

Informal Document to the UN-ECE Air Convention: A roadmap for international collaboration reducing black carbon emissions Summary of the draft EUABCA roadmap, version November 19 2020

Submitted by the project participants in the EU-funded Action on Black Carbon in the Arctic (EUABCA)

This document is presented by the EUABCA project group as informal material to be considered by the representatives to the UNECE Air Conventions' 58th Working Group on Strategies and Review and the 40th session of the Executive Body.

The document highlights ongoing work to develop a roadmap for international policy collaboration to facilitate effective reductions of black carbon emissions. The roadmap covers five substance areas and monitoring and identifies for each area a set of specific actions that can be advanced through international collaboration. The report does not necessarily reflect the views and opinions of the European Commission / European Union.

The authors warmly welcome comments and perspectives from the participants at WGSR58 and EB40 on the proposed areas of collaboration and the specific actions. The actions will be elaborated in greater detail in more extensive documentation. If you have comments on the areas and actions, please send these **before the 31st of December 2020** to any of the following email addresses: Mikael.hilden@syke.fi, bradley.matthews@umweltbundesamt.at, or Stefan.astrom@ivl.se.

A roadmap for international collaboration reducing black carbon emissions

Addressing black carbon (BC) is part of the solution strategies for air pollution and climate change. More than half of global black carbon emissions originate from residential combustion and road transport with the remainder emitted from industry, agriculture, non-road transport, oil and gas exploration, and forest and savannah fires. The Arctic warms faster than other regions of the world and black carbon emissions contribute in a variety of ways; e.g., direct deposition of particles on snow and ice, and impact on formation and lifetime of clouds and heat transfer from mid latitudes. Black carbon also has negative health effects.

Past policies and improved technology have already led to substantial emission reduction in several sectors including transport and industry, and solutions are available to cut emissions further. Such emission reduction would be in line with many of the objectives of the European Green Deal,¹ including a transition to clean energy and to less polluting transport solutions.

The Arctic is one of the areas in which the goals to reduce emissions of black carbon has been given prominence.² The Arctic Council has recognised the importance of reducing emissions of black carbon within the Arctic, and globally.

The EU-funded Action on Black Carbon in the Arctic seeks to contribute to the development of collective responses that reduce black carbon emissions affecting the Arctic.³ The Action, carried out by a group of expert organisations, has engaged in interaction with a broad group of stakeholders and countries to identify feasible ways of taking action. Alignment with activities in international fora, including the Arctic Council and the UNECE Convention on Long-range Transboundary Air Pollution (the Air Convention) has guided the development of a roadmap on enhanced international cooperation for actions that can reduce emissions of black carbon which impact on the Arctic.

This document⁴ presents the key elements of the draft roadmap and suggested actions where international collaboration can be enhanced. This summary is intended to stimulate discussion on the topics and will be elaborated on in more extensive documentation of the roadmap.



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

¹ The European Green Deal, Brussels, 11.12.2019, COM(2019) 640 final

² IQALUIT 2015 SAO Report to Ministers: Enhanced Black Carbon and Methane Emissions Reductions - An Arctic Council Framework for Action

³ <https://eua-bca.amap.no/>

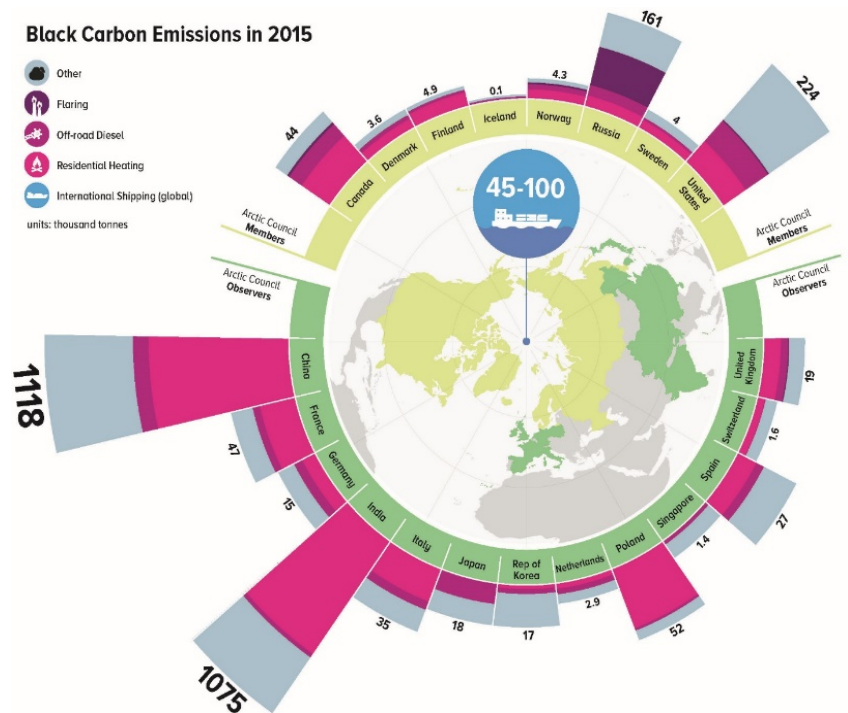
⁴ Produced by the EU funded Action on Black Carbon in the Arctic November 2020 to reflect the present state of the roadmap. The document does not necessarily reflect the views and opinions of the European Commission

The areas of action

The roadmap focuses on the following sectors, which are especially relevant for the Arctic.

- 1) Gas Flaring
- 2) Domestic Heating
- 3) Shipping
- 4) Diesel/On and Off-Road
- 5) Open Burning

To complement enhanced action on these five priority sectors, the road map outlines paths for further international cooperation on monitoring Northern hemisphere BC emissions as well as BC in the Arctic environment.



Specific actions

The roadmap recognises that each area of action has its specific features. For example, a significant part of the emissions arise in activities dependent on fossil fuels, which in the long run will be phased out, but which in the short and medium term will be regulated in particular through policies for the protection of air quality. In reducing emissions from the biomass stoves, product design is of additional importance. Open agricultural burning can be addressed through pollution control and agricultural policies that affect practice. Potentially important international actions are highlighted below for each area. Detailed elaborations of the sector and area specific action will be made available on the project's website: <https://eua-bca.amap.no>

Gas flaring

Gas flaring from the oil and gas sector could, considering current legislation and assumed oil and gas sector development, become by 2030 the largest BC emission source in the Arctic Council countries. While there is urgent need to improve monitoring of flaring activities and gas composition as well as perform further measurements of emission factors, several solutions have been identified and shown to reduce emissions.

Possible actions for international co-operation include:

- the promotion of R&D in field measurement data on actual BC emission rates for a diverse range of flares relevant to the Arctic region;
- support for the World Bank's Zero Routine Flaring by 2030, close monitoring and reporting of progress including independent research;
- the definition of common environmental standards for BC.

Small-scale domestic heating

Small-scale domestic heating is one of the most important sources of BC-emissions within the Arctic region. In contrast to several other key sectors, emissions from small-scale heating are diffuse and caused by private households. The control of these emissions is challenging: there

is limited direct regulation and control, and cost-effectiveness in terms of emission reduction is not a central driver of decisions. What matters is access to affordable fuels and assurance of comfortable use. The actions are mainly national, but exchange of experience supports transnational diffusion of particularly effective policies.

Possible actions for international co-operation include:

- sharing of experiences in developing and implementing information and incentives that improve use and stimulated rapid replacement of inefficient and polluting wood burning equipment;
- development of further measurement standards and criteria to ensure that new stoves and boilers minimise emissions;
- promote the implementation of new EU Eco-design requirements and similar policies also beyond the EU.

Shipping

Emissions from shipping can potentially increase in the Arctic due to ever longer ice-free periods and new Arctic shipping routes. To avoid an increase of direct BC emissions in the Arctic, actions under the International Maritime Organization (IMO) are essential, but also regional, national or subnational actions can be important for addressing emissions in specific sea areas.

Possible actions for international co-operation include:

- continue support of the development of standardised BC sampling and measurement protocols under IMO;
- advance internationally agreed regulations to reduce BC emissions from Arctic shipping;
- introduce and harmonise regional, national and local emission control, in particular through harmonised regulations for ports and specific Arctic shipping routes;
- set up joint competitive R&D support for innovative low emission sea transport.

On and off-road transport and stationary engines

Black carbon emissions from internal combustion engines used in on- and off-road transport and in electricity generation can increase in the Arctic with expanding economic activities. Internationally significant reductions have already been achieved in the area of transport and engines that comply with the most recent standards emit only a fraction of black carbon per unit of fuel used compared with older engines. Additional progress can still be made by scrapping old vehicles, strengthening legislation and its enforcement, and by developing technologies further, including e-vehicles.

Possible actions for international co-operation include:

- harmonise rules for annual vehicle exhaust maintenance testing;
- stricter regulation of international trade of second-hand vehicles;
- research on emissions during alternative engine test driving cycles for off-road vehicles;
- harmonising emission standards for vehicles and machinery;
- mandating use of particle filters on stationary diesel generators.

Open Biomass Burning

Open biomass burning is globally a significant source of black carbon emissions. Exposure to smoke from open burning is a serious health concern. The most extensive wildfires in the northern hemisphere occur in Russia and Canada, but many other countries have also experienced serious wildfires. In the Arctic, climate change may increase the risk of wildfires,

while open burning of cropland is unlikely to expand in the areas contributing significantly to emissions of black carbon reaching the Arctic.

Possible actions for international co-operation include:

- common air quality regulation, in particular promoting the banning and improved enforcement of bans on open burning on cropland;
- harmonising the integration of emission reduction policies in agricultural policies;
- sharing of information systems and campaigns for raising awareness to prevent wildfires;
- international development of capacities and skills to fight wildfires as part of disaster risk management;
- exchange of good practice in monitoring and surveillance systems of wildfires.

Paths toward enhanced monitoring of BC that affects the Arctic

Effective international cooperation aiming to curb BC impacts in the Arctic will continue to depend heavily on systems that monitor Arctic BC at source and *in situ*. By adequately monitoring northern hemispheric BC emissions together with measurements of ambient air BC and BC deposition at remote Arctic locations, it is possible to track progress on reducing Arctic-relevant BC emissions and the subsequent Arctic BC burden.

BC emissions reporting

Nation states that are parties to the UNECE Air Convention and/or members or observers of the Arctic Council are formally encouraged to report their national BC emissions inventories under these fora. Member States of the EU are furthermore encouraged to report BC emissions under the National Emission reduction Commitments (NEC) Directive.⁵ Despite a large proportion of countries regularly submitting BC emissions inventories, the non-reporting countries represent a substantial monitoring gap, particularly from an Arctic perspective. Furthermore, issues have been raised with regards the transparency, consistency, comparability, completeness and accuracy of reported BC emissions inventories.

To improve both the extent and quality of national BC inventory reporting, the road map identifies options for enhanced international cooperation that include:

- intensifying sharing of best practises on BC inventory compilation through e.g. bilateral initiatives and regional capacity building instruments;
- increasing attention to reported BC emissions as part of the in-depth inventory reviews under the UNECE Air Convention; and
- active cooperation between UNECE Air Convention and the IPCC to elaborate improved- and globally applicable inventory methodologies for BC.

Monitoring BC in the Arctic

The Arctic Council Member countries are all Parties to the UNECE Air Convention and members of the World Meteorological Organization (WMO). Within these fora, the programmes EMEP and Global Atmospheric Watch (GAW), respectively, coordinate and synthesise in situ monitoring of aerosols including BC. However, given the broad geographical- and multi-pollutant scope of these programmes, enhanced international cooperation, particularly between the AC Member countries, is considered necessary to improve the extent and sustainability of in situ BC monitoring in the Arctic.

⁵ Directive (EU) 2016/2284

Options for enhanced international cooperation on in situ BC monitoring in the Arctic include:

- strengthening of the in situ monitoring component under the AC Framework or Action on Enhanced Black Carbon and Methane Emissions Reductions; and
- extension of existing Arctic Monitoring and Assessment Programme (AMAP) activities to, inter alia, coordinate BC monitoring at Arctic stations and promote data sharing as part of more regularly updated assessments of Arctic BC monitoring

Conclusions

Full implementation of currently available technologies could reduce global anthropogenic BC emissions by 70 % from 2010 levels by 2030.⁶ If only Arctic Council member countries take full action, the corresponding reduction would be approximately 15 %.

Reducing BC emissions would improve air quality across the region and avoid some of the expected warming of the Arctic in the coming decades. There are, however, significant uncertainties, in particular due to other pollutants co-emitted with black carbon. Some of these may have a cooling effect through, e.g., enhancing cloud formation.⁴

There are numerous ways to reduce emissions of black carbon. Those with the highest priority provide multiple benefits in terms of reducing air pollution and increasing resource efficiency and reducing the rate of climate change. Developing the knowledge-base and strengthening systematic monitoring and reporting is also of high priority.

The detailed analysis of options shows that the specific actions that strengthen the ability to reduce emissions of black carbon will need to be supported by activities that bridge policy areas. This bridging is needed within the Arctic Council and its working and expert groups, between the Arctic Council and the UN-ECE Air Convention and different sectors within the EU, and between different international policy initiatives.

Website

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

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⁶ Kühn et al. 2020. Effects of black carbon mitigation on Arctic climate. Atmos. Chem. Phys., 20, 5527–5546, <https://doi.org/10.5194/acp-20-5527-2020>, page 5532