

NATIONAL REPORT BY SWITZERLAND

MAY 2020

Enhanced Black Carbon and Methane
Emissions Reductions

Arctic Council Framework for Action

Switzerland biennial national reports as a contribution to the Summary Report 2021

1 Introduction

The reduction of black carbon and methane emissions in the Arctic is of critical importance to tackle climate change in this region but also to address human health issues in Western/ Continental Europe. Therefore, Switzerland, as an observer state, welcomes and supports the Arctic Council's initiatives on black carbon and methane emissions reduction.

This national report is for information of the Arctic Council on the progress towards the commonly agreed vision: *"We commit to take enhanced, ambitious, national and collective action to accelerate the decline in our overall black carbon emissions and to significantly reduce our overall methane emissions."*

The report contains the actual data on emissions and emission estimates for the future, which are consistent with the data submitted to the Economic Commission for Europe of the United Nations Convention on Long-Range Transboundary Air Pollution (UNECE CLRTAP) and to the United Nations Framework Convention on Climate Change.

Authors: Swiss Federal Office for the Environment FOEN
Air Pollution Control and Chemicals Division

2 Black carbon emissions and future projections

2.1 Short summary of main findings on the historical and trends towards the future in emissions at state level.

The calculation of the BC inventory is annually performed by the Federal Office for the Environment which is in charge of the national emissions inventories of air pollutants and greenhouse gases in Switzerland.

The revised Gothenburg protocol under the UNECE Convention on Long-range Transboundary Air Pollution specifies emission reduction commitments in terms of percentage reductions from the reference year 2005 to 2020. It covers one additional air pollutant, namely particulate matter (PM_{2.5}), and thereby black carbon as a component of PM_{2.5}. The emission estimates of black carbon (BC) are submit on a voluntary basis in this framework. On 7 October 2019, the amended protocol including the new reduction commitments for 2020 has entered into force.

Switzerland, as a Party to the revised Gothenburg protocol, is on the way to achieve the expected emissions abatement as indicated below in the table 2-27 from the *Switzerland's Informative Inventory Report 2020 (IIR), Submission under CLRTAP*, March 2020, Federal Office for the Environment, Bern.

Table 2-27: Reported emission reductions in 2018 versus level of 2005 and reduction commitments per 2020. The Emission commitments 2020 are defined as reductions in percentages from 2005.

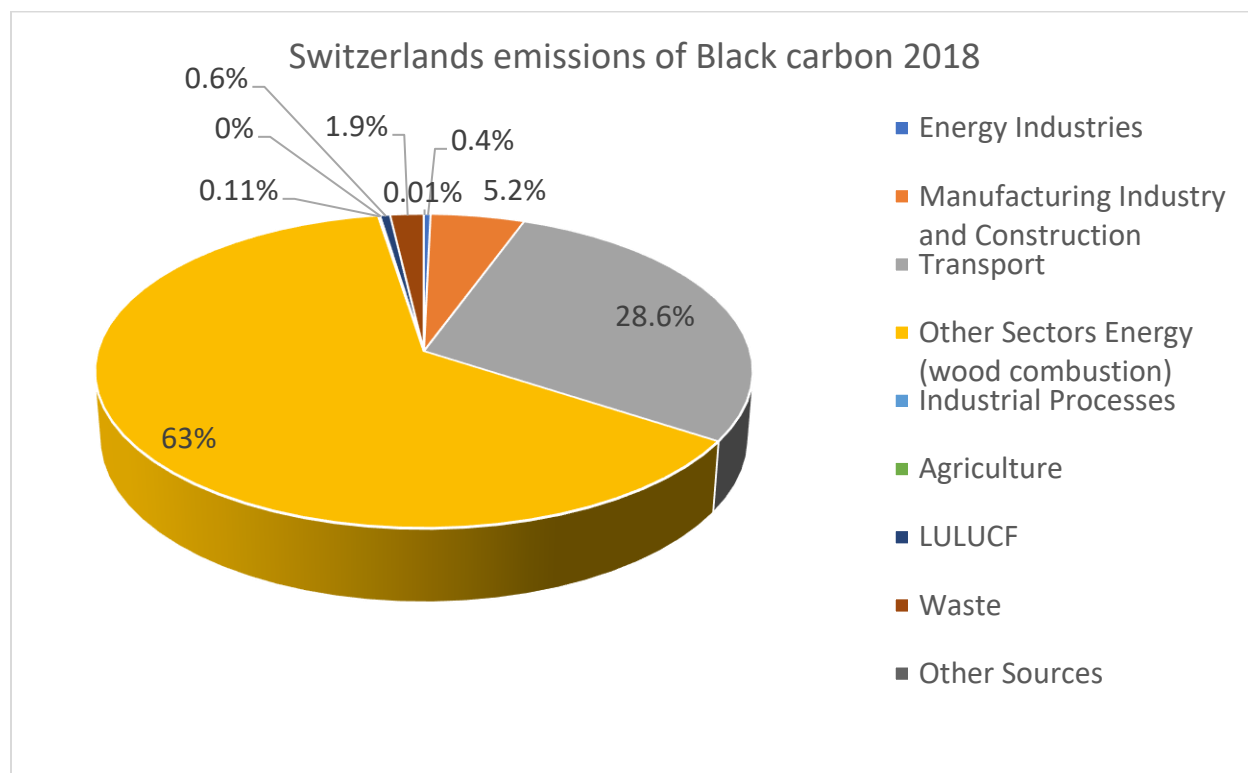
Pollutant	Emission reduction commitments 2020	Reduction achieved in 2018
	%reduction of 2005 level	
SO _x	21%	63%
NO _x	41%	28%
NMVOG	30%	29%
NH ₃	8%	7%
PM _{2.5}	26%	33%

The detailed reported emission data are available under:

https://www.ceip.at/ms/ceip_home1/ceip_home/status_reporting/2020_submissions/

2.2 Informative graphs showing state emissions in 2018 and time series graphs from 2000 to 2018, as well as estimates for 2025 and 2030.

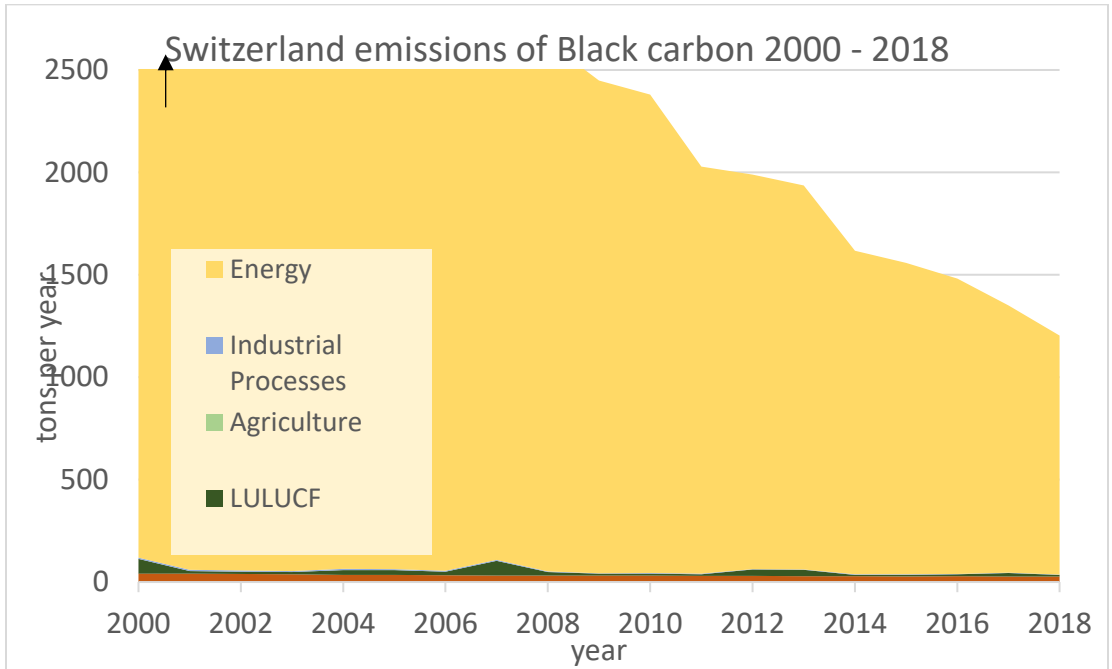
Switzerland uses the EMEP/EEA 2016 Guidebook to estimate BC emissions complemented by some national data¹. The following figure provides an overview on the sources and their respective contribution to the Swiss national emissions. Wood combustion is largely the dominant emission source (63% in 2018) of BC in Switzerland according to the available statistical data.



Total national BC emissions decreased by around 70% between 2000 and 2018. The main drivers for this decrease are the introduction of particle filter traps on the various on-road and off-road diesel engines due to the implementation of the Action Plan 2006 against PM of the Federal Council (Swiss Government), as well as measures taken to reduce emissions of various combustion installations. Further reductions of BC emissions are expected until 2035.

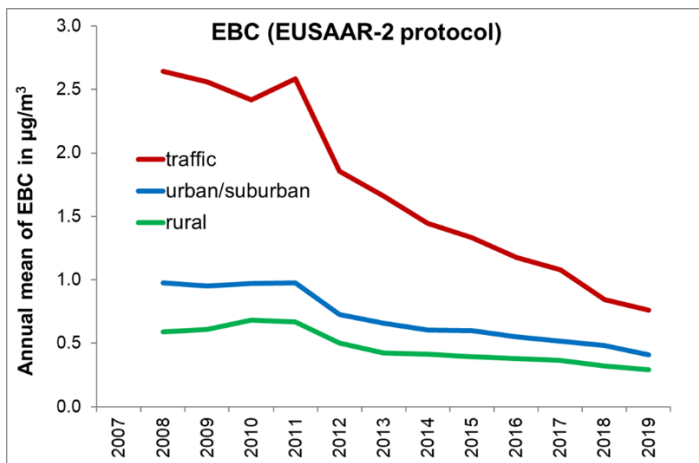
¹ Switzerland supports common reporting guidelines on Short-Lived Climate Forcers. The IPCC is currently working on the development of such guidelines that will ensure a robust scientific basis and allow comparability of national inventories.

Year	2000	2005	2010	2015	2020	2025	2030	2035
BC emis. in tonnes	3'648	3'148	2'369	1'551	1'078	828	644	469



In the graphic above the “Energy” sector covers all energy consuming activities including energy industries, manufacturing industry and construction, transport and others sectors of combustion. The biggest part of the BC emissions results of wood combustion.

The decrease of emissions appears also at the level of elementary carbon (EC) concentrations in PM2.5 registered in the National Monitoring Network NABEL where the decrease is particularly strong (approximately 70%) at the near traffic stations between 2008 and 2019.

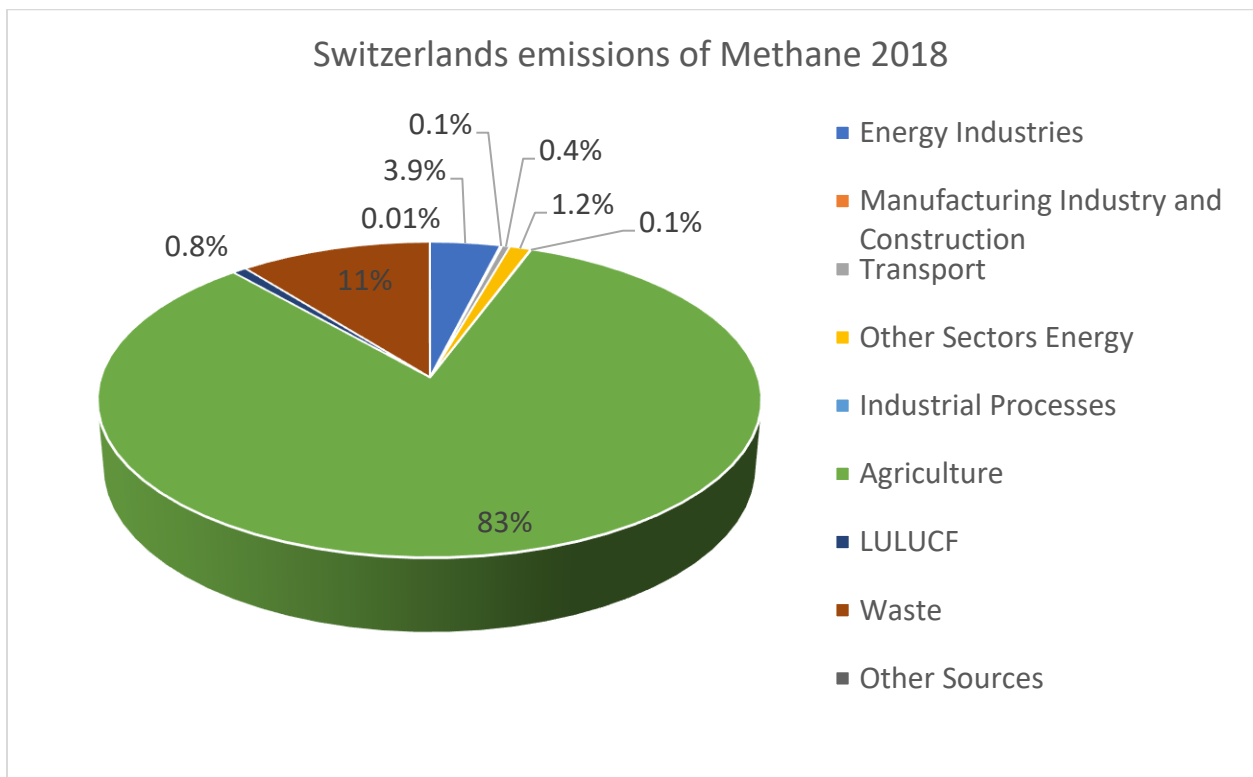


3 Methane emissions and future projections

3.1 Short summary of main findings on the historical and trends towards the future in emissions at state level.

The CH₄ emissions estimates are submit to the UNFCCC. The methane’s inventory is performed annually by the Swiss Federal Office for the Environment which is in charge of the national emissions inventories of air pollutants and greenhouse gases.

Measured in CO₂ equivalents, methane (CH₄) accounted for approximately 10 per cent of Switzerland's overall greenhouse gas emissions.

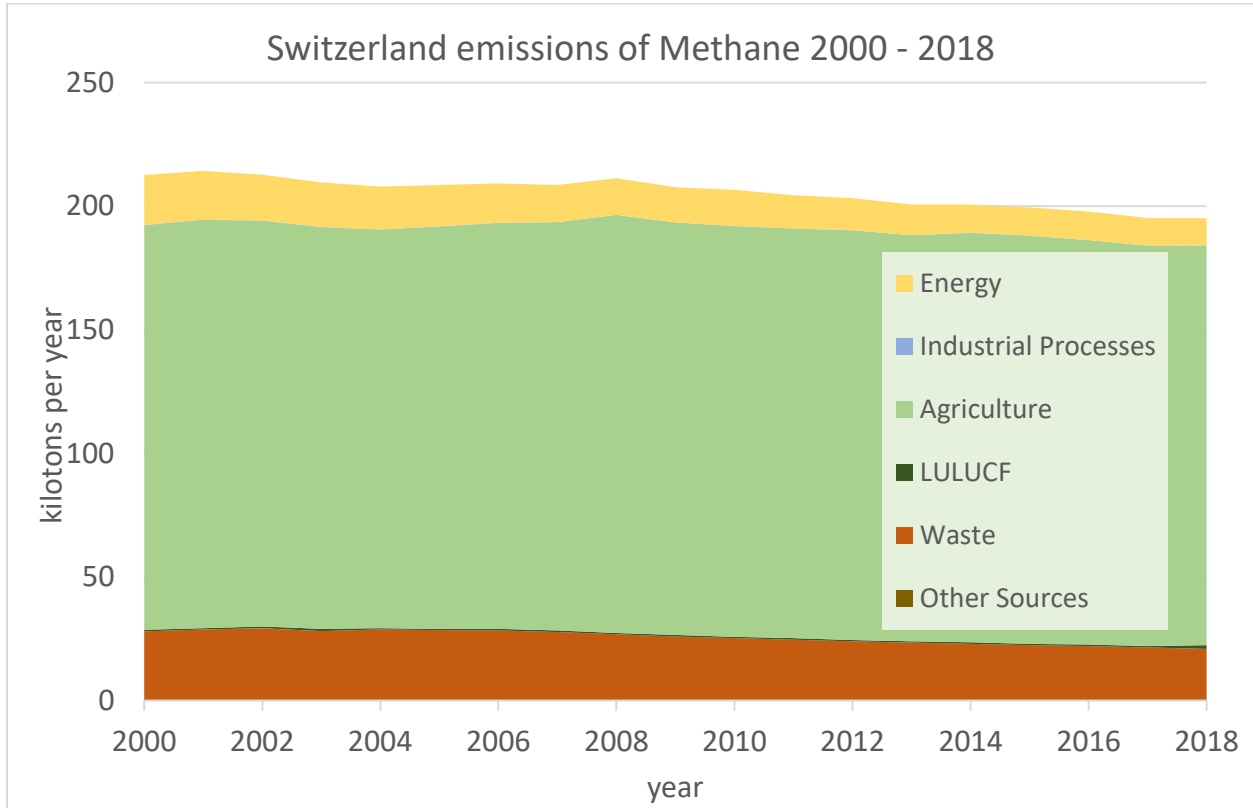


The detailed reported data are available at: <https://unfccc.int/ghg-inventories-annex-i-parties/2020>

3.2 Informative graphs showing state emissions – time series graphs from 2010 and estimates for 2020 and 2030.

Year	2000	2005	2010	2015	2020	2025	2030	2035
CH ₄ emissions in kilotonnes	213	209	207	199	192	191	190	189

The major part of methane emissions (more than 80%) is produced by agriculture, mainly coming from animals farming and storage of manure. The animal number of ruminant is driving the methane emissions, which decreased around 9% between 1990 and 2000 and stay later more or less at the same level.



4 National strategies and action plans

4.1 Short overview on governance structure regarding BC and methane (What are the responsible ministries, agencies etc. for developing strategies and action plans. I.e. a list or a table naming the responsible bodies with short descriptions on what are the roles and responsibilities. As appropriate per state.)

4.2 National strategies

In the framework of the Swiss clean air policy, the Federal Council adopted in 2006 an action plan to abate particulate matter, with a focus on soot, i.e. also BC, produced by diesel motors and wood burning.

The Swiss agriculture will continue to foster GHG emission reductions in the future, in particular those of CH₄ and N₂O that are decreasing since 1990. In fact, the greenhouse gas intensity (greenhouse gases emitted per unit of foodstuff produced) will decrease in the Swiss agricultural sector. This is the result of the Swiss climate strategy for agriculture, i.e. the declaration of intent to reduce greenhouse gas emissions from agriculture by one third by 2050 compared to 1990 with technical, operational and organizational measures and by another third with measures influencing food production and consumption.

4.3 National action plans

Under the implementation of the PM action plan of 2006, the Swiss government decided to apply systematically particle filters traps on all diesel engines in line with the corresponding EU legislation. It allow to decrease the soot concentrations at traffic-exposed monitoring stations of more than 40%.

In addition to the measures applied to diesel engines, new abatement measures are introduce in the revised Ordinance on Air Pollution Control to address stationary sources. Indeed, on 11 April 2018 the Federal Council adopted additional measures to reduce the levels of short-lived climate forcers such as particulate matter and CO from small wood-heating installations and construction machinery. Furthermore, in accordance with eco-design, further measures were adopt that require increased energy efficiency from heating installations.

5 International work

5.1 Highlight the main priorities for international work

Switzerland is highly supporting the work under the UNECE Convention on Long-range Transboundary Air Pollution Transport and in particular as Party to the Gothenburg Protocol. In line with the commitment of this protocol, Switzerland reports annually on national emissions data related to Black Carbon (BC) on a voluntary basis. A decrease of approximately 66% of BC emissions is register since 2005.

Switzerland is also actively engaged in the Climate and Clean Air Coalition (CCAC) that promotes action on Short-Lived Climate Forcers (SLCF). Switzerland under its national clean air policy is commit to continue reducing SLCF at the national level and supports such efforts in partner countries in the framework of its international cooperation.

Furthermore, Switzerland has provided financial support for the methodological work by the Intergovernmental Panel on Climate Change (IPCC) on SLCF in view of better understanding the climate effects of these forcers (e.g. black carbon), and to developing guidelines for reporting on national inventories.

6 Annexes

Annex 1: Black carbon emission tables

In tonnes	1990	1995	2000	2005	2010	2015	Latest inventory year 2018	2020	2025	2030
Energy	5'103	4'509	3'604	3'110	2'337	1'520	1'167	1'050	801	619
Industrial Processes	6.3	4.0	2.7	2.6	1.6	1.3	1.3	1.3	1.3	1.3
Agriculture	-	-	-	-	-	-	-	-	-	-
Land Use, Land-Use Change and Forestry	71	25	10	8	5	6	7	7	7	7
Waste	41	34	31	27	26	24	22	20	19	17
Other	0.1	0.1	0.1	0.1	0.1	0.1	0.14	0.1	0.1	0.1
Total (in tonnes)	5'222	4'571	3'648	3'148	2'369	1'551	1'197	1'078	828	644

Annex 2: Methane emission table

	2010	2011	2012	2013	2014	2015	2016	2017	Latest inventory year 2018	2020	2030
Energy	15	13	13	12	11	11	11.5	11	11.0	11	11
Industrial Processes	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.10	0.10
Agriculture	166	166	166	164	166	165	164	162	162	161	160
Land Use, Land-Use Change and Forestry	0.5	0.6	0.5	0.5	0.5	0.5	0.6	0.6	1.5	0.1	0.1
Waste	25	25	24	23	23	22	22	21	21	20	18
Other	0.02	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.03	0.02	0.03
Total	207	204	203	201	201	199	198	195	195	192	190
Total (without LULUCF)	206.1	203.9	202.8	200.2	200.1	198.9	197.2	194.7	193.6	191.9	189.9

Annex 3: States are invite to annex a table listing all actions with regard to the recommendations in the 2019 Summary Report.

For reference, please see the [Summary Report 2019](#), appendix 1 on page 56. The idea is that this annex in the national report will feed into a similar annex in the 2021 Summary Report.

Mobile and stationary diesel-powered sources

Table A1: Status of recommended actions 2019 related to the reduction of emissions from diesel engines.

Recommendation 1a	Switzerland apply systematically the most recent EURO legislation to reduce emissions from all new diesel vehicles and engines by adopting and implementing world-class particulate matter exhaust emission standards based on particle numbers regulation. It means the use of efficient and long lasting diesel particle filter traps including checking of performance and maintenance.
Recommendation 1c	Reduce black carbon by stimulating the shift to alternative vehicle technologies and modes of transportation, and through efficiency measures. Switzerland promotes the intensive uses of public transportation, as well as pedestrian and bike usages. Various incentives are under discussion to favor the extended usage of electro-mobility,
Recommendation 1d	Covered by the EU legislation on diesel engines
Recommendation 1e	The Swiss Ordinance on Air Pollution Control is also addressing and regulating emissions from stationary diesel engines.

Residential Combustion

Table A3: Status of the recommended actions 2017 to reduce emissions from residential combustion

Recommendation 3a	The Swiss Ordinance on Air Pollution Control is regulating emissions from new solid fuel combustion appliances by accelerating deployment of cleaner and more efficient heating sources and by promoting proper operation and maintenance of appliances, including storage and treatment of fuels. Report only in German or French
Recommendation 3b	Several promotion programme are deployed to improve the quality and mainly the ignition of wood fire to reduce emissions from legacy solid fuel combustion appliances by accelerating replacement with cleaner and more efficient new heating sources and promoting proper operation and maintenance of appliances, including storage and treatment of fuels. See e.g. documentation and leaflets (only in German or French) https://www.fairfeuern.ch/index.php?id=9 https://point-of-fire.ch/?utm_source=partner&utm_medium=diverse&utm_campaign=initial-versand