP

CLRTAP Parties and Arctic Council Members and Observers



Upcoming from EUA-BCA



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- Technical report - *Assessment of observation capacities and data availability of Black Carbon in the Arctic region* (led by NILU) (to be released in September 2019)
- Publication and data set of baseline and mitigation **BC emissions scenarios** (led by IIASA) (October 2019)
- **BAT Guidance Documents** on Black Carbon Emissions from Gas Flaring (September 2019) and Domestic Heating (2021) (led by Carbon Limits)
- ***Roadmap to enhance international cooperation on black carbon emissions policy to protect the Arctic (2020)***

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Website: <https://eua-bca.amap.no/>

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