

Key Environmental Statistics 2024



Ministry of Sustainability
and the Environment
— SINGAPORE —

The COVID-19 pandemic in 2021 and 2022 led to prevalent work-from-home arrangements and overall decline in economic activities. Indices affected are indicated with an asterisk (*) in the following sections:

- **Clean Air**
- **Solid Waste Management**
- **Environmental Health**
- **Food Safety and Security**
- **Water Resource Management**
- **Climate Change and Energy Efficiency**

Clean Air

Pollutant	Averaging Time	2021	2022	2023	Long Term Targets (not exceeding)
Sulphur Dioxide (SO ₂)* (µg/m ³)	24-hour ¹	89 ²	37	20	20
Nitrogen Dioxide (NO ₂)* (µg/m ³)	1-hour ¹ Annual	123 25	128 25	122 23	200 40
Ozone (O ₃) (µg/m ³)	8-hour ¹	176	124	154 ³	100
Particulate Matter PM10* (µg/m ³)	24-hour Annual	51 28	51 24	62 ⁴ 24	50 20
Particulate Matter PM2.5* (µg/m ³)	24-hour Annual	28 12	26 11	39 ⁴ 11	25 10
Carbon Monoxide (CO)* (mg/m ³)	1-hour ¹ 8-hour ¹	1.3 1.2	2.1 1.7	1.8 1.5	30 10

Air Quality in terms of PSI⁵

Percentage of days in a year when Pollutant Standards Index (PSI) is in the	2021 ⁶	2022	2023 ⁴
Good & Moderate range	99.5	100	99.5
Unhealthy range	0.5	0	0.5

¹ Maximum 24-hour (SO₂), 8-hour (Ozone, CO) or 1-hour (NO₂, CO).

² The maximum recorded 24-hour SO₂ level of 89µg/m³ was only observed on 1 day in 2021. The second highest recorded level was significantly lower at 37µg/m³.

³ Ozone is a secondary pollutant that forms in the air through complex photochemical reactions involving nitrogen oxides and volatile organic compounds. Ozone levels fluctuate as its formation is influenced by various weather conditions, including solar radiation, temperature, wind, humidity, and rainfall. While hot, sunny days can promote Ozone formation, the relationship is not straightforward due to the complex interactions involved. The 8-hour means for Ozone in 2023 are within the typical range observed in past years.

⁴ The 24-hour means (99th percentile) for PM10 and PM2.5 were higher in 2023 as Singapore was impacted by transboundary smoke haze. Additionally, there were 2 days where PSI entered the Unhealthy range in 2023 due to elevated PM2.5 levels.

⁵ PSI includes Sulphur Dioxide (SO₂), Particulate Matter (PM10), Particulate Matter (PM 2.5), Nitrogen Dioxide (NO₂), Carbon Monoxide (CO) and Ozone (O₃). Figures are rounded to the nearest 0.5.

⁶ There were 2 days in 2021 where PSI entered the Unhealthy range due to elevated Ozone levels.

Solid Waste Management*

	Unit	2021	2022	2023 ¹
Total waste generated ²	Mil tonnes/yr	6.94	7.39	6.86
Total waste recycled ³	Mil tonnes/yr %	3.83 55	4.19 57	3.55 52
Total waste disposed of ⁴	Mil tonnes/yr %	3.11 45	3.20 43	3.31 48
Total domestic waste disposed of ³	Mil tonnes/yr	1.58	1.63	1.67
Total domestic waste disposed of per capita	Kg a day /person	0.81	0.80	0.78
Domestic recycling rate ³	%	13	12	12
Total non-domestic waste disposed of ⁴	Mil tonnes/yr	1.54	1.57	1.64
Total non-domestic waste disposed of per \$billion GDP	Tonnes a day/GDP (\$billion)	8.7	8.5	8.7
Non-domestic recycling rate ³	%	70	72	67
Total energy produced from incineration	MWh	1,177,668	1,502,487	1,192,429

Year that Semakau Landfill is expected to be filled up: 2035

¹ Refer to NEA website for key highlights of the 2023 Waste Statistics and Overall Recycling. <https://www.nea.gov.sg/our-services/waste-management/waste-statistics-and-overall-recycling>

² Total waste generated = Total waste recycled + Total waste disposed of

³ Sustainable Singapore Blueprint target for 2030 is 70% for overall recycling rate, 30% for domestic recycling rate and 81% for non-domestic recycling rate.

⁴ Total waste disposed of comprises waste that is incinerated and/or landfilled. Figures exclude metals recovered from Incineration Bottom Ash.

Solid Waste Management*

Waste Stream	Amount of Waste Generated (Tonnes/yr)	Amount of Waste Recycled (Tonnes/yr)	Recycling Rate 2023 (%)	Percentage Point Change from 2022 Recycling Rate (%)
Paper/Cardboard	1,251,000	387,000	31	-6
Ferrous metal	1,296,000	1,289,000	99	0
Plastics	957,000	48,000	5	-1
Construction & Demolition	832,000	828,000	99	0
Food	755,000	132,000	18	0
Horticultural	256,000	218,000	85	0
Wood	447,000	299,000	67	-4
Ash & sludge	231,000	32,000	14	3
Textile/Leather	211,000	5,000	2	0
Used slag	176,000	173,000	98	-1
Non-ferrous metal	106,000	105,000	99	1
Glass	75,000	6,000	8	-6
Scrap tyres	27,000	26,000	95	0
Others (stones, ceramics, rubber etc.)	238,000	6,000	N.A.	N.A.
Overall	6,859,000	3,553,000	52	-5

Note: The figures may not add up to the total due to rounding off.

The recycling rate for the "Others" category is not meaningful as it is an aggregation of miscellaneous waste types that are managed and recycled differently.

Metal recovered from incineration bottom ash for recycling is excluded from waste disposed of.

Wood and horticultural waste recycled include 447,000 tonnes sent to facilities (e.g. biomass power plants and Sembcorp's Energy from Waste plant) for use as fuel.

Environmental Health

Vector Control	2021	2022	2023
No. of local dengue fever cases per 100,000 population*	96	571	165

Note: Figures are based on the latest updated data from the Ministry of Health.

Food Safety and Security

Food Safety	2021	2022	2023
Foodborne illness cases related to foodborne outbreak ¹ per 100,000 population*	25.6	21.2	23.0
No. of licensed food establishments ²	51,809	52,599	53,471

Food Supply Resilience	2021	2022	2023
No. of the 5 most commonly consumed food items (seafood, eggs, chicken, pork and vegetables) that has less than 50% of supply from a single country	4 ³	3 ⁴	4 ⁵
No. of licensed local food farms ⁶	260	257	254

¹ The figures include only the number of persons (also known as cases) affected in foodborne outbreaks involving 15 or more persons.

² Comprises non-retail food establishments (e.g. food manufacturers, cold stores, slaughterhouses); and retail food establishments (e.g. food shops, food stalls and supermarkets). Data is as at Dec of each year.

³ The food items are seafood, chicken, pork and vegetables for 2021.

⁴ The food items are seafood, pork and vegetables for 2022.

⁵ The food items are seafood, eggs, pork and vegetables for 2023.

⁶ Comprises of sea-based seafood, land-based seafood, vegetables, hen shell eggs and others (cattle, goat and quail eggs). Data is as at Dec of each year.

Water Resource Management

Access	2021	2022	2023
Improved Drinking Water Sources ¹	100%		
Improved Sanitation ²			
Tests meeting WHO drinking water quality guidelines			

System Efficiency	2021	2022	2023
Distribution Losses (%)	8.2	7.5	7.2
No. of leaks per 100 km of potable water pipelines*	4.2	4.1	4.5
No. of disruptions per month per 1,000 km of sewers (average over a year)	10.1	9.9	9.9
Flood prone areas (Hectares)	28.0	27.0	24.0

Supply	2021	2022	2023
No. of reservoirs in Singapore	17		
Sale of potable water in Singapore (Mil m ³)			
• Domestic*	316.5	305.9	300.2
• Non-domestic*	184.9	200.8	209.3
Sale of NEWater* (Mil m ³)	148.9	148.2	145.1
Sale of Industrial Water* (Mil m ³)	11.4	12.0	13.7
Volume of used water treated* (Mil m ³)	608.5	603.2	604.4

¹ As defined by the World Health Organisation (WHO), i.e. water sources that, by nature of construction or through active intervention, are protected from outside contamination. These include piped water into premises, protected dug well, etc.

² As defined by the WHO, i.e. sanitation facilities that hygienically separate human excreta from human contact. These include flush/pour flush toilets or latrines connected to a sewer, septic tank, etc.

Water Resource Management

Water Demand and Management	2021	2022	2023
Per Capital Household Water Consumption* (Litres/Day)	158	149	141

Public Outreach	2021	2022	2023
No. of lifestyle events held at reservoirs and waterways*	44	84	96
No. of ABC Waters projects completed by PUB (Cumulative) ¹	49	52	55



¹ Figures include projects carried out by public agencies and exclude test-bedding projects.

Climate Change and Energy Efficiency

Climate Change/Energy	Unit	2021	2022	2023
Total greenhouse gas emissions* ^{1,2}	MtCO ₂ e	58.3	58.6	NA ³
Energy consumption per dollar GDP (% improvement from 2005 levels)* ²	%	36.7	40.3	NA ³
Grid emissions factor ^{2,4}	kgCO ₂ /kWh	0.4085	0.4168	NA ³
Domestic electricity use per capita* ^{4,5}	MWh	1.52	1.40	NA ³

¹ Estimated using 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories and Global Warming Potential values from the IPCC 5th Assessment Report. International Bunker fuels are excluded in accordance with United Nations Framework Convention on Climate Change (UNFCCC) reporting guidelines.

² In accordance with 2006 IPCC Guidelines, figures may be periodically updated as more accurate data are made available.

³ Data will be available in 2025.

⁴ Data obtained from Energy Market Authority.

⁵ Data obtained from Department of Statistics.

Regional & International Collaboration

Environmental agreements that Singapore has ratified / acceded to

10 Mar 1976

- ▶ Treaty on the Non-Proliferation of Nuclear Weapons (NPT)

5 Jan 1989

- ▶ Vienna Convention for the Protection of the Ozone Layer
- ▶ Montreal Protocol on Substances that Deplete the Ozone Layer

2 Jan 1996

- ▶ Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal

22 Sep 2000

- ▶ 1992 Copenhagen Amendment to Montreal Protocol
- ▶ 1997 Montreal Amendment to Montreal Protocol

14 Jan 2003

- ▶ ASEAN Agreement on Transboundary Haze Pollution

12 Apr 2006

- ▶ Kyoto Protocol to the United Nations Framework Convention on Climate Change

31 Mar 2008

- ▶ Additional Protocol for the Application of Safeguards
- ▶ Modified Small Quantities Protocol for the Application of Safeguards

2014

- 22 Sep** ▶ Convention on the Physical Protection of Nuclear Material (CPPNM)
- 23 Sep** ▶ Doha Amendment to the Kyoto Protocol

22 Oct

- ▶ Amendment to the Convention on the Physical Protection of Nuclear Material

22 Sep 2017

- ▶ Minamata Convention on Mercury

1 Jun 2022

- ▶ Kigali Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer

18 Oct 1977

- ▶ Comprehensive Safeguards Agreement with a Small Quantities Protocol

2 Mar 1993

- ▶ 1990 London Amendment to Montreal Protocol

1997

29 May

- ▶ United Nations Framework Convention on Climate Change

15 Dec

- ▶ Convention on Assistance in the Case of Nuclear Accident or Radiological Emergency
- ▶ Convention on Early Notification of a Nuclear Accident
- ▶ Convention on Nuclear Safety

10 Nov 2001

- ▶ Comprehensive Nuclear Test-Ban Treaty (CTBT)¹

24 May 2005

- ▶ Stockholm Convention on Persistent Organic Pollutants
- ▶ Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade

10 Jan 2007

- ▶ 1999 Beijing Amendment to the Montreal Protocol on Substances That Deplete the Ozone Layer

12 Jul 2012

- ▶ ASEAN Plus Three Emergency Rice Reserve Agreement

21 Sep 2016

- ▶ Paris Agreement under the United Nations Framework Convention on Climate Change

30 Oct 2018

- ▶ Protocol to amend ASEAN Plus Three Emergency Rice Reserve Agreement

¹ This agreement is not yet in force

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Ministry of Sustainability
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— SINGAPORE —

40 Scotts Road, Environment Building,
#24-00 Singapore 228231

www.MSE.gov.sg

MSE Quality Service:
1800-738-4622



40 Scotts Road, Environment Building,
#13-00, Singapore 228231

www.NEA.gov.sg

Contact Centre

Hotline:
1800-CALL-NEA (1800-2255-632)



40 Scotts Road, Environment Building,
#22-01, Singapore 228231

www.PUB.gov.sg

Email: PUB_One@pub.gov.sg

PUB-One (24-hour Contact Centre):
1800-CALL-PUB (1800-2255-782)



52 Jurong Gateway Road, JEM Office Tower,
#14-01, Singapore 608550

www.SFA.gov.sg

Feedback:
<https://csp.sfa.gov.sg/feedback>

Contact Centre Hotline:
1800-CALL-SFA (1800 805 2575)

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