



MAY 2016

HOBART CLIMATE CHANGE INFORMATION FOR DECISION MAKING



The 'Hobart Climate Change information for decision making' (the Information) is based on the Climate Futures Tasmania 'Local Climate Profile Hobart City Municipality' developed by the Antarctic Climate Ecosystems Cooperative Research Centre's Climate Futures Tasmania (CFT) project and available from the Tasmanian Government's Department of Premier and Cabinet's website. The local climate profiles provides detailed climate models specific to Tasmania at 10 km² intervals across the state. The Information expands these local profiles and has been developed to support decision making across the City of Hobart's strategic, operational, service, adaptation and emergency management planning functions.

The information is to be reviewed and updated when more up-to-date and good-quality-information becomes available or at quinquennial intervals. It should be considered in conjunction with the City's policies and strategies and alongside technical and industry standards.

CURRENT CLIMATE AND RECENT TRENDS

Hobart has a temperate, maritime climate with relatively mild winters. Long-term average temperatures have risen in the decades since the 1950s, at a rate of up to 0.1 °C per decade

Despite covering a small geographic area Hobart experiences a marked rainfall gradient in average annual rainfall from about 1100 mm on the slopes of Mt Wellington to 615 mm in the city. There has been a decline in average annual rainfall since the mid 1970s, and this decline has been strongest in autumn

EXTREME EVENTS

The changes in climate that are most likely to impact upon the City's infrastructure, roads, and the local community and environment are a magnification in intensity of extreme events. Potential impacts on Hobart, by 2100 are as follows:

The temperature of very hot days to increase by up to 3°C. Warm spells (days in a row where temperatures are in the top 5%) currently last around 5 days and may increase by up to 3 – 6 days

Extended heat waves and more extreme temperatures are likely to enhance the occurrence and intensity of bushfires

Rainfall will trend towards heavier events interspersed by longer dry periods. High daily runoff events are likely to increase, including those that may lead to erosion or flooding. Rainfall volume in a 200-year average recurrence interval (ARI) event will increase by up to 30-40%

Inundation along Derwent estuary frontage will increase. The current 100-year storm tide event is around 0.9 to 1.4 m above average sea level, and accounting for sea level rise (0.82 m), the current 100-year coastal inundation event may become a 50-year event by 2030, and a 2 to 6-year event by 2090

PROJECTED CHANGE IN CONDITIONS BY 2100 (A21 EMISSIONS SCENARIO)

Table 1: Projected changes for Hobart City by 2100 relative to the baseline period (1961-1990)

Climate Variable	2010 -2039			2040 - 2069			2070 - 2099		
	Value	Change	% Change	Value	Change	% Change	Value	Change	% Change
Temperature									
Average Daily Mean (annual)	12.0°C	0.8 °C	+7.0%	12.8°C	1.5°C	+13.5%	13.8°C	2.5°C	+2.5%
Average daily maximum temperature (annual)	16.5°C	0.7°C	+4.7%	17.2°C	1.5°C	+9%	18.2°C	2.4°C	+16%
Summer days (>25°C)/year	22.5 days	4.3 days	+24%	28.6 days	10.4 days	+57%	39.4 days	21	+116%
Warm spell duration (# days)	5 days	+ 1 days	+25%	6 days	+1°C days	+25%	8 days	+3 days	+75%
Hottest daily temperature of the year	34.3°C	0.7°C	+2%	35.2°C	1.6°C	+5%	36.2°C	2.6°C	+7.6%
Mean Minimum -Asphalt Critical Viscosity	152014	40881	+37%	202151	91018	+82%	299599	188466	+170%
Cold nights (minimum temperature < lowest 10%)	-	-	-4%	-	-	-7%	-	-9%	-
Warm nights (minimum temperature > highest 10%)	-	-	+5%	-	-	+11%	-	-	+20%
Frost risk days/year (<2°C)	15.3 days	-14.1 days	-48%	7.7 days	-21.8 days	-74%	2.7 days	-26.7 days	-91%
Freeze days/year (0°C)	2.6 days	-3.5 days	-52%	1.09 days	-5.0 days	-82%	0.3 days	-6 days	-96%
Extreme Warm Days (number of days > 30°C)	4.2 days	1 day	31%	5.8 days	2.6 days	+80%	8 days	4.8 days	+150%
Extreme Heat Days (number of days > 40°C)	0.01 day	0	0%	0.02 day	0.02 day	+300%	0.08 day	0.07 day	+1300%
Rainfall									
Rainfall (total annual average)	725.4 mm	12.0 mm	+1.7%	740.9 mm	27.6 mm	+4%	732.9 mm	19.5 mm	+2.7%
Seasonal Rainfall - Summer	179.3 mm	12.2 mm	+7%	183.8 mm	16.7 mm	+10%	179.0 mm	11.8 mm	+7%
Seasonal Rainfall - Winter	187.7 mm	-2.8 mm	-1.5%	190.2 mm	-0.3 mm	-0.1%	188.2 mm	-2.3 mm	-1%
Seasonal Rainfall - Autumn	172.2 mm	10.4 mm	+6%	176.5 mm	14.7 mm	+9%	180.3 mm	18.6 mm	+11.5%

¹ The IPCC developed a series of global greenhouse gas emission scenarios that outline alternative images of the future. The scenarios are based on consideration of demographic development, socio-economic development and technological change. The scenarios outline alternative images of the future. The A2 emissions scenario was selected as it is consistent with (slightly less than) the current concentration of greenhouse gases emitted into the atmosphere.

Climate Variable	2010 -2039			2040 - 2069			2070 - 2099		
	Value	Change	% Change	Value	Change	% Change	Value	Change	% Change
Seasonal Rainfall - Spring	186.2 mm	-7.8 mm	-4%	190.4 mm	-3.6 mm	-2%	185.4 mm	-8.6 mm	-4%
Rainfall (wettest day of the year)	48 mm (48 to 49)	-	+9%	51 mm (50 to 62)	-	+16%	52 mm (45 to 64)	-	+18%
Rainfall extreme (24hr) - 10% AEP	72 mm	6 mm	+9%	78 mm	12 mm	+18%	79 mm	13.6 mm	+21%
Rainfall extreme (24hr) - 1% AEP	119 mm	26.9 mm	+29%	127 mm	35.1 mm	+38%	119 mm	26.8 mm	+29%
Rainfall extreme (24 hr) 0.5% AEP	131 mm	31 mm	+31%	140 mm	40 mm	+40%	130 mm	30 mm	+30%
Rainfall extreme (48hr) - 10% AEP	102 mm	13.2 mm	+15%	97 mm	10.7 mm	+12%	78 mm	-11.3 mm	-13%
Rainfall extreme (48hr) - 1% AEP	150 mm	25.9 mm	+21%	123 mm	-0.6 mm	-0.5%	75 mm	-48.6 mm	-39%
Rainfall extreme (48 hr) – 0.5% AEP	163 mm	29 mm	+22%	128 mm	-6 mm	-4%	80 mm	-54 mm	-41%
Runoff	459.1 mm	13.0 mm	+3%	474.7 mm	28.6 mm	+6%	474.5 mm	28.4mm	+6%
River Derwent annual flow	3200 mm	-	-2%	3070 mm	-	-6%	3102 mm	-	-5% (-16% to +14%)
Evaporation	919.4 mm	20.1 mm	+2.2%	942.2 mm	42.9 mm	+4.8%	984.1 mm	84.8 mm	+9.5%
Relative Humidity	737.8 RH	3.3 RH	+0.5%	741.7 RH	7.1 RH	+1%	745.5 RH	11.0 RH	+1.5%
Fire									
Fire Danger (FFDI)	Fire season longer, earlier start Places with high fire danger currently projected to get worse more rapidly								
Wind speed									
Wind speed (ms ⁻¹)	Little change projected by 2085 (<5%) Change in seasonality, with higher speeds in July-October, and lower speeds in November - May								
Sea level rise Planning Allowances ²									
			2050 - 0.2 metres			2100 - 0.8 metres			

²The Sea Level Rise Planning Allowances are endorsed by the Tasmanian Government and were developed separately from the CFT profiles. Information on the methodology used to develop the allowances is detailed in '[Derivation of Tasmanian Sea Level Rise Planning Allowances, technical Paper August 2012](#)'

NOTES:

- All values are based on the Climate Futures for Tasmania projections, using previously published results in the Climate Futures for Tasmania reports and the ClimateAsyst tool (<http://www.pittsh.com.au/climateasyst/>). The projections were completed in 2009 using climate models from the CMIP3 archive. See accompanying report "An evaluation of the Climate Futures for Tasmania projections for guiding climate change adaptation in Hobart" for details. The Climate Futures for Tasmania reports can be found at http://www.dpac.tas.gov.au/divisions/climatechange/climate_change_in_tasmania/impacts_of_climate_change. The exception being the sea level rise values which are endorsed by the Tasmanian government and available at http://www.dpac.tas.gov.au/divisions/climatechange/climate_change_in_tasmania/impacts_of_climate_change/coastal_impacts.
- Values given are the multi-model mean of the six Global Climate Models downscaled in the Climate Futures for Tasmania project. Averaging the six models smooths out the variability and shows the forced climate response independent of the model variability. For most variables, the range between climate models is not large relative to the percent change projected. For example, the range in the number of Summer days/year is 22 to 23 days by the 2025 period; 28 to 30 by 2055, and 38 to 42 days per year by the end of the century period (2085). This represents a maximum range of 10%. The range in rainfall projections for Hobart is less than 5% for the near and mid-century periods (2010 to 2039 and 2040 to 2069), and 5-7.5% for the end of century period (2070 to 2099) (see Report on CFT context for more detail about uncertainty).
- The AEP is a measure of the rarity of a rainfall event. It is expressed as the probability that a given rainfall total accumulated over a given duration will be exceeded in any one year. So, on average, there is a 10% chance that more than 72mm rain will fall in Hobart over a 24 hour period in 2010-2039. By the end of the century the amount of rainfall with the same probability increases to 79mm.
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