1. Summary of current black carbon emissions to CLRTAP, where appropriate, and, if available, future projections

1.1 Background to reported BC emissions

Emission estimates are based on official Swedish statistics, e.g. energy statistics, agricultural statistics, environmental reports from industry and emission factors (nationally developed factors as well as internationally recommended ones).

Sweden uses the Guidelines for Estimating and Reporting Emission Data for reporting to the Convention on Long-Range Transboundary Air Pollution (CLRTAP) and the 2013 EMEP/EEA Air Pollutant Emission Inventory Guidebook as methodological guidance. Sweden also uses methodologies in accordance with the IPCC 2006 Guidelines for National Greenhouse Gas Inventories1 and methods that are in general in line with Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories IPCC-NGGIP (Good Practice Guidance). Some parts of the methodologies are taken directly from the IPCC Guidelines, the Good Practice Guidance and the EMEP/EEA Air Pollutant Emission Inventory Guidebook.

1.2 Latest inventory data

Black Carbon (BC) was reported as an additional air pollutant for the first time in the Informative Inventory Report (IIR) for Sweden in 2015 (inventory data 2013)[1]. The voluntary reporting of BC was included under the CLRTAP's revised Gothenburg Protocol and is included in the reporting Guidelines as a component of $PM_{2.5}$.

In 2013, the estimated BC emissions in Sweden were approximately 3.7 ktonnes in total. The energy sector, NFR sector 1, accounts for 95 % of the Swedish BC-emissions. NFR sector 1 includes emissions from energy production, transport, mobile machinery, housing and commercial sector, as well as part of the industrial sector. The remaining 5 % comes from industrial processes and waste incineration. The aggregated emissions of black carbon have declined by almost one-fourth compared to 2000. The largest reduction occurred in the energy sector, 1 ktonne (24 %). Emissions also decreased within industrial processes and product use sector, by 0,06 ktonnes (45 %) while emissions increased some in the waste sector. Additional data are presented in Annex I.

[1] http://www.ceip.at/ms/ceip_home1/ceip_home/status_reporting/2015_submissions/

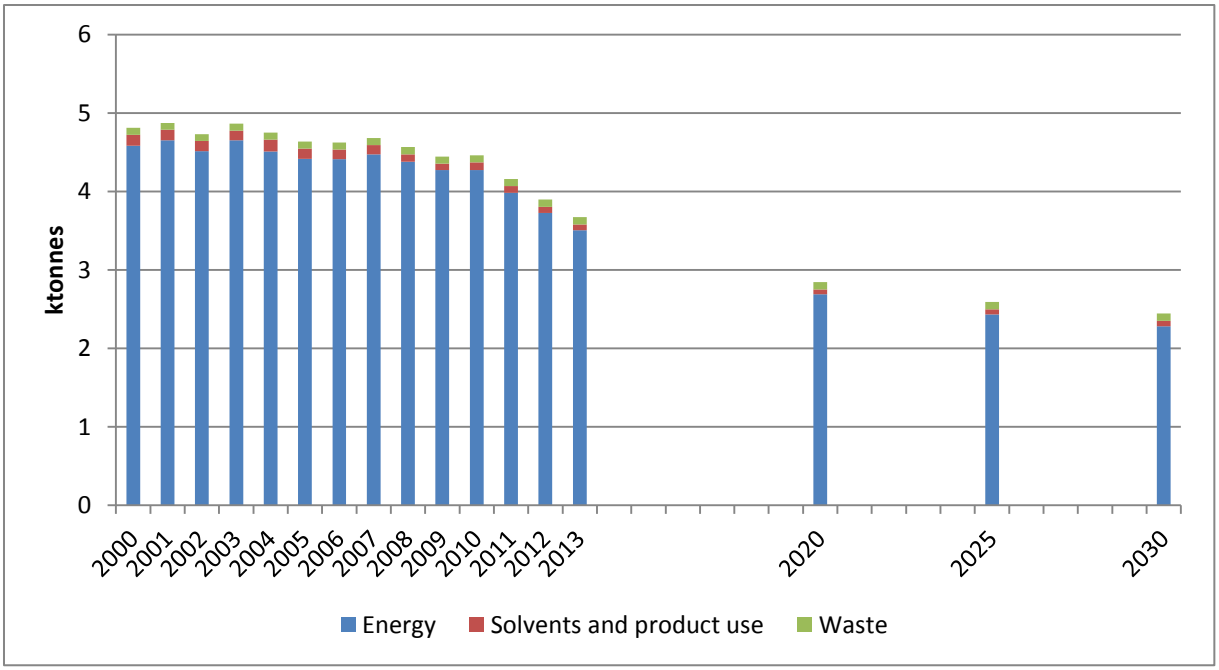

Figure 1. Historic and future emissions of BC presented in the NFR-format

1.3 Future projections of BC emissions

Projections of future Swedish emissions of BC were reported to CLRTAP in Mars 2015[2] and are available for 2020, 2025 and 2030. The long term projection shows that BC emissions are expected to decline by 29 %, to 2,6 ktonnes, between 2013 and 2030. From 2000 this equals a reduction of nearly 46 %.

1.4 Additional analyses of historic and future emissions

A national in-depth study was undertaken to get a better understanding of historic and future sources of Swedish air pollutants. The final report was presented in June 2015[3]. Emissions were divided into the following sectors to facilitate for example the design of policies and measures:

- Energy – electricity and heat production (1A1a)
- Industry – emissions from processes and combustion within industry (1A1b-c, 1A2, 1B, 2A-C, 2H-L)
- Transport (1A3)
- Working machinery (1A4aii, 1A4bii, 1A4cii, 1A4ciii, 1A5b)
- Housing and commercial (1A4ai, 1A4bi, 1A4ci, 1A5a)
- Solvents and product use (2D, 2G)
- Agriculture
- Waste

Emissions of BC have been reduced from 4,8 ktonnes in 2000 to 3,7 ktonnes in 2013, a decline by 24 %. Reductions have mainly occurred after 2010. The greatest reduction has

[2] http://www.ceip.at/ms/ceip_home1/ceip_home/status_reporting/2015_submissions/

[3] http://www.naturvardsverket.se/Om-Naturvardsverket/Publikationer/ISBN/6600/978-91-620-6689-5/

occurred within the transport sector were emissions have declined by 39% since 2000. Within the household and commercial sector emissions increased between 2000 and 2010 but have declined some after 2010. During 2013 BC-emissions from the household and commercial sector were 16 % above the 2000 emissions from the sector.

During 2013 the transport sector accounted for 34 % of the BC-emissions while the housing and commercial sector and industry accounted for 26 % each, working machinery for 8 %, energy production for 3 % and waste for 2 % of the total Swedish BC-emissions.

According to the future projection Swedish emissions of BC will continue to decrease, by 29 %, to 2,6 ktonnes year 2030 compared to 2013. A large part, 70 %, of the expected reduction is due to the continued decrease within the transport sector. By 2030 emissions of BC from the transport sector are expected to decline by 60 % compared to 2013. Emissions from industry and working machinery are expected to decline until 2030 while emissions from the housing and commercial sector are projected to increase by 31 % until 2020 and then decrease slightly until 2030. By 2020 the housing and commercial sector will be the largest source of BC-emissions in Sweden and will by 2030 account for almost half, 46 %, of the Swedish BC-emissions. By 2030, industry will account for 23 %, the transport sector for 19 %, working machinery for 5 %, the energy sector for 4 % and the waste sector for 3 % of total emissions.

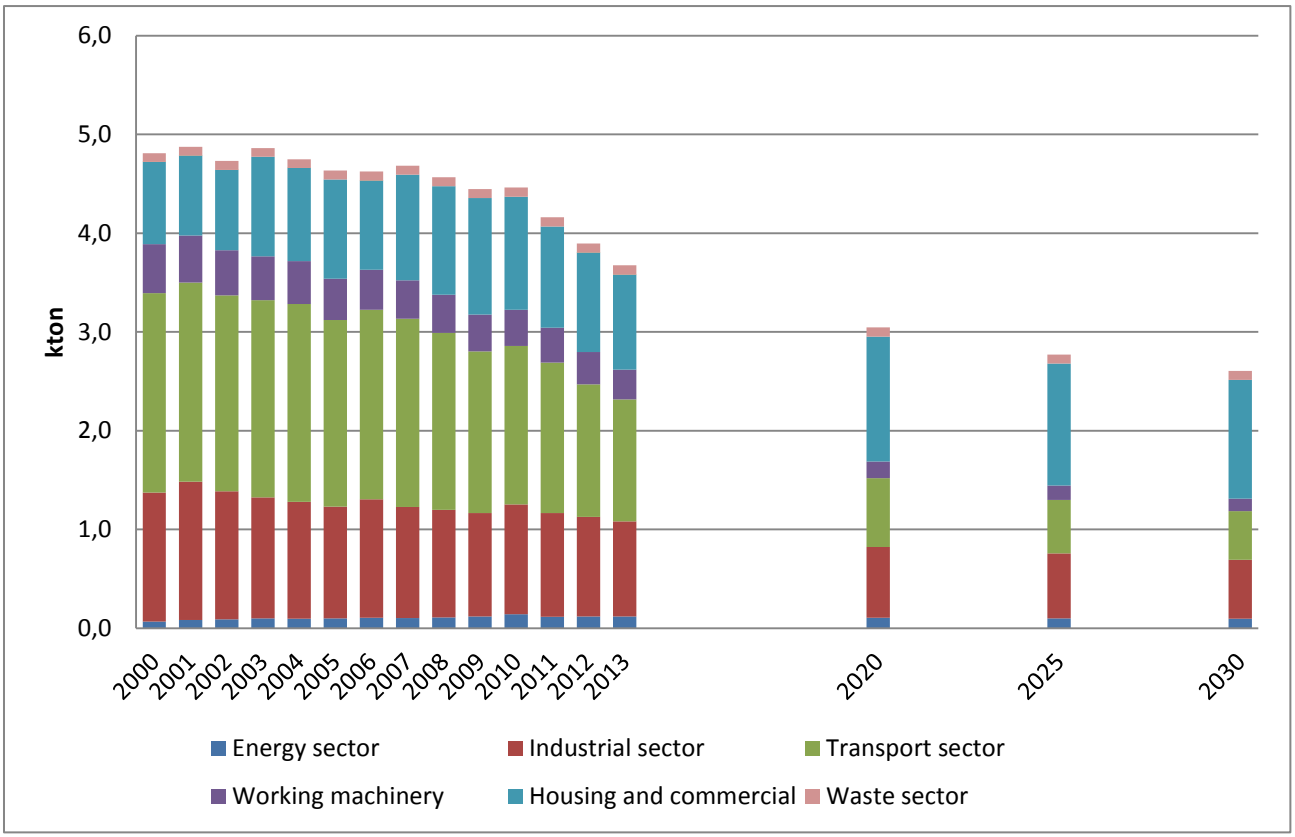

Figure 2. Historic and projected emissions of Black Carbon (BC) from different sectors. Sectors not equivalent to NFR format.

2. *Summary of current methane emissions to UNFCCC and, if available, future projections*

Emission estimates are based on data from national or official Swedish statistics, e.g. energy statistics, European Union Emission Trading Scheme (EU ETS), environmental reports, agricultural and forestry statistics, as well as data on production and consumption obtained directly from the major producers and consumers, respectively.Emission factors and thermal values used are either developed nationally or are internationally recommended default factors.

Reported data are taken from the Swedish National Inventory Report (NIR), published by the Swedish Environmental Protection Agency. The NIR for the year 2015 was prepared in accordance with the Reporting Guidelines agreed by the UNFCCC on its nineteenth session of the Conference of the Parties (COP) in Warsaw 2013 and subsequent decisions. It contains national greenhouse gas emission inventories for the period 1990 to 2013. The methods used to calculate the emissions and removals are in accordance with the IPCC 2006 Guidelines for National Greenhouse Gas Inventories and IPCC supplementary guidelines for KP LULUCF and also the IPCC supplementary guidelines for Wetlands (2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories). For further information and descriptions of methods used to produce the estimates, please see the NIR for the year 2015.

2.1 Latest inventory data

A preliminary NIR has been published on the Swedish EPA website but not yet submitted to the UNFCCC[4].

In 2013, the total Swedish emissions of methane (CH_4) , excluding emissions from LULUCF, were 5.3 million tonnes calculated as carbon dioxide equivalents, or just over 9 % of total greenhouse gas emissions (Figure 2.5). In 2013 the aggregated emissions of methane had declined by one third compared to 1990.

64 % of the emissions of methane (CH_4) in 2013 originated from agriculture (CRF 3), 25 % from the waste sector (CRF 5) and 11 % from the energy sector (CRF 1). Within the waste sector emissions declined by 62 % between 1990 and 2013 mainly because of decreasing quantities of organic waste deposited on landfills. Also the quantities of recovered landfill gas increased between 1990 and 2003. Emissions from the agricultural sector decreased by 13 % between 1990 and 2013. For a detailed table of annual methane emissions see Annex II.

[4] http://www.naturvardsverket.se/upload/sa-mar-miljon/statistik-a-till-o/vaxthusgaser/2015/rapport-nir-2015-preliminar.pdf

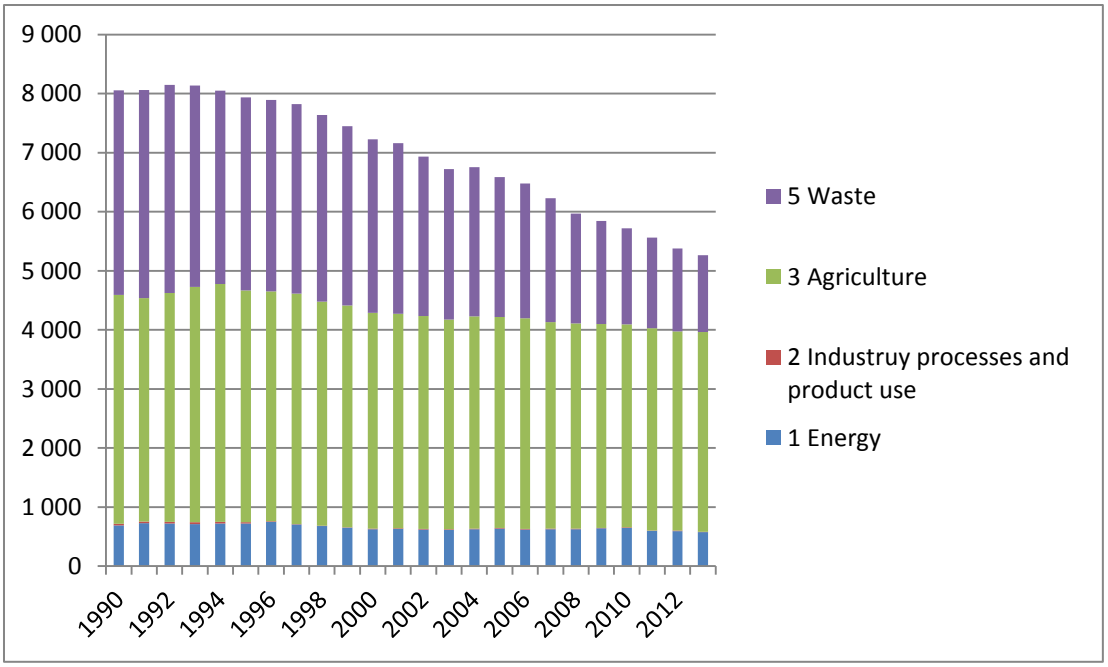

Figure 3. Total emissions of CH_4 by sectors in ktonnes CO_2-eq., 1990-2013, CRF-format

2.2 Projections of future methane emissions

Projections of greenhouse gas emissions in Sweden have been produced for the years 2015, 2020, 2025, 2030 and 2035[5]. The projections are based on the policies and measures approved by the Swedish parliament up to the year 2014, which means that they are projections "with existing measures". The projections were produced to be used in Checkpoint 2015, an in-depth evaluation of progress towards the objectives, which was presented to the Swedish Government in the autumn of 2014. Thus, they are based on greenhouse gas emissions submitted in 2014. For the reporting on projections in 2015, they have been adjusted to the 2015 submission of inventory data and for the IPCC 2006 reporting guidelines and new global warming potentials (GWPs).

The projections are based on a number of assumptions, all of which naturally involve uncertainty, and the results should be interpreted with this in mind. The projections can mainly be regarded as a consequential analysis of the assumptions that have been made. The method for estimating the projections is mainly developed for a medium-term or a long-term projection, which means that the projection does not take into consideration variations on a short-term basis.

[5] http://www.naturvardsverket.se/Sa-mar-miljon/Klimat-och-luft/Klimat/utslappen-av-vaxthusgaser/Prognoser-for-vaxthusgasutslapp/

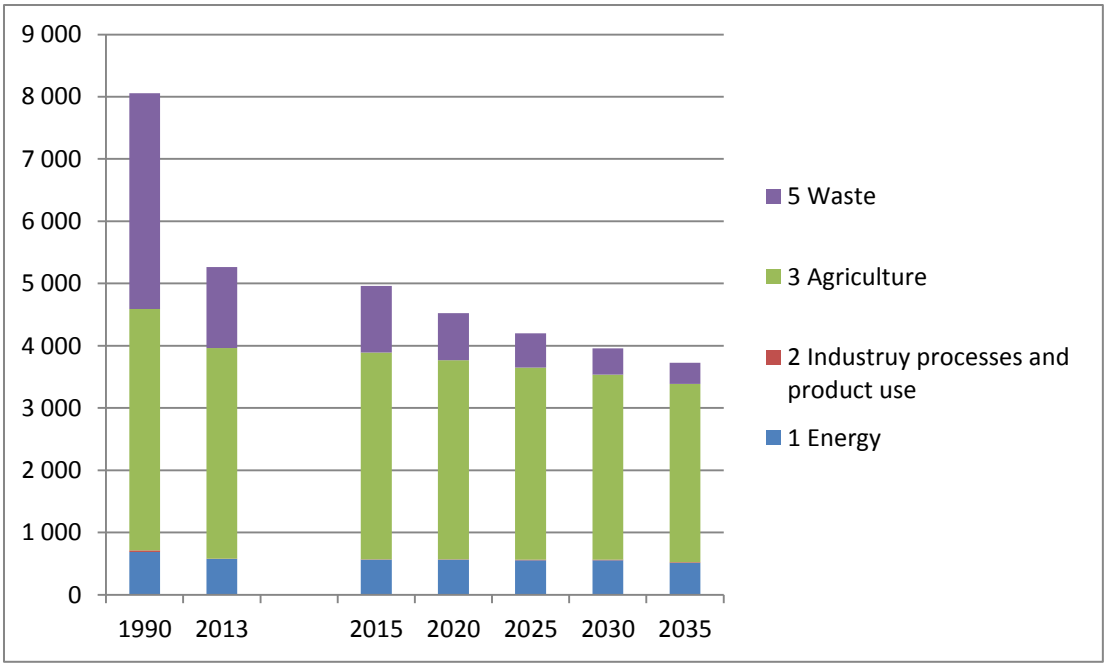

Figure 4. Projected methane emissions by sectors, excluding LULUCF, presented in ktonnes CO_2-eq., together with emissions for year 1990 and 2013, CRF-format

From 1990 to 2020 the emissions of methane are projected to decline by 44 % and by 2035 the methane emissions are projected to be 54 % below the 1990 level. The projected trend in emissions differs between sectors. Reductions until 2035 are mainly expected to occur in the agriculture and waste sectors. Emissions from the waste sector are expected to decline by 72% until 2035 and from the agricultural sector by 12%.

3. Summary of relevant National Actions, National Action Plans, or Mitigation Strategies

Sweden has several policy instruments in place that target black carbon as part of a wider scope of greenhouse gases and air pollutants. There are also policies aimed at specifically reducing $PM_{2.5}$ and PM_{10}. In the following, a brief summary is provided of the relevant measures.

3.1 Cross-sectoral

The Environmental Code
(All sectors)
General legislation in the area of the environment has been collated in the Environmental Code since January 1999. Among other aspects, the Environmental Code contains general rules for consideration which are to be observed in all activities and measures. Major environmentally hazardous activities are covered by an obligation to obtain a permit. Greenhouse gas emissions form a part of the permit appraisal procedure and the Code also includes requirements to use the "best possible technology". Moreover, the Code allows that additional requirements are made in individual cases. This policy instrument helps reducing emissions of both black carbon and methane.

Ordinance (2010:477) of air quality
(All sectors)
EU-standards are implemented in the air quality ordinance as environmental quality standards. For instance, there are threshold standards for $PM_{2.5}$ and PM_{10}. In order to ensure that an environmental quality standard is met, an action programme may be established. The ordinance reduces emissions of black carbon.

The national environmental quality objectives
(All sectors)
The environmental quality objectives are non-legally binding goals that are crucial to the Swedish welfare, and that are intended to guide the sum total of Swedish efforts to safeguard the environment. In all, there are sixteen environmental quality objectives for the state of the Swedish environment which environmental action should result in. These objectives are to be met within one generation, i.e. by 2020 (2050 in the case of the climate objective). For each objective there are a number of 'specifications', making clear the state of the environment to be achieved. There are also a few milestone targets which define steps on the way to achieving the environmental quality objectives and the generational goal (the direction of the changes in society that need to occur within one generation if the country's environmental quality objectives are to be achieved).

The quality objective *Reduced climate impact* provides that concentrations of greenhouse gases in the atmosphere must be stabilized at a level that will prevent dangerous anthropogenic interference with the climate system. To keep the temperature rise within this limit, the combined atmospheric concentration of the greenhouse gases carbon dioxide, methane, nitrous oxide, sulphur hexafluoride (SF6), perfluorocarbons (PFCs) and hydrofluorocarbons (HFCs) should not, in the long term, exceed 400 parts per million (ppm), expressed as carbon dioxide equivalent. The Swedish Parliament has adopted a vision of zero

net emissions of greenhouse gases to the atmosphere in Sweden by 2050. The *reduced climate impact* objective is aimed at reducing inter alia the emissions of methane.

The quality objective *Clean air* stipulates that the air must be clean enough not to represent a risk to human health or to animals, plants or cultural assets. The objective has ten 'specifications', two of which regards $PM_{2.5}$ and PM_{10}. The *clean air* objective includes emissions of both black carbon and methane.

The reduced climate impact- and clean air objectives include four milestone targets related to methane and black carbon:

- ***Emissions of greenhouse gases by 2020***
  By 2020, emissions of greenhouse gases in Sweden, from activities not included in the EU Emissions Trading Scheme, should be reduced by 40 percent compared with 1990. This means that, by 2020, greenhouse gas emissions from the non-trading sectors are to be around 20 million tonnes of carbon dioxide equivalent lower than in 1990. The decrease will be achieved by emission reductions in Sweden and by means of investments in other EU member states or flexible mechanisms such as the Clean Development Mechanism.
- ***Limited emissions of transboundary air pollution in Europe***
  – The European Union will have decided on additional limitations regarding national emissions of air pollution through a revision of the National Emission Ceilings Directive by 2015, and
  – the amendment to the Gothenburg Protocol under the Convention on Long-Range Transboundary Air Pollution will have been ratified by enough countries for it to enter into force by 2015.
- ***Emissions of air pollution from maritime shipping***
  Emissions of sulphur dioxide, nitrogen oxides and particulate matter from shipping in the Baltic Sea and the North Sea are to have begun to be reduced by 2016.
- ***Emissions of air pollution from small-scale wood burning***
  New boilers for small-scale wood burning are to have low emissions of air pollutants and high levels of efficiency. The Swedish National Board of Housing, Building and Planning has been tasked with preparing new building regulations during 2012.

The Planning and Building Act
(All sectors)
Measures in the area of public planning principally have an impact on emission trends in the longer term and may be of great significance from this point of view. Measures in public planning are principally governed by the Planning and Building Act (PBL) but many measures, for example major infrastructure projects, are also covered by the provisions of the Environmental Code. Since May 2011, the PBL introduced a new requirement to take account of environmental and climate aspects in planning. The significance of the development of the built environment for energy and transport needs in the longer term has been increasingly highlighted and the new PBL also made it mandatory to consider inter-municipal and regional circumstances in planning. The PBL helps reducing emissions of both black carbon and methane.

3.2 Energy

Building Regulations (BBR)
Building Regulations (BBR) regulates small-scale wood burning. The rules contain regulations and general advice for new and redevelopment within urban areas. It is mainly the

inconvenience of flue gases that is limited and maximum emissions of organic carbon. BBR reduces emissions of black carbon.

Temporary prohibition against small-scale wood burning
Municipalities are able to, on the basis of the ordinance (1998:899) on environmentally hazardous activities and health, issue regulations for ”temporary ban on small-scale wood burning with some solid fuels in the specified areas”. This possibility of temporary prohibition can reduce emissions of black carbon.

Eco labels
The eco labels “the Swan” (the official Nordic Eco label) and P-Mark have different requirements for boilers, including emissions of dust. Eco labels contribute to the reduction of emissions of black carbon.

3.3 Industry

Energy tax on fossil fuels for heating in industry
Since 2011, an energy tax on fossil heating fuels has been levied according to their energy content, significantly increasing the tax on LPG, natural gas, coal and coke. On fuels used in industrial manufacturing processes, 30 % of the standard energy tax is paid. This instrument reduces emissions of both black carbon and methane.

3.4 Transport

Emission standards
Ordinance (1998:1709) on emission standards for certain combustion-powered mobile machinery regulates emissions of inter alia particulate matter from working machines. These standards reduce emissions of black carbon.

Exhaust emission control
Emission Control Act (2011:318) is designed to prevent emission of exhaust gases and other pollutants from fuels in motor vehicles from harming or causing damage to human health or the environment. The law includes, among other things, emission classes. This instrument reduces emissions of black carbon.

Vehicle fuel taxes
Diesel is subject to an energy tax. In accordance with the climate policy decision in 2009, the energy tax on diesel has been raised in two stages, in 2011 and 2013, by a total of SEK 0.40 per litre. The energy tax reduces emissions of black carbon.

Tolls for certain heavy vehicles
Heavy traffic is charged with a toll under the Act (1997:1137) on tolls for certain heavy vehicles. The size of the toll is partly based on the vehicles environmental/emissions class. This toll reduces emissions of black carbon.

Changed regulations on the maximum number of stud in studded tires
As of July 1, 2013 a changed limit of maximum number of stud in newly studded tires was introduced (regulation TSFS 2009:90). This change resulted in an average reduction in the number of studs in tires by 15 percent compared to the previously applicable rules. Fewer studs in studded tires result in a reduction of emissions of black carbon.

Shortened season for studded tires
As of 2010 the season for use of studded tires is shortened by 14 days during the spring (regulation TSFS 2009:90). A shorter season reduces emissions of black carbon.

Environmental zones
Under the ordinance (1998:1276) of road traffic, individual municipalities have the right to restrict heavy traffic in areas with poor air quality. Only heavy traffic that meets certain standards is allowed in the area. Environmental zones are introduced in Stockholm, Gothenburg, Malmö, Uppsala, Helsingborg and Lund. This instrument helps reducing emissions of black carbon.

Congestion tax
The Congestion Tax Act (2004:629) introduced congestion tax in order to reduce traffic during peak hours and thus improve air quality. The law is designed so that it can be applied in urban areas throughout Sweden, but is currently applied only in Stockholm and Gothenburg. Congestion taxes reduce emissions of black carbon.

Reduced speed in some streets
A local action to reduce particle formation has been to reduce speed on certain streets. This action has taken place in Gothenburg, Uppsala and Stockholm for instance. This instrument reduces emissions of black carbon.

Local traffic regulations with ban on studded tires
Since 2009, municipalities have an opportunity to set up local traffic regulations for a certain road or section of road with a ban on vehicles with studded tires (ordinance 2009:985). Stockholm, Gothenburg and Uppsala have announced such bans. This opportunity was expanded in 2011 to include all roads in a given area but so far, no municipalities have made use of this. These local traffic regulations reduce emissions of black carbon.

Dust control measures
Dust control measures are undertaken to reduce resuspension of road dust. A salt solution is sprayed on the road surface so that it is kept moist. This prevents the dust from the road surface to release (emit) and increase the levels of particulate matter in the air. Dust control measures are used in, inter alia, Stockholm, Gothenburg, Jönköping, Norrköping, Uppsala and Örnsköldsvik. Dust control reduces emissions of black carbon.

Improved cleaning of roads after winter season
Some cities such as Uppsala and Stockholm perform intensified and earlier sand collecting in the spring to reduce particle levels. Directly adjacent to sand collection the roads are cleaned with vacuum suction or pressure washer with super suction. Improved cleaning reduces emissions of black carbon.

Procurement requirements
At procurement of contracts the Swedish Transport Administration and the metropolitan municipalities Gothenburg, Stockholm and Malmö jointly apply requirements on fuel, age, exhaust emissions and emission control equipment of lorries and working machines. Procurement requirements help reducing emissions of black carbon.

3.5 Waste

Landfill tax
In 2000 a tax was imposed on waste disposed of to landfill (SFS 1999:673). This tax reduces emissions of methane.

Ordinance on landfilling of waste
Under the ordinance (2001:512) on landfilling of waste, a ban on landfilling of combustible materials was introduced in 2002 and a similar ban was imposed on organic material in 2005. The ordinance also regulates collection and disposal of methane gas from landfills. The aim of the ordinance is to prevent and reduce landfilling adverse effects on human health and the environment. The ordinance reduces emissions of methane.

3.6 Agriculture

The Rural Development Programme 2014-2020
The Swedish Government decided on a new Rural Development Program in June 2014. The new programme, which is ongoing 2014-2020, includes support for investments, for young entrepreneurs, capacity building, cooperation and innovation, support to areas with natural constraints, animal welfare payments, ecological farming and environmental and climate actions. One area of focus is to reduce agricultural emissions of greenhouse gases such as methane. The programme budget amounts to a total of 36 billion Swedish crowns, of which 59 percent is financed by Sweden and the remaining 41 percent by EU. This instrument helps reducing emissions of methane.

Support to biogas production
On 1 January 2015, a support to biogas production from manure was established. The support aims to compensate for the double climate benefit obtained when manure is digested; namely benefit in reduced spontaneous methane emissions from manure and increased production of biogas that can replace fossil fuels. Production of biogas by anaerobic digestion of manure mobilizing a maximum of 20 cents/kWh produced biogas. The support reduces emissions of methane.

Voluntary commitment
In 2007 the Swedish Waste Management and Recycling association introduced a voluntary commitment where facilities included undertake to actively work with mapping and measures to reduce emissions of methane. This commitment helps reducing emissions of methane.

3.7 Work in progress

3.7.1 Ongoing work within the EU

Medium Combustion Plant (MCP) Directive
A proposal for a new Directive to reduce pollution from medium-sized combustion installations, such as energy plants for street blocks or large buildings, and small industry installations, has been negotiated in 2014. The presidency of the Council and the European Parliament reached a provisional agreement on the directive in June 2015. A new MCP Directive will help reduce emissions of black carbon.

Ecodesign Directive

In October 2014, the Commission agreed on product regulations with legal requirements on ecodesign for solid fuel boilers equipment for direct room heating using solid fuels, such as stoves, fireplaces and masonry heaters. The stricter requirements will regulate the emissions of particulate matter, unburned hydrocarbons, carbon monoxide and nitrogen oxides and is expected to be formally adopted and incorporated into law in 2015. The new requirements will take effect in 2020 for solid fuel boilers, respectively in 2022 for space heaters. Member States may introduce the requirements earlier. The legal requirements only apply newly installed boilers and space heaters directly. A new Ecodesign Directive will help reduce emissions of black carbon.

Test cycle
The Commission plans to introduce requirements for a new test cycle for exhaust emission testing to the approval of vehicles. The new test cycle known as the World Light Duty Test Procedure (WLTP) is intended to replace the previous test cycle New European Driving Cycle (NEDC) applicable since 1997, as this cycle is not sufficiently strictly regulated to reflect real driving conditions. A decision to introduce the WLTP-cycle is expected to be taken in 2015 and should enter into force in 2017. WLTP will help reduce emissions of black carbon.

National Emission Ceilings (NEC) Directive
There is an ongoing revision of the National Emission Ceiling Directive with more stringent national emission ceilings for the four pollutants included in the current legislation, as well as new ceilings for $PM_{2.5}$ and methane. A decision can be expected in 2016 at the earliest. A new NEC Directive will help reduce emissions of black carbon.

Non-Road Mobile Machinery (NRMM) Directive
Emissions from Non-Road Mobile Machinery are regulated by six directives whereof five are amendment directives. The Directive 97/68/EC sets out the maximum permitted exhaust emissions in relation to the power of the engine. There is an ongoing review of the NRMM Directive which is proposed to include large working machines (above 560 kW) and harmonizing emissions standards with US emission regulations step IV. The requirements are believed to be in force no earlier than 2020. A new NRMM Directive will help reduce emissions of black carbon.

3.7.2 The Cross-Party Committee on Environmental Objectives
The Swedish Cross-Party Committee on Environmental Objectives is, until June 2016, working on a strategy for a comprehensive air protection policy. Their future work is focused through a geographical breakdown at local, national and international level. The strategy will contribute to the relevant parts of the Swedish environmental policy. The strategy will also contribute to the ability of Sweden to fulfill commitments within the EU and internationally in terms of air pollutants such as soot. The assignment includes proposing milestone targets, instruments and measures. Suggestions shall be made regarding:

- the instruments and measures needed to limit air pollutants impact on health, climate and environment at national, regional and local level,
- how the efforts to reduce emissions of short-lived air pollutants can be coordinated with the efforts to achieve the environmental quality objective *Reduced climate impact* and consider a milestone target with suggestions for instruments and measures to reduce emissions of Short-Lived Climate Pollutants (SLCP),
- what Sweden should prioritize in the air protection work in the EU and international fora.

The upcoming strategy will hopefully help reducing emissions of both black carbon and methane

4. Highlights of best practices or lessons learned for key sectors

Within the waste sector emissions declined by 62 % between 1990 and 2013 mainly because of decreasing quantities of organic waste deposited on landfills (see 2.1).

5. Projects relevant for the Arctic

5.1 Nordic Council of Ministers - Climate and Air Pollution Group

The Nordic Council of Ministers has provided funding for a number of projects relevant for the Arctic environment, for instance:

- **Black Carbon and other Emissions from wood burning - testing protocols Svanen**
  The project seeks to decrease emissions of the strong climate forcer black carbon from wood burning by continuing development of testing protocols that will lead to development of black carbon standards for the Nordic eco-label Swan-marked stoves in the next criteria revision.

- **NORTRIP-2 Emissions of non-exhaust particles from road traffic – evaluation of the effects of measures to reduce emissions on air quality and exposure**.
  The project studies effects on air quality of policies and measures to reduce emissions with focus on concentrations of PM10 in Nordic Cities with levels above EU limit values.

- **CarboNord – Effects of BC on air quality and climate in northern Europe and the Arctic**.
  Evaluation of BC transport towards Northern Europe and Arctic, contributions of main sources, relevant transformations of the BC-containing aerosols, and project them to the effects on health and climate.

- **BCNOR - Sources to carbonaceous aerosols in Nordic Winter**
  The aim is to quantify the contribution of the most abundant sources of the carbonaceous aerosol (here: BC and OC) in the Nordic rural background environment during winter. The project will separate the anthropogenic sources according to whether the emissions originate from combustion of fossil fuel (e.g. vehicle emissions) or biomass (domestic wood burning).

- **Improved emission inventories of SLCPs in the Nordic countries**
  Increase the knowledge on the real emissions of SLCP (primarily BC/PM2.5, but also CH4, CO, NMVOC) from Nordic sources. Identify mitigation actions to reduce emissions of BC in the Nordic countries. Coordinate/cooperate with other relevant international activities, e.g. emission inventory work within TFEIP (Task Force on Emission Inventories and Projections) under CLRTAP as well as groups within the Arctic Council.

6. Other information if available

The research in the program SCAC[6] (Swedish Clean Air and Climate Program) is focused on exposure and health effects, effects on ecosystems, and climate effects from so-called short-lived climate pollutants (SLCP) as well as the synergies and conflicts between air pollution and climate action. Special attention will be devoted in the program to develop robust systems and processes for emission projections and scenarios, and to develop indicators, methods and models to evaluate and assess the cost effectiveness of different policy options.

Several articles are under way but not yet published.

[6] http://www.scac.se/2.372c2b801403903d2757e42.html

Annex I - Projected national sectoral total emissions of BC (With Measures), ktonnes

NFR Code	*Longname*	*2000*	*most recent historic year (2013)*	*2020*	*2025*	*2030*
1A1	**Energy industries** (Combustion in power plants & Energy Production)	0,10	0,15	0,14	0,14	0,14
1A2	**Manufacturing Industries and Construction** (Combustion in industry including Mobile)	1,14	0,85	0,61	0,55	0,48
1A3b	**Road Transport**	1,73	0,97	0,56	0,41	0,36
1A3bi	R.T., Passenger cars	0,38	0,22	0,11	0,06	0,04
1A3bii	R.T., Light duty vehicles	0,27	0,24	0,08	0,03	0,01
1A3biii	R.T., Heavy duty vehicles	0,87	0,28	0,11	0,05	0,02
1A3biv	R.T., Mopeds & Motorcycles	0,00	0,00	0,00	0,00	0,00
1A3bv	R.T., Gasoline evaporation		NA	NA	NA	NA
1A3bvi	R.T., Automobile tyre and brake wear	0,20	0,23	0,25	0,27	0,29
1A3bvii	R.T., Automobile road abrasion	NE	NE	NE	NE	NE
1A3a,c,d,e	**Off-road transport**	0,29	0,26	0,14	0,14	0,13
1A4	**Other sectors** (Commercial, institutional, residential, agriculture and fishing stationary and mobile combustion)	1,31	1,26	1,43	1,37	1,32
1A5	**Other**	0,02	0,01	0,00	0,00	0,00
1B	**Fugitive emissions** (Fugitive emissions from fuels)	0,00	0,00	0,01	0,01	0,01
2A,B,C,H,I,J,K,L	**Industrial Processes**	0,14	0,08	0,06	0,07	0,07
2D, 2G	**Solvent and other product use**	1E-06	8E-07	3E-08	3E-08	3E-08
3B	**Animal husbandry and manure management**	NA	NA	NA	NA	NA
5	**Waste**	0,09	0,09	0,09	0,09	0,09
6A	**Other (included in National Total for Entire Territory)**	NO	NO	NO	NO	NO
NATIONAL TOTAL	**National Total for the entire territory**	4,81	3,67	3,05	2,77	2,61

Annex II - Emissions of methane

Emissions of CH_4 as ktonnes CO_2-eq

År	1 Energy	2 Industrial Processes and Product Use	3 Agriculture	5 Waste	Total
1990	690.49	26.21	3 875.00	3 463.98	8 055.68
1991	725.79	28.33	3 783.98	3 519.31	8 057.40
1992	723.08	27.26	3 873.96	3 523.54	8 147.84
1993	713.47	27.47	3 985.31	3 409.73	8 135.98
1994	723.90	27.69	4 022.30	3 274.10	8 048.00
1995	722.81	18.35	3 927.06	3 268.99	7 937.20
1996	749.16	8.37	3 893.64	3 241.06	7 892.23
1997	703.01	8.85	3 902.26	3 209.61	7 823.73
1998	677.00	8.66	3 792.96	3 160.70	7 639.32
1999	650.06	8.46	3 756.17	3 030.40	7 445.09
2000	623.33	9.41	3 656.84	2 938.22	7 227.79
2001	631.18	9.64	3 630.71	2 886.84	7 158.36
2002	618.80	9.59	3 604.36	2 701.24	6 933.98
2003	615.70	9.89	3 547.30	2 549.70	6 722.59
2004	624.84	9.85	3 595.69	2 523.01	6 753.40
2005	635.18	9.36	3 570.38	2 369.57	6 584.48
2006	617.73	9.40	3 569.60	2 282.76	6 479.50
2007	624.14	9.34	3 498.63	2 097.06	6 229.17
2008	624.31	8.83	3 473.21	1 860.43	5 966.78
2009	639.65	8.43	3 447.43	1 746.09	5 841.59
2010	645.81	8.68	3 438.11	1 626.11	5 718.71
2011	595.18	8.50	3 422.83	1 534.13	5 560.63
2012	594.07	9.11	3 370.00	1 405.53	5 378.71
2013	573.19	8.76	3 383.45	1 299.19	5 264.59

Emissions of CH_4 in ktonnes

År	1 Energy	2 Industrial Processes and Product Use	3 Agriculture	5 Waste	Total
1990	27.62	1.05	155.00	138.56	322.23
1991	29.03	1.13	151.36	140.77	322.30
1992	28.92	1.09	154.96	140.94	325.91
1993	28.54	1.10	159.41	136.39	325.44
1994	28.96	1.11	160.89	130.96	321.92
1995	28.91	0.73	157.08	130.76	317.49
1996	29.97	0.33	155.75	129.64	315.69
1997	28.12	0.35	156.09	128.38	312.95
1998	27.08	0.35	151.72	126.43	305.57
1999	26.00	0.34	150.25	121.22	297.80
2000	24.93	0.38	146.27	117.53	289.11
2001	25.25	0.39	145.23	115.47	286.33
2002	24.75	0.38	144.17	108.05	277.36
2003	24.63	0.40	141.89	101.99	268.90
2004	24.99	0.39	143.83	100.92	270.14
2005	25.41	0.37	142.82	94.78	263.38
2006	24.71	0.38	142.78	91.31	259.18
2007	24.97	0.37	139.95	83.88	249.17
2008	24.97	0.35	138.93	74.42	238.67
2009	25.59	0.34	137.90	69.84	233.66
2010	25.83	0.35	137.52	65.04	228.75
2011	23.81	0.34	136.91	61.37	222.43
2012	23.76	0.36	134.80	56.22	215.15
2013	22.93	0.35	135.34	51.97	210.58