

Task Force on Short-Lived Climate Forcers Under the Arctic Council

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Overview



- Short Lived Climate Forcers: What are they and why are they so important for the Arctic?
- Task Force mandate from Arctic Council Tromsø Declaration
- Progress to date, key issues, and challenges



Arctic Climate Change



- **Temperature rise (both air and water) occurring at a faster rate than other regions**
- **Sea ice extent has decreased sharply; existing ice becoming thinner and increasingly vulnerable to melting**
- **Global climate and societal implications:**
 - Glacier melt contributes to sea level rise
 - Loss of snow and ice reduces surface reflectivity, amplifies warming
 - Permafrost melting may lead to methane releases

Role of Short-Lived Climate Forcers (SLCFs) in Arctic Climate Change



- Buildup of carbon dioxide (CO₂) in our atmosphere remains single largest and long-term contributor to climate change
- Some recent research suggests combined effect of methane, black carbon, and tropospheric ozone may be having climate impact in the Arctic that is comparable to that of CO₂
 - But exact contribution of these SLCFs to Arctic climate change remains uncertain
- Arctic warming could be slowed to some degree by reducing SLCFs
- Reducing emissions of SLCFs offers more immediate climate benefit compared to CO₂ emission reductions

Arctic Council Tromsø Declaration



- Note the role that shorter-lived climate forcers such as black carbon, methane and tropospheric ozone precursors may play in Arctic climate change, and recognize that reductions of emissions have the potential to slow the rate of Arctic snow, sea ice and sheet ice melting in the near term
- Decide to establish a task force on short-lived climate forcers to identify existing and new measures to reduce emissions of these forcers and recommend further immediate actions that can be taken and to report on progress at the next Ministerial meeting (2011)



Task Force 2010



- BC may play a unique role in the Arctic through its double absorption: as atmospheric particle and deposited on snow
- Within the Operating Guidelines given by the SAOs, the Task Force is focusing its energies on BC
- Focus on BC does not indicate any pre-ordained conclusion about the overall importance of BC for the Arctic climate system in comparison to methane and tropospheric ozone

Planned Products of Task Force

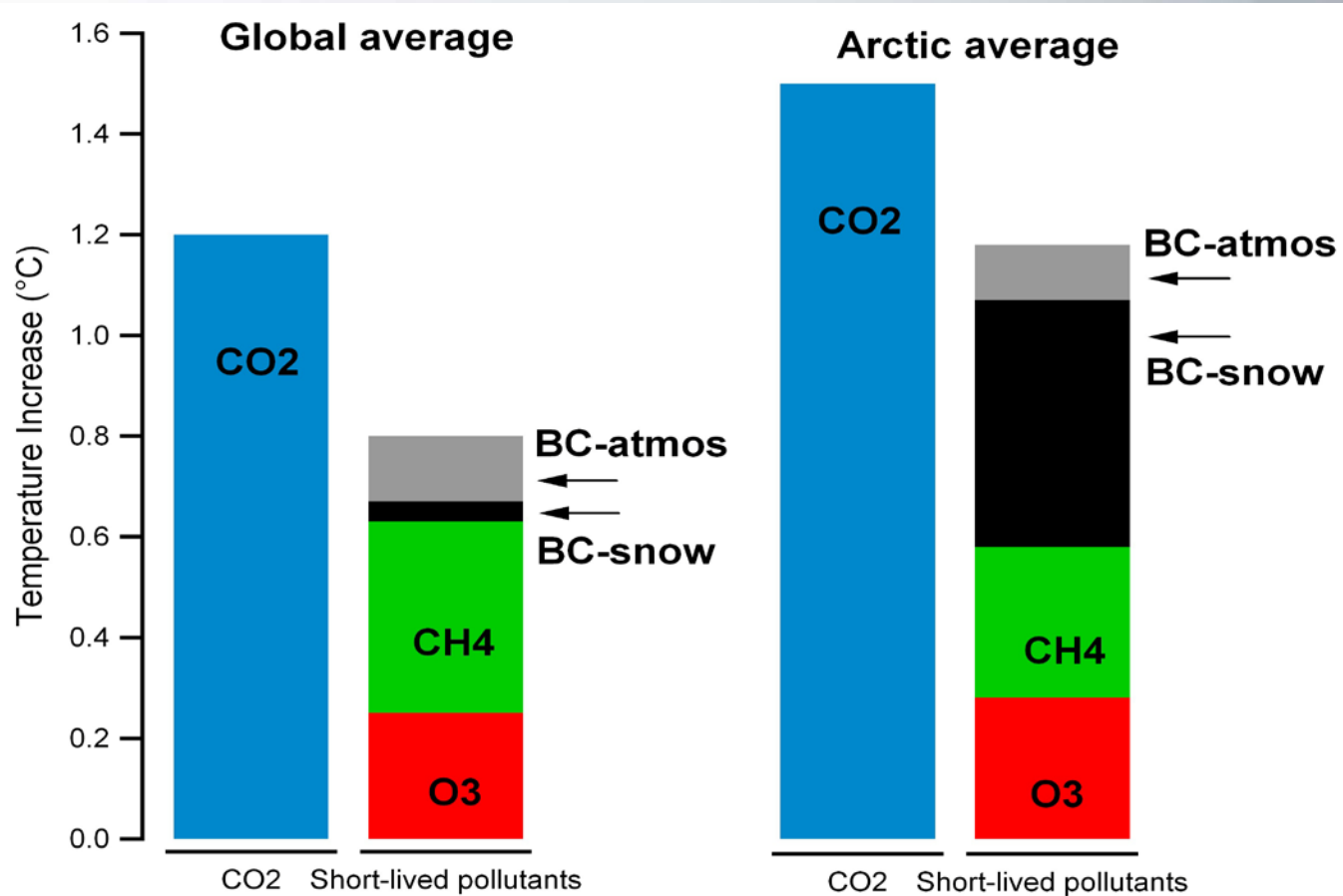


Technical Report (focus to date on BC & OC emissions)

1. Brief climate and Arctic scientific context
2. Brief overview of health effects
3. Emissions by country and by sector
4. Projected future emissions (ca. 2020/2030)
5. Current regulations, policies, programs that affect emissions and may be used for further emissions control
6. Additional mitigation opportunities with associated costs
7. Implementation feasibility
8. Emissions from non-Arctic Council regions
9. Recommendations

Summary for Policymakers

SLCFs are Global, but with Greatest Impact in Arctic



Warming Since 1880. Quinn, *Impact of Short-Lived Pollutants on Arctic Climate*, presented at AMAP, Oslo, September 15 2008

Example of Current Task Force work: Black carbon emissions by nation and by sector (Gg/year)



	CAN	USA	RUS	ICE	DEN	NOR	SWE	FIN	Total
Ag Burn	12.25	3.02	8.86	0	0	0	0	0	24.1
Industry	2.9	14.38	11.97	0.01	0.06	0.21	1.69	1.31	32.5
Open Burn	40.35	60.4	80.56	0	0.04	0.05	0.14	0.05	181.6
Power Gen.	0.19	2.82	1.26	0	0.02	0	0.01	0.02	4.3
Residential Biofuel	3.25	32.59	27.8	0.01	0.42	1.16	3.04	1.01	69.3
Residential Coal	0.27	19.88	12.25	0	0.06	0	0	0.03	32.5
Residential Other	0.53	3.21	0.56	0	0.06	0.04	0.12	0.07	4.6
Road Transport	17.07	211.33	29.78	0.09	2.99	2.4	4.6	3.25	271.5
Off-road transport	17.7	100.42	27.11	0.56	3.14	3.24	2.86	2.68	157.7
Total	94.51	448.05	200.15	0.67	6.79	7.1	12.46	8.42	778

Note: shipping is not included

Note: these emission estimates by themselves do not tell the whole story of how emissions affect the Arctic – which requires transport and deposition information as well

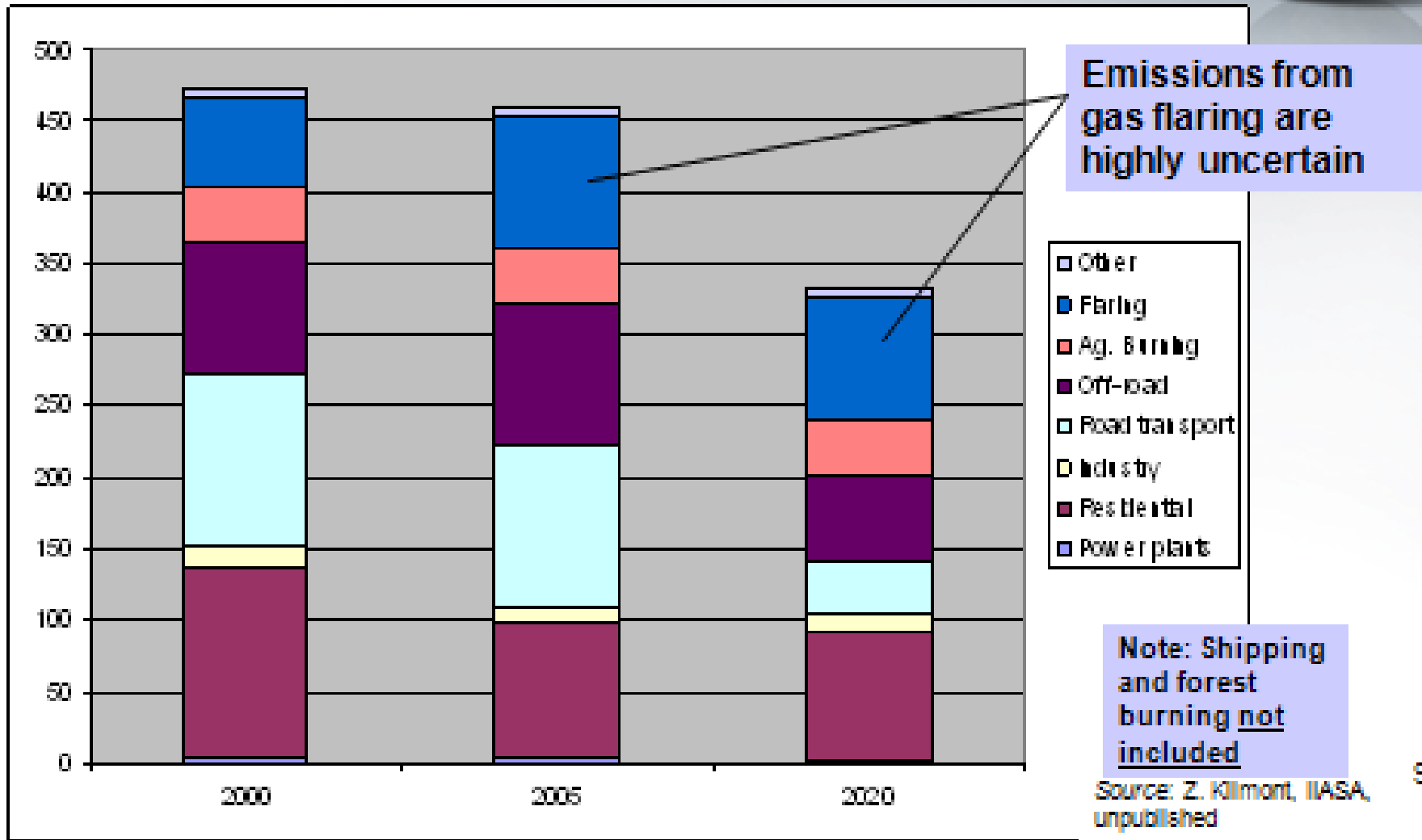
Global Emissions are 8000 Gg/yr.

Data provided by Tami Bond. These are not official country emission estimates.

Very Preliminary BC Emission Projection Estimates to 2020, Total for All 8 AC Countries



Modeling from IIASA (GAINS model)



Emerging Story on BC Emission Sources and Trends



- **On-road and off-road diesel vehicles**
 - Currently large source for all countries, but projected trends are downward
 - Further mitigation potential could focus on retrofitting existing vehicles
- **Residential burning**
 - Perhaps larger source than originally anticipated
 - Source appears significant for all countries
- **Agricultural burning**
 - Remains an issue primarily for USA, Canada and Russia
- **Wildfires and prescribed burning**
 - Appears to be very significant source
 - Important to consider linkages with/causation by agricultural burning
 - Consider reaction and needs of agricultural communities
- **Shipping**
 - Expectation and concern about projected increases in emissions
- **Gas flaring**
 - Preliminary estimates and high uncertainty point towards immediate need to better understand relative magnitude and importance of this source
 - BC mitigation efforts would also impact methane emissions
- **Power plants**
 - Not a significant source of BC, unlike other pollutants affecting health and climate

Relevant Forums and Efforts Outside of the Arctic Council



- IMO
 - Proposal to consider Arctic climate impacts of BC from shipping put forward in March by Norway, Sweden, US
- CLRTAP Expert Group on Black Carbon
 - Also co-chaired by Norway and US, exploring integration of BC into Gothenburg Protocol revision
- UNFCCC
 - No agreed action as yet on “near-term climate impacts”
- UNEP
 - Expert report on global SLCF considerations and impact forthcoming in late 2010



Challenges Ahead: Moving Towards Recommendations



- The quality of analytic work and recommendations will depend heavily on national inputs from AC nations
- We will need to make recommendations in the face of scientific and technical uncertainties
- We should be capable of identifying the relative magnitude of different emission sources; and we should know their directional impact on the Arctic climate
- We will identify existing policies and programs in the different countries capable of delivering additional mitigation options
- Costs of different mitigation strategies will be an area of focus over the coming months, but precise cost-benefit analysis will be difficult.
- Some significant sources may lie outside Arctic Council nations, or be subject to non-Arctic forums such as the IMO and CLRTAP



Issues for Discussion



- Scientific uncertainties will remain: Will governments nevertheless be willing to move forward on policy measures?
- To what degree should the Task Force consider health and other co-benefits to Arctic nations (for example, from decreasing BC and ozone from diesel or agricultural fires), for its recommendations?
- To what degree should the Task Force focus on non-Arctic nations and forums to request additional action?
- Are there opportunities for early actions we can be taking now; for example, the U.S. black carbon initiatives to reduce SLCF emissions from key source categories?