

10 October 2012

Task Force on Short-Lived Climate Forcers

Progress Report in Preparation for SAO November 14-15, 2012 Meeting

This submission serves as a brief overview of the progress to date made by the Task Force on Short-Lived Climate Forcers (SLCFs). This submission also serves to identify key issues the Senior Arctic Officials (SAOs) may wish to focus on as the Task Force works to complete its deliverables and recommendations in time for the Arctic Council Ministerial in May 2013.

1. The Task Force mandate

The Task Force produced its first deliverable for the 2011 Arctic Council Ministerial meeting, including both a technical report and summary for policymakers with a number of recommendations, focusing on the role of black carbon emissions. These reports are available on the Arctic Council website.¹ The 2011 Arctic Council Declaration agreed upon in Nuuk, Greenland extended the mandate of the Task Force with the following language:

Welcome the Arctic Council reports on Short-Lived Climate Forcers (SLCF), that have significantly enhanced understanding of black carbon, encourage Arctic states to implement, as appropriate in their national circumstances, relevant recommendations for reducing emissions of black carbon, and request the Task Force and the AMAP expert group to continue their work by focusing on methane and tropospheric ozone, as well as further black carbon work where necessary and provide a report to the next Ministerial meeting in 2013.

Furthermore, the SAO's final report to Ministers, reflecting the Task Force's own recommendations (from 2011), stated the following:

Regarding future work for black carbon, the Task Force recommends continued focus on the costs of implementing certain measures, the additional emission reduction potential of some measures, potential Arctic climate benefits, and potential health benefits.

Regarding methane, the Task Force notes that the Arctic Council and Council nations may be able to leverage existing efforts to encourage additional methane reductions, both within and outside Arctic Council nations, by communicating and demonstrating the climate benefits of such measures specifically for the Arctic region.

2. The Task Force's planned deliverables

The Task Force is working towards the completion of two documents to deliver to SAOs. The first document is a brief **Summary for Policymakers** that will 1) expand upon certain aspects of the Task Force's 2011 recommendations on black carbon in light of new

¹ Arctic Council Task Force on Short Lived Climate Forcers (2011) An Assessment of Emissions and Mitigation Options for Black Carbon for the Arctic Council available at: <http://www.arctic-council.org/index.php/en/about/documents/category/7-working-groups-scientific-reportsassessments>; Arctic Council Task Force on Short Lived Climate Forcers (2011) Progress Report and Recommendations for Ministers available at <http://www.arctic-council.org/index.php/en/about/documents/category/21-task-force-and-contact-group-reports>.

information; 2) present a menu of options for the SAOs to consider for actions that can be taken to address methane emissions; 3) provide updated scientific context on the role of SLCFs in Arctic climate change, with a particular focus on methane; and 4) provide a number of key messages regarding the potential climate and health benefits of addressing SLCFs, as well as recommendations for future research and pilot projects. Sectors receiving special attention include oil and gas operations, marine shipping, and open burning given their potential for future emission increases in the Arctic.

The second document is a **technical support document**, containing a more detailed review of recent scientific findings, updates on black carbon and methane emissions from Arctic countries, future emission projections, mitigation analyses with associated costs, and a catalogue of relevant regulations, policies, and international forums. The co-chairs will show key results of these analyses at the November 2012 SAO meeting.

3. Collaboration with AMAP

The Task Force and AMAP expert groups on black carbon/tropospheric ozone and methane have agreed to 1) provide scientific context for the Task Force's recommendations; and 2) identify mitigation scenarios that may be assessed by AMAP in terms of their Arctic climate implications. Some of the co-chairs from the Task Force and AMAP groups have been attending one another's meetings. The AMAP groups are operating on a longer time horizon (i.e., beyond 2013) compared to the Task Force, but nevertheless the AMAP expert group chairs have committed to providing interim products (through Task Force-AMAP exchanges) that can serve the Task Force for its 2013 deliverables.

In its revised work plan submitted to SAOs in March, the Task Force noted it will also seek guidance from AMAP and other scientists as necessary to determine the extent to which non-methane precursors of tropospheric ozone should be addressed in Task Force recommendations.

4. Some messages on black carbon and methane climate effects and emissions

Black carbon and methane are different in a number of ways, and these differences have implications for SAO consideration. First, as the Task Force stated previously, the **location, timing (i.e., season of the year), and co-pollutant reductions of mitigation actions** for black carbon are likely important in determining the net benefit of the action for the Arctic climate. By contrast, the location and timing of methane emissions mitigation is not nearly as important, neither for Arctic nor global climate benefits; in other words, it is our current understanding that reducing one ton of methane *anywhere* in the world will essentially have the same temperature reduction effect in the Arctic.

This means Arctic Council nations, as well as other nations in, or operating in, high northern latitudes, have a unique role to play in reducing black carbon emissions that impact the Arctic climate. The Task Force previously reported that Arctic Council nations make up about 10% of the world's global black carbon emissions, but, according to the 2011 AMAP report, tend to have a higher Arctic climate impact *per unit of emissions*. For methane, even though the location of Arctic Council nations does not create a unique opportunity to

achieve pronounced Arctic climate benefits as it does for black carbon, the Arctic Council as a whole is currently responsible for approximately **20% of the world's anthropogenic methane emissions**, according to both IIASA and U.S. EPA estimates.

It should also be noted that, as the Task Force previously reported, black carbon emissions for Arctic Council nations as a whole are projected to continue *decreasing* over the next couple of decades (primarily as a result of particulate matter controls on many new diesel engines, along with improved diesel fuel quality). Methane emissions, however, are projected to *increase* for the Arctic Council as a whole, by between 8 and over 20% by 2030 compared to 2005 levels, according to IIASA and draft U.S. EPA estimates, respectively.² Thus, the Arctic Council countries have a very important role to play in methane mitigation, since they are currently major emitters currently and anticipate further emissions increases over the next 20 years without new mitigation efforts.

5. Validity of Task Force's 2011 recommendations regarding black carbon

The Task Force is reviewing its 2011 recommendations regarding black carbon emissions in light of new information. **The 2011 recommendations continue to appear valid and worthy of SAO consideration.** There are some specific new developments which have implications for the 2011 recommendations (see e.g., #6 below). In particular, the Task Force has discussed extending or updating its recommendations on marine shipping, gas flaring, and agricultural burning.

It is worth noting how some actions have, or have not, occurred in light of the recommendations. For example, some efforts have occurred to improve and share black carbon emission inventories, but in some cases national data on black carbon emissions is still not available. Retrofitting of older diesel engines remains a significant black carbon mitigation opportunity, and some countries have not set stringent particulate matter standards for some categories of mobile diesel sources (including nonroad diesels, locomotives, commercial marine other than ocean going vessels, and even, in some cases, on-road diesels).

6. New developments in LRTAP, IMO, and CCAC

In May 2012, amendments to the Gothenburg Protocol under the Convention on Long-Range Transboundary Air Pollution (**LRTAP**) were finalized and adopted, but have not yet entered into force. The revised Protocol includes emission reduction commitments for fine particulate matter. Black carbon is included in the Protocol as a component of particulate matter, though the Protocol includes no specific emission limits for black carbon. Rather, LRTAP Parties are encouraged to prioritize those particulate matter reduction measures that will also reduce black carbon. In addition, LRTAP Parties will be encouraged to voluntarily report their black carbon emissions, using inventory guidelines currently under

² The difference between IIASA and U.S. EPA future methane emission projections appears to primarily be the result of differences in underlying assumptions about methane emission releases in the oil and gas production sector. Additional differences are likely due to methodological differences in the estimation of country level emissions. Globally, methane emissions are projected to increase at a slightly higher rate than projected for the Arctic Council.

development by a technical body under LRTAP. The Task Force is considering recommendations about how the Arctic Council could engage in these efforts to encourage both black carbon mitigation and to support black carbon emission inventory guidance development and reporting.

In February 2012, the **IMO** established a black carbon correspondence group to, among other things, identify black carbon measurement and control measures for international shipping. A report from this group should be available in February 2013 and should be considered at the next meeting of the IMO Marine Environment Protection Committee in May 2013. The Task Force is considering recommendations about how the Arctic Council could engage in next steps in this process and ensure that Arctic climate considerations are given the appropriate attention.

In February 2012, six countries (including Canada, Sweden and the United States) launched the Climate and Clean Air Coalition (**CCAC**) to Reduce Short-Lived Climate Pollutants. The CCAC's membership has since more than tripled. G8 countries have committed to joining, and the Coalition now includes all Arctic Countries except for Iceland and Russia. (Russia is in the process of completing its application to join). The CCAC is a voluntary partnership whose objectives include: raising awareness of these pollutants, enhancing and developing new national and regional actions, promoting best practices, and improving scientific understanding of SLCF impacts and mitigation strategies. Given that the CCAC is also addressing black carbon and methane, the Task Force is considering how Arctic Council actions could be complementary to CCAC efforts.

7. Recent methane analyses

The Task Force is receiving as technical inputs recent analyses on methane emissions, future emission projections (out to 2030), and mitigation analyses for all eight Arctic Council countries from IIASA and U.S. EPA. Some highlights of these analyses will be presented at the SAO November, 2012 meeting.

The largest sources of methane emissions in Arctic Council nations include the oil and gas sector, coal mining, solid waste or landfills, and agricultural livestock. As stated above, the Arctic Council as a whole is responsible for approximately 20% of the world's anthropogenic methane emissions; and these emissions are projected to *increase* between 2005 and 2030. The United States and Russia rank among the world's largest emitters of anthropogenic methane emissions.

For each of the major sources of methane emissions, existing, cost-effective technologies and practices can be employed to reduce emissions and generate energy. In **oil and gas systems**, for example, there are numerous opportunities to reduce methane emissions through often simple operational changes that can have a large impact for relatively low cost. For active **underground coal mines**, methane is removed for safety reasons, but this methane can be recovered and used profitably instead of vented. Likewise, methane emissions from **landfills** can be captured and utilized. In **agriculture**, manure and agro-industrial waste management systems can be large sources of methane, and these

emissions too can be captured with current technologies with a number of other environmental co-benefits.

8. Health effects: some key messages

Measures to reduce methane and black carbon recommended by the Task Force would produce health and environmental benefits fairly directly, in addition to those benefits accruing from reductions in the rate and magnitude of climate change overall. However, we currently lack a complete set of quantitative estimates of the potential health benefits of specific measures to help inform mitigation decisions in individual Arctic Council nations.

For Arctic Council nations, actions taken to reduce black carbon emissions can be expected to provide health benefits. The Task Force is likely to emphasize that black carbon mitigation measures in densely populated areas are likely to provide the greatest health benefits.

Methane mitigation measures also benefit public health (through associated decreases in ground-level ozone), although to a lesser degree and on a longer timescale than reductions in black carbon. Due to its decadal lifetime, methane affects ozone concentrations fairly uniformly around the world. Therefore, reducing methane emissions in any location would reduce ozone-related health impacts all around the world, regardless of where the emissions reductions occur. However, in some sectors, measures targeting methane reductions can sometimes produce co-benefit reductions of other ozone precursors, and in such cases, health impacts may be felt both on a regional and global level.

9. Next Task Force meeting

The Task Force is planning its **next meeting 12-14 December 2012**, with the location to be determined. The Task Force will use this meeting to work towards finalizing its two documents, the technical support document and the summary for policymakers, taking into account any comments and feedback received from the SAOs.