

# Antarctica: information on national emissions, population and GDP, and mitigation targets

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## TODO

- Table with info on target (main and reclass; emissions from NDC; target quantis + plot).
- GWP: NDC emissions converted from AR2 to AR4 by national conversion factor (2010–2017, PRIMAP-hist v2.1).
- References!

## 1 Non-LULUCF emissions and socio-economic data

With national emissions of 4.1 kt CO<sub>2</sub>eq, Antarctica contributed 0.000008% to global emissions in 2017, while in 2030 its share is estimated to decrease to 0.000007% (Table 1). The estimates for 2030 are based on the downscaled SSP2 Middle of the Road marker scenario (dmSSP2), in which Antarctica is estimated to emit 4.5 kt CO<sub>2</sub>eq in 2030. That change in emissions would constitute an increase of 7.9% compared to 2017. The pathways dmSSP1–5 show a range of 4.5–4.5 kt CO<sub>2</sub>eq in 2030, and 4.5–4.5 kt CO<sub>2</sub>eq in 2050. In terms of accumulated historical emissions, Antarctica contributed to the global 1850–2017 emissions by 0.00002%. When only accounting for the years 1990–2017, its contribution decreases to 0.00001%. All of the emissions are presented following GWP AR4, and exclude emissions from LULUCF (exclLU), and bunkers fuels emissions (exclBunkers).

Table 1: National emissions (dmSSP2), GDP and population for Antarctica, together with the emissions per unit of GDP and per capita emissions (all for 2017 and 2030). Additionally, the global share and its rank are displayed.

	Year	Total	Unit	Glob. share	Rank
<b>Emissions</b>	2017	4.1	kt CO <sub>2</sub> eq	0.000008%	206
	2030	4.5	kt CO <sub>2</sub> eq	0.000007%	206
<b>GDP</b>	2017	–	2011 GK\$	–	–
	2030	–	2011 GK\$	–	–
<b>Emissions per GDP</b>	2017	–	t CO <sub>2</sub> eq / 2011 GK\$	–	–
	2030	–	t CO <sub>2</sub> eq / 2011 GK\$	–	–
<b>Population</b>	2017	–	Pers	–	–
	2030	–	Pers	–	–
<b>Emissions per capita</b>	2017	–	t CO <sub>2</sub> eq / Pers	–	–
	2030	–	t CO <sub>2</sub> eq / Pers	–	–

For Antarctica, in 2017 the main emissions share on sectoral level (Fig. 1) came from the Energy sector (100.0%). The Kyoto GHG with the highest emissions in 2017 was CO<sub>2</sub>, constituting as much as 100.0% of the national emissions. The total of F-gases only represented 0.0%. The total CO<sub>2</sub> emissions are expected to be 100.0% of the national Kyoto GHG emissions in 2030 (dmSSP2).

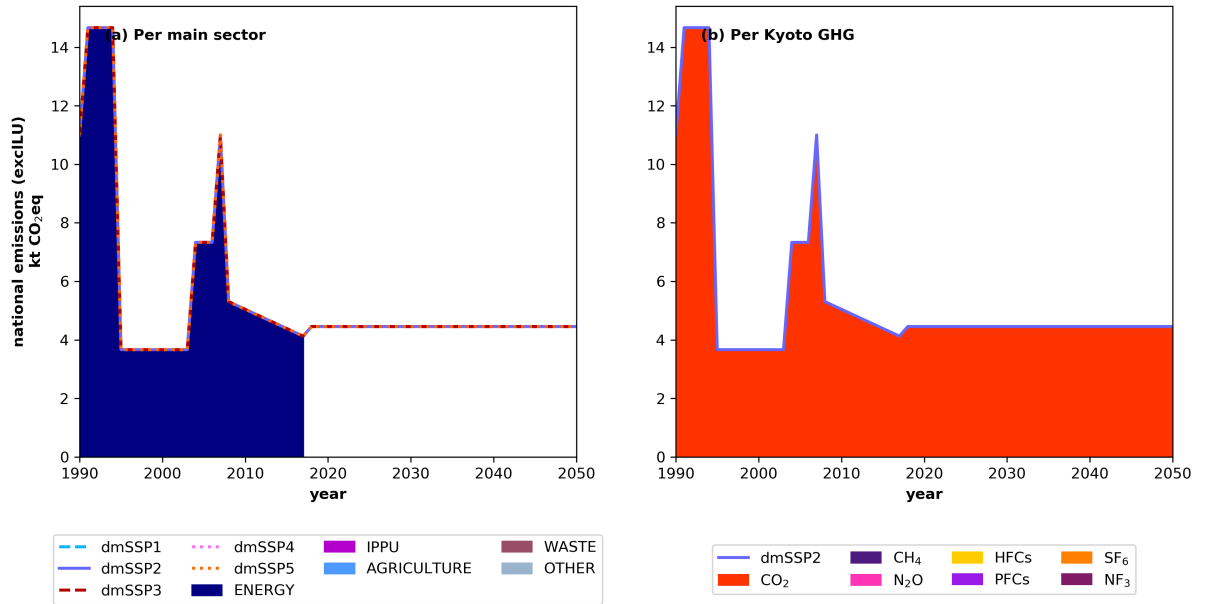


Figure 1: 'Stacked' timeseries of national emissions (exclLU) per main-sector (a) and Kyoto GHG (b). No information available on the sectoral contributions after 2017.

For Antarctica, no GDP and population data are available from dmSSPs.

## 2 LULUCF emissions

No LULUCF data are available for Antarctica from the following sources: CRF (2019), CRF (2018), BUR (3<sup>rd</sup>), BUR (2<sup>nd</sup>), BUR (1<sup>st</sup>), UNFCCC (2019), FAO (2019).

### 3 Mitigation targets (NDC)

Give the %cov for the base and target year (and 2017). Global share for 2030 for the mitigated pathways and % reduction relative to 1990 and 2017. Table with the 'input' data and the resulting targets (like `ndcs_targets.csv`). Antarctica does not have an (I)NDC. Therefore the assumed 'mitigated' emissions pathways used for global aggregates equal the baseline emissions (dmSSP1–5).

### 4 Data sources, additional information and references

**PRIMAP-hist v2.1:** emissions from PRIMAP-hist are data from the country reported data priority scenario (HISTCR).

**dmSSPs:** emissions, population and GDP data are PMSSPBIE data for the five marker scenarios.

**SSPs** Shared Socio-economic Pathways. Narratives and challenges to mitigation and adaptation: SSP1: Sustainability, Taking the Green Road (low / low); SSP2: Middle of the Road (medium / medium); SSP3: Regional Rivalry, A Rocky Road (high / high); SSP4: Inequality, A Road Divided (low / high); and SSP5: Fossil-fuelled Development, Taking the Highway (high / low).

**GDP** Gross Domestic Product. Throughout this document the GDP is given as GDP PPP, with PPP being the Purchasing Power Parity.

**GWP** Global Warming Potential. we use GWP values from the IPCC 4<sup>th</sup> Assessment Report (AR4). They reflect the forcing potential of one kilogram of a gas' emissions in comparison to one kilogram of CO<sub>2</sub> ( $GWP_{CO_2} = 1$ ). The GWPs correspond to a 100-yr period and are for CH<sub>4</sub>: 25, for N<sub>2</sub>O: 298, for SF<sub>6</sub>: 22800, and for NF<sub>3</sub>: 17200. For the basket of HFC-gases the GWPs from AR4 are in the range 4–14800, and for PFCs 7190–12200. To assess emissions of several GHGs, their emissions are weighted by their respective GWPs and presented in CO<sub>2</sub> equivalents (CO<sub>2</sub>eq).

**LULUCF** Land Use, Land-Use Change and Forestry. Emissions from LULUCF are excluded throughout the document, unless stated otherwise.

**Bunkers fuels** Emissions from international aviation and shipping.

**Kyoto GHG** Kyoto GHG (Greenhouse Gas) basket: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF<sub>6</sub>), and nitrogen trifluoride (NF<sub>3</sub>).

**F-gases** Fluorinated gases. Basket of HFCs, PFCs, and the gases SF<sub>6</sub> and NF<sub>3</sub>. Some F-gases have very long atmospheric lifetimes and high Global Warming Potentials.

**Target reclassification** When a country has, e.g., an RBU target (relative reduction compared to Business-As-Usual), and the BAU emissions are provided, it can be quantified based on the given emissions, and is reclassified from type\_main RBU to type\_reclass ABS (absolute emissions target). Additionally, 'NGT' targets can be reclassified as 'ABU' (absolute reduction compared to Business-As-Usual) if absolute mitigation effects due to planned policies and measures are provided.

**Links to additional information:**

- CLIMATEWATCH
- CarbonBrief: Clear on Climate
- Climate Action Tracker
- Country resolved combined emission and socio-economic pathways based on the RCP and SSP scenarios (February 2020)
- Guest post: Calculating the true climate impact of aviation emissions (September 2020)
- IGES NDC Database
- IPCC (The Intergovernmental Panel on Climate Change)
- IPCC Special Report: Global Warming of 1.5° (2018)
- ISIMIP / ISIpedia
- NDC Explorer
- NDC PARTNERSHIP
- PBL Climate Pledge NDC tool
- SSP Database (Shared Socioeconomic Pathways) - Version 2.0 (December 2018)
- The PRIMAP-hist national historical emissions time series (1850-2017) (2019)
- UNFCCC (United Nations Framework Convention on Climate Change)
- World's richest 1% cause double CO<sub>2</sub> emissions of poorest 50%, says Oxfam
- #showyourbudgets