



Black Carbon – Cutting across climate and air quality issues

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Organised by CITEPA, with the support of the French Ministry of Ecology, Sustainable Development and Energy (MEDDE), the French Environment and Energy Agency (ADEME) and the Swiss Federal Office for the Environment

TFIAM



Black Carbon – Cutting across climate and air quality issues

Participation of French and international experts from the research community, policy makers from the French administration, EU institutions, international bodies for having a comprehensive insight into BC issues with local and global effects

14 presentations aimed at providing the latest knowledge of the BC issues

- Definition, impacts on climate change and air quality
- Emissions sources and reduction measures
- French and international public policies

170 participants to this meeting



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Definition, impacts on climate change and air quality

Gilles Aimoz – **Black carbon and air quality** (ADEME (F))

Paolo Laj – **Black Carbon and climate change** (CNRS Glaciology and Geophysic Laboratory (F))

Armelle Baeza Squiban – **Impact of BC on health – WHO report on BC** (University Paris Diderot (F))

Olivier Favez – **How to monitor BC in the environment and in chimneys** (INERIS (F))

Emission sources and reduction measures

Markus Amann – **Black carbon emission sources, trends, and mitigation potentials** - State of knowledge and needs for further research (IIASA (Au))

Nicolas Jeuland - **Black Carbon emission from road vehicles and non road mobile sources** (French institute of petroleum, new energie (IFPEN) (F))



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Emission sources and reduction measures

Thomas Nussbaumer - **Black carbon emissions from wood combustion** – Formation mechanisms and reduction techniques (Lucerne University of Applied Sciences, Verenum Research, Zürich)

Edmund Hughes - **Consideration by the IMO of Black Carbon emissions from international shipping** (International Maritime Organisation – UN)

Gaston Theis - **The Swiss experience with the reduction of BC emissions from construction machinery** (Swiss Federal Office for the Environment (CH))

Gary Fuller - **Use of black carbon as a tracer to assess measures for improving air quality** (King's College London (UK))



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French and international public policies

Richard Ballaman - **The UNECE Convention on Long-Range Transboundary Air Pollution and the Gothenburg Protocol** (Swiss Federal Office for the Environment (CH))

André Zuber - **Current insights and directions for future EU air quality policy** (European Commission, Environment Directorate-General (EC))

Sophie Bonnard - **Introduction to the Climate and Clean air initiative** (UNEP)

Isabelle Derville - **French policies to reduce PM and BC** (MEDDE – F)



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Many messages from the conference but among other :

BC and climate change

BC Mitigation strategies should not be considered as alternatives to CO₂ emission abatements

Negative radiative forcing from co-emitted substances may be higher than positive RF by BC - Reduction of BC emission, a mitigation option for BC-rich sources only

In Western Europe, climate mitigation through BC emission abatements may have a limited effect in terms of RF but not necessarily the case of other regions of the World (cf. India)

Health impacts

The review of the results of all available toxicological studies suggested that BC (measured as EC) may not be a major directly toxic component of fine PM, but it may operate as a universal carrier of a wide variety of chemical constituents



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BC monitoring

BC monitoring methods commonly used for ambient air measurements do not allow for direct measurements in Chimneys (dilution needed)

BC monitoring methods rather complex - Harmonization / standardisation to be achieved for ambient air for thermo-optical methods and optical methods

Harmonization / standardisation to be started for stack emissions

BC emissions and reduction potentials

Sources and amount of BC emissions different from country groups to country groups (Europe versus East Asia for instance) are estimated. Open burning of forests, grasses and woodlands are large emitters in Africa, industrial coal in East Asia, on road sources in Europe.

Effective implementation of current policies will exhaust reduction potential for several technologies in some regions but large mitigation potential still exists



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Mobile sources

For mobile sources, advanced combustion concepts allow reduction of soot and NO_x. After treatment technologies and alternative fuels considered to further reduce PM emissions.

Research activities are now focusing on the characterization of ultrafine particles emitted by vehicles

DPF a proven technology for diesel soot removal from construction machinery emissions. DPF can be used not only on new engines, but also for retrofitting existing ones.

Positive experience of Switzerland on that issue. PN-limit for non-road mobile machinery in Europe would be useful



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Mobile sources

Ship BC emissions

Specific emission rates of Black Carbon from ships are highly variable from ship to ship and highly load-dependent on a given ship

Several possible control measures identified such as fuel type : gas; alternative power sources; water-in-fuel injection or in engine; engine concept : common rail, fuel injection, turbochargers, slide valves; Particulate filters/exhaust gas cleaning systems; slow steaming.

Works to further identify, collate and investigate possible control measures to reduce the impact on the Arctic of Black Carbon emissions from international shipping

A report in early 2014



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Biomass combustion

Biomass combustion results in three primary particle types Condensable Organic Compounds (COC), Soot (BC) and Salts. Particle emissions and their chemical composition strongly depend on the combustion regime. Formation mechanisms well understood. Combustion design and operation, excess air control reduce emissions. ESP and fabric filters (for dry fuels) are state-of-the-art and highly efficient in industrial scale plants

Air quality indicator

Elemental / black carbon is a useful tracer to determine the efficiency of urban air pollution interventions affecting vehicle tail pipe emissions (LEZ...)

Expensive measures to control tailpipe emissions of BC and PM10 might be undermined by increases wood heating and may contribute to population exposure to PM



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Many messages from the conference but among other :

Coalition Clean Air and Climate :

- Raise awareness of SLCF impacts and mitigation strategies;
 - Enhance and develop new national and regional actions, identify and overcome barriers, enhance capacity and mobilize support
 - Promote best practices and showcase successful efforts;
 - Improve scientific understanding of SLCFs
- 31 state partners and 29 non state partners



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EU

Include provisions from the Gothenburg Protocol as amended

Establish BC emission inventories and projections

Give priority to emission reductions from significant sources of BC when meeting the PM reduction commitment

Consider mitigation actions on BC sources

Mandatory, directly or indirectly through regulation on PM emissions

Voluntary, such as with Urban Clean Air Programme and Partnership Implementation Agreements

Internationally within the CLRTAP and CCAC

Consider later action

Air quality standards and monitoring requirements in AAQD

Updates of guidance for sectors (e.g. BREF and BREF conclusion)



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To download the presentation

http://download-citepa.tropicalex.net/yzw_jouet2013