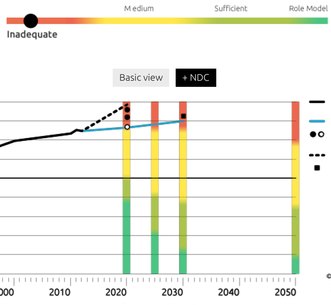
CLIMATE ACTION TRACKER

Singapore

History: 2017 2016 2015

Page last updated: 2nd November 2016

Rating



Note: Hover over the coloured bars for a pop-up with the fair emissions range per effort sharing category. More information here.

Assessment

Singapore's Nationally Determined Contribution (NDC) emissions target is very weak compared to currently implemented policies, which, according to our analysis, will lead to emissions in 2030 of 60 $MtCO_2e$—a 123% increase above 1994 levels. Yet, even without any additional policies Singapore will overachieve its NDC target of a 36% reduction of emissions intensity below 2005 levels by 2030, reaching a more than 40% reduction this year. We rate Singapore's NDC 2030 target as "inadequate" under all interpretations of a "fair" approach in line with holding warming below2°C, let alone with the Paris Agreement's stronger 1.5°C limit. Singapore's mitigation target for 2030 should be substantially strengthened to reflect the country high economic capability in order to be rated as "sufficient.".

Singapore's climate change strategy focuses mainly on adaptation. Singapore's currently implemented mitigation policies have focused on replacing oil and coal in the electricity generation sector, resulting in natural gas reaching a 96% share of the energy mix in 2015. In order to diversify its energy mix and avoid energy dependency, the country has significantly expanded its Liquefied Natural Gas (LNG) and solar energy capacity in recent years. However due to its geographical limitations that constrain renewables expansion and a decision against deploying nuclear power, Singapore's energy matrix of the country will likely remain very uniform in the future, resulting in a prolonging of the its dependence on fossil-fuels.

Outside the power generation sector, Singapore's mitigation efforts almost exclusively consist of measures aimed at further improving energy-efficiency trough programs like Green Mark standards for buildings, public transport, fuel efficiency standards, home appliance efficiency standards, industrial energy efficiency, and waste management. The government says it will study the possibility of a carbon price to enhance efforts across all sectors.

Finally, it must be noted that Singapore is one of the world's largest international navigation and aviation hubs. Emissions associated with these activities are nearly three times as high as domestic emissions and have risen steeply over recent decades. Despite the fact that those emissions are not included in Singapore's national inventory, and therefore are not taken into account in our analysis, it must be noted that Singapore has a significant potential to influence any type of negotiations regarding mitigation efforts in this sector, and could play a central role in the implementation of measures to tackle emissions from bunkers and international aviation.

Pledges and targets

Paris Agreement targets

On July 3, 2015 Singapore submitted its Intended Nationally Determined Contribution (INDC), with a target of reducing emissions intensity of GDP by 36% below 2005 levels by 2030 and stabilising emissions, aiming for them to peak around 65 $MtCO_2e$ in 2030 (Singapore Government, 2015).

More recently, Singapore officially ratified the Paris Agreement (PA) on September 21, 2016. According to point 22 of the Paris Decision accompanying Paris Agreement (PA), since no NDC was submitted before the Party's ratification of the PA, the Party's INDC automatically became its first NDC (UNFCCC, 2015).

2020 Pledge

Under the Copenhagen agreement, Singapore committed to reduce its emissions by 7-11% below BAU emissions in 2020 unilaterally and, in the event of a legally binding international agreement, by 16% below BAU. The National Climate Change Strategy includes several unconditional mitigation targets for the same year, e.g. a 35% reduction in energy intensity from 2005 levels (National Climate Change Secretariat, 2012).

Of concern is that the BAU pathway provided by the government as reference for the 2020 target assumed the emissions intensity of the economy would go in the opposite direction from the historical trend, increasing significantly until 2020. Despite the fact the emissions intensity of GDP dropped 48% between 2000 and 2010, the BAU pathway assumes a 17% increase between 2010 and 2020.

Copenhagen pledge	
2020 target	7-11% below BAU by 2020 (unconditional) [138-168% above 1994 by 2020]
	16% below BAU by 2020 (conditional) [100% above 1994 by 2020]
Conditions	Conditional to legally binding international agreement
Paris Agreement target	
Ratified	Yes
2030 target	-36% of emissions intensity below 2005 by 2030 [143% above 1994 by 2030]
Coverage	Economy-wide, all gases covered
Emission peak target	2030
Long term goal(s)	
Long-term goal(s)	-45% of emissions intensity below 2005 by 2035 (Aspirational goal)

Fair share

We rate Singapore's 2020 and 2030 targets as "inadequate". The mean that the commitments are not consistent with interpretations of a "fair" approach in line with holding warming below 2°C, let alone with the Paris Agreement's stronger 1.5°C limit unless other countries make much deeper reductions and comparably greater effort. Singapore could strengthen its reduction target to reflect its high capability.

Current policy projections

According to our current policy emissions pathway, mainly due to expected stable economic growth and a total primary energy supply strongly influenced by the chemical, petrochemical and oil-refining industries, GHG emissions will continue raising steadily in the coming decades, reaching 60 $MtCO_2e$ in 2030. Despite the continued emissions growth projected under our current policy, Singapore's emissions will be lower than its 2020 and 2030 emissions targets. This means that it can achieve its emissions mitigation goals with no additional efforts beyond currently implemented policies.

A significant share of Singapore's climate policies focuses on adaptation - due to its high vulnerability to the adverse effects of climate change. For mitigation, the national climate strategy is based on three areas: increasing energy and carbon efficiency, reducing carbon emissions in power generation, and development of low-carbon technology (Ministry of the Environment and Water Resources, 2016).

Improving energy efficiency across the economy is the backbone of Singapore's mitigation strategy. In its latest National Climate Action Plan (Ministry of the Environment and Water Resources, 2016), the government listed a number of policies to improve energy efficiency across all sectors., including an Energy Conservation Act, Green Mark Certification and Energy Labelling schemes, home appliances Energy Performance Standards, among others.

The multiple energy efficiency measures are expected to improve energy and emission intensity but not to compensate for the increasing energy demand from the industry and buildings sectors, which will result in rising emissions (APERC, 2015). By contrast, the transport sector energy demand and associated emissions are expected to stagnate as a result of multiple measures to promote public transport and improve the emissions intensity of road transport.

The major trend in recent decades has been to replace oil with natural gas. As a result, the consumption of gas has increased six-fold since of the early 2000's. In 2015, more than 95% of Singapore's electricity was provided by gas-fired power plants (Ministry of the Environment and Water Resources, 2016), an increase from below 70% a decade earlier. However, even if the emissions from natural gas are lower than those from other fossil fuels, processes like gas liquefaction, transportation and regasification significantly increase Singapore's carbon footprint and reduce its emissions reduction potential.

Additional policies in the power sector include multiple incentives to increase the share of renewable generation, including the SolarNova programme and the expansion of Waste-to-Energy (WTE) capacity. For renewables, the national target is to increase installed solar capacity from 60MWp in 2015 to 350MWp in 2020 and to increase the renewable electricity share to 8% of peak power in 2030 (Singapore's Government, 2015). Due to the small area and high urban density of the country, renewable energy will have a limited expansion and is expected to cover less than 10% of electricity demand by 2030 (APERC, 2015). This, combined with a projected stable increase in power demand and generation will result in rising emissions from electricity in the next decades (APERC, 2015).

Even assuming Singapore's mitigation policies cannot be substantially strengthened due to domestic factors like the limits to renewables, a more ambitious mitigation target, which could be reached financing emissions reductions elsewhere, would demonstrate the government's commitment to contribute its fair share to global climate change mitigation.

Lastly, it must be noted that Singapore is one of the world's largest international navigation and aviation hubs. Due to the large amount of bunker and jet fuels required for these activities, their associated emissions are nearly three times as high as domestic emissions and have risen steeply over recent decades (IEA, 2014). Singapore could therefore play a central role in the negotiation and implementation of measures to tackle emissions from bunkers and international aviation. Those emissions are not included in Singapore's national inventory and therefore are excluded from our current policy emissions pathway.

Assumptions

Pledge and historical emissions

Singapore provided a national greenhouse gas inventory for 1994, 2000 and 2010, and emission projections for 2020 for a business as usual (BAU) scenario. Data for emissions in between 1994 and 2000 was calculated using linear interpolation and emissions between 2000 and 2010 were taken from the figures presented in the Biennial Update Report (National Environment Agency, 2014)

Singapore is a city-state with one of the highest population densities in the world and is nearly completely dependent on imports for food. Most of the remaining natural areas are sanctuaries. We therefore do not consider emissions related to LULUCF sector for the analysis, as they are negligible.

The target emissions levels we use are taken directly from Singapore's INDC, where it is clarified that to achieve the 2030 Emissions Intensity level, Singapore's emissions are expected to stabilise at around 65 $MtCO_2e$ based on current projected growth.

Current policy projections

Our current policy emissions pathway relies on energy related CO_2 emissions projections of the latest energy outlook of the Asia Pacific Energy Research Centre (APERC, 2015) and on non-CO_2 projections from the United States Environment Protection Agency (US EPA, 2012); which constitute the most up-to date emissions projections for the country.

Since APERC's energy outlook includes projections only for energy related CO_2 emissions, for our current policy pathway we assume that non-energy related CO_2 emissions will remain constant for the whole projection period at the last historical data level available, corresponding to 2010 (IEA, 2014). This assumption is done due to lack of projections for this type of emissions and taking into account their small and decreasing share in total emissions (4% in 1990 and 1% from 2005 to 2010).

We excluded emissions from marine and aviation bunkers when calculating the comparability range which determines the rating. These emissions are nearly three times higher than the rest of Singapore's emissions—with the great majority being related to Singapore's role as a hub in international shipping.

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