

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

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## Authors:

Annika Guenther<sup>1</sup>

Johannes Guetschow<sup>1</sup>

## Affiliations:

1. Potsdam Institute for Climate Impact Research, Germany

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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 52.6 Mt CO<sub>2</sub>eq, Hong Kong contributed 0.1% to global emissions in 2017, and in 2030 its share is estimated to stay at a similar level (Table ??). The estimates for 2030 are based on the downscaled SSP2 Middle of the Road marker scenario (dmSSP2), in which Hong Kong is estimated to emit 55.9 Mt CO<sub>2</sub>eq in 2030. That change in emissions would constitute an increase of 6.3% compared to 2017. The pathways dmSSP1–5 show a range of 44.3–62.9 Mt CO<sub>2</sub>eq in 2030, and 45.3–91.7 Mt CO<sub>2</sub>eq in 2050. The country’s global rank in terms of total emissions per unit of GDP was 193 in 2017, and 69 regarding the per-capita emissions (196 and 77 in 2030). In terms of accumulated historical emissions, Hong Kong contributed to the global 1850–2017 emissions by 0.07%. When only accounting for the years 1990–2017, its contribution increases to 0.1%. 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 Hong Kong, 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	52.6	Mt CO <sub>2</sub> eq	0.1%	83
	2030	55.9	Mt CO <sub>2</sub> eq	0.1%	89
<b>GDP</b>	2017	403.5	Billion 2011 GK\$	0.3%	46
	2030	543.0	Billion 2011 GK\$	0.3%	49
<b>Emissions per GDP</b>	2017	130.4	t CO <sub>2</sub> eq / Million 2011 GK\$	0.1%	193
	2030	103.0	t CO <sub>2</sub> eq / Million 2011 GK\$	0.1%	196
<b>Population</b>	2017	7.3	Million Pers	0.09%	104
	2030	8.0	Million Pers	0.09%	104
<b>Emissions per capita</b>	2017	7.2	t CO <sub>2</sub> eq / Pers	0.4%	69
	2030	7.0	t CO <sub>2</sub> eq / Pers	0.4%	77

For Hong Kong, in 2017 the main emissions share on sectoral level (Fig. ??) came from the Energy sector (93.6%), followed by Waste (3.8%) The Kyoto GHG with the highest emissions in 2017 was CO<sub>2</sub>, constituting as much as 94.9% of the national emissions. Second largest contributor was CH<sub>4</sub> (4.1%) The total of F-gases only represented 0.1%. The total CO<sub>2</sub> emissions are expected to be 89.6% of the national Kyoto GHG emissions in 2030 (dmSSP2).

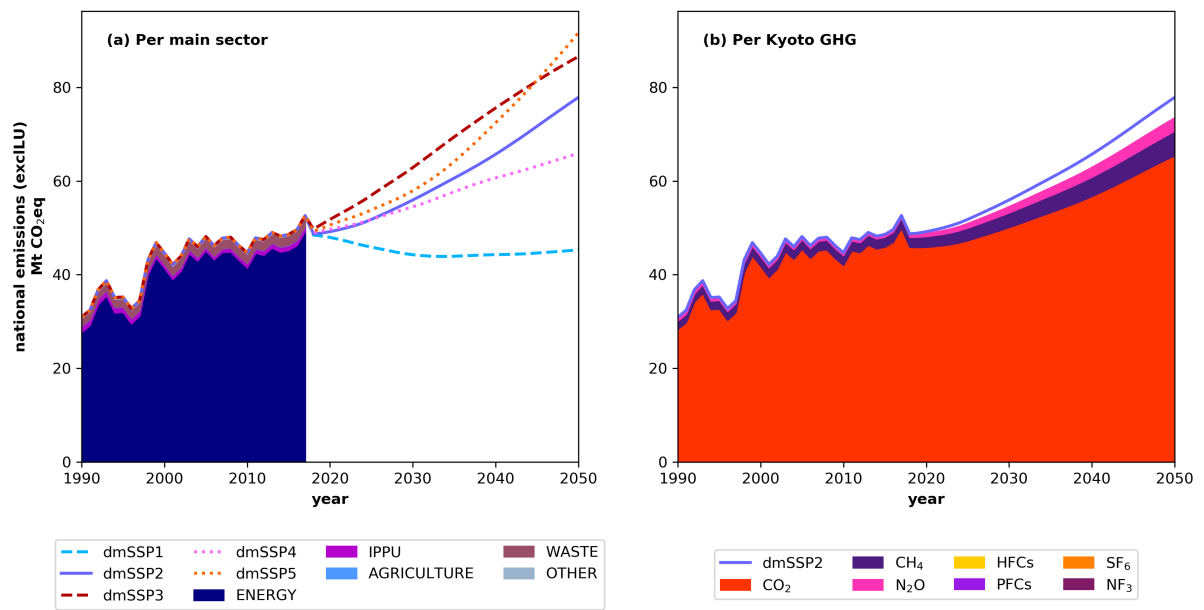


Figure 1: 'Stacked' timeseries of national emissions (exclLU) per main-sector (a) and Kyoto GHG (b). No information available on the sectoral contributions after 2017.

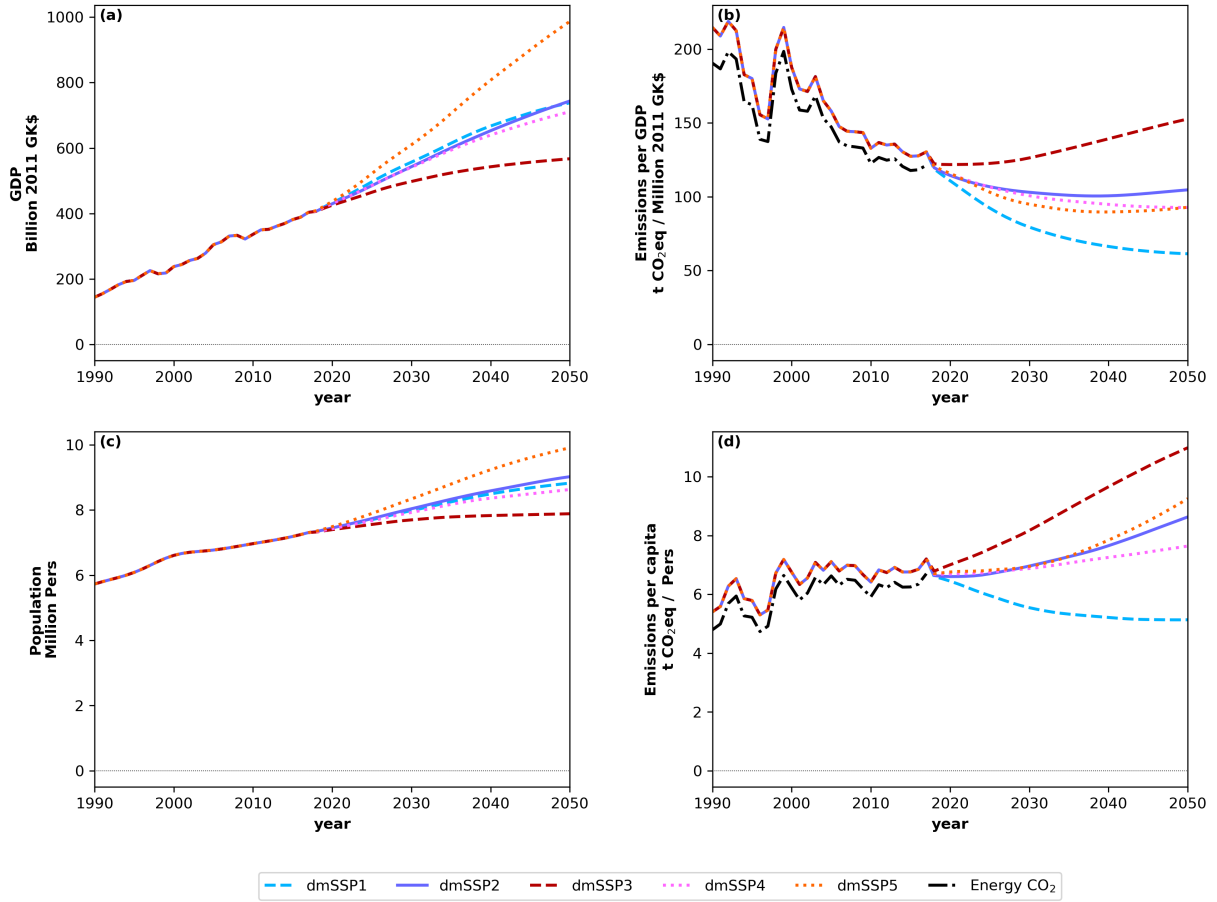


Figure 2: Timeseries of national GDP (a) and population (c), and Kyoto GHG emissions (exclLU, exclBunkers) per unit of GDP (b) or per capita (d).

The national GDP increased in recent years, and the emissions per unit of GDP had an opposite trend (Fig. ??). The population increased, and the per capita emissions dropped. Following dmSSP2, the GDP is projected to increase towards 2050. The emissions per GDP are estimated to decrease towards 2050. Hong Kong's population is assumed to grow towards 2050, and the per capita emissions are expected to increase towards 2050.

## 2 LULUCF emissions

LULUCF emissions data for Hong Kong are available from the following sources (Fig. ??): FAO (2019).

**High fluctuations? Data gaps? Difference between sources?**

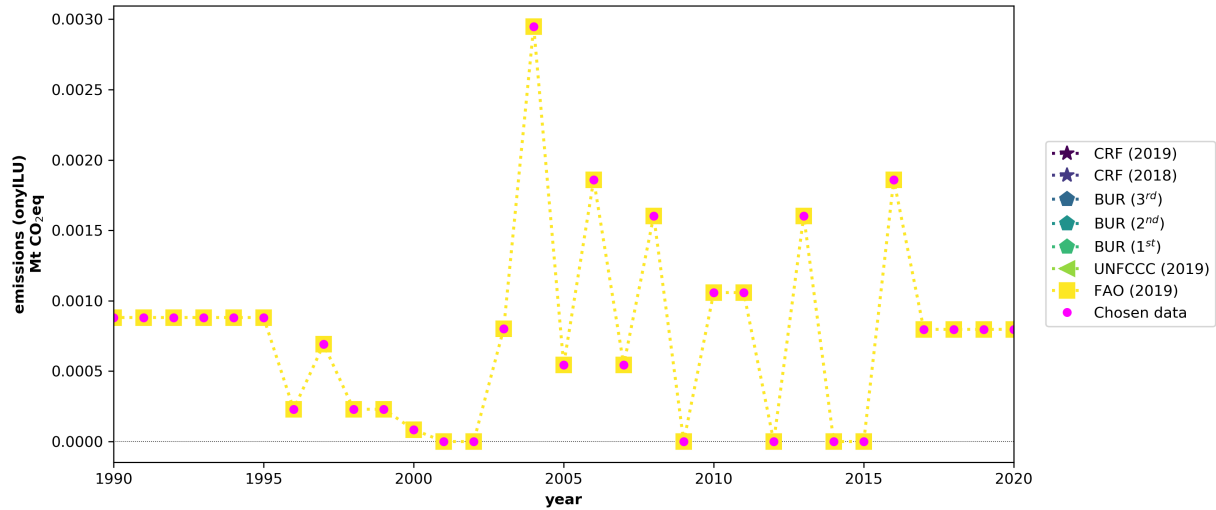


Figure 3: Timeseries of emissions from LULUCF ( $\text{CO}_2$  plus  $\text{CH}_4$  and  $\text{N}_2\text{O}$ ) as available from different data-sources. Indicated in pink are the 'chosen' data, as used in our assessment of Hong Kong's NDC (if needed). The pink timeseries was inter- and / or extrapolated (interpolation: linear, extrapolation: constant).

### 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`). Hong Kong 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<sub>CO2</sub> = 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](#)