C40 CITIES
CLIMATE LEADERSHIP GROUP

27 C40 CITIES
HAVE PEAKED THEIR GREENHOUSE GAS EMISSIONS

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ABOUT THE STUDY

In 2016, nations ratified an international agreement on climate change, the Paris Agreement, thereby committing to ambitious efforts to keep global average temperature rise to well below 2º C above pre-industrial levels, and to further pursue efforts to limit temperature rise to 1.5º C. According to the world's leading scientists, global greenhouse gas (GHG) emissions must peak by 2020 and then begin to decline rapidly if there is any hope of delivering the Paris Agreement and preventing the impacts of catastrophic climate change.

This study shows that at least 27 member cities of the C40 Cities Climate Leadership Group have peaked emissions by 2012 and are already on a path to a lower carbon future, helping to convert the Paris Agreement from aspiration into reality. The cities are: Barcelona, Basel, Berlin, Boston, Chicago, Copenhagen, Heidelberg, London, Los Angeles, Madrid, Melbourne, Milan, Montréal, New Orleans, New York City, Oslo, Paris, Philadelphia, Portland, Rome, San Francisco, Stockholm, Sydney, Toronto, Vancouver, Warsaw, and Washington D.C.

To date, mayors of more than 60 C40 cities have publicly committed to the development and implementation of ambitious climate action plans by 2020 that go beyond national commitments, in order to achieve the highest goals of the Paris Agreement. These plans will see many more cities achieve peak emissions in the years ahead and become emissions neutral by no later than 2050.

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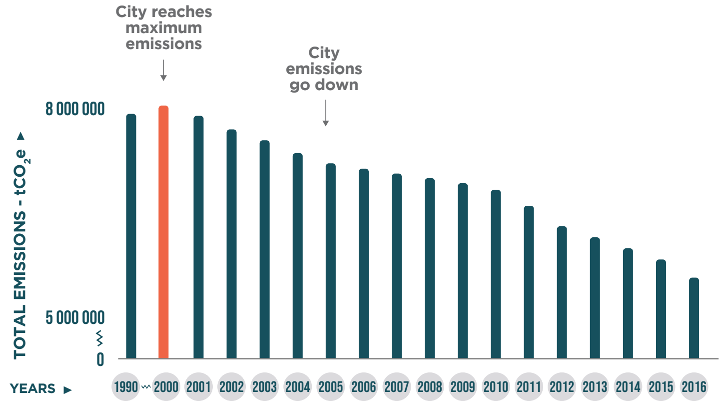
WHAT DOES PEAKING LOOK LIKE?



EXAMPLE: SAN FRANCISCO

1990 — BERLIN, HEIDELBERG, LOS ANGELES, MONTRÉAL, STOCKHOLM

1991 — COPENHAGEN

2000 — LONDON, PORTLAND, SAN FRANCISCO

2004 — PARIS, ROME

2005 — BOSTON, CHICAGO, MILAN

2006 — NEW YORK CITY, PHILADELPHIA, WASHINGTON D.C.

2007 — MADRID, SYDNEY, WARSAW

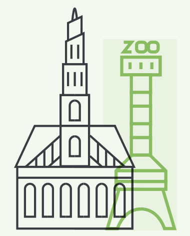
2008 — BARCELONA

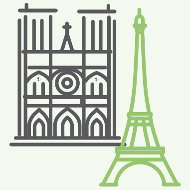
2009 — VANCOUVER

2010 — BASEL, MELBOURNE, NEW ORLEANS

2011 — TORONTO

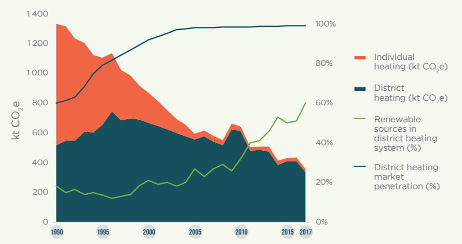
2013 — OSLO





WHAT'S DRIVING CITIES TO PEAK EMISSIONS?

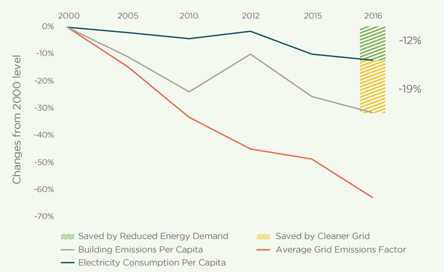
EVOLUTION OF EMISSIONS FROM HEATING ENERGY USE IN COPENHAGEN



DECENTRALISED ENERGY
COPENHAGEN

The City of Copenhagen peaked its GHG emissions in 1991 and emissions have more than halved since then.
A key contributing factor is the continuous expansion of its district heating system, one of the largest in the world. The market penetration of the system has grown from 60% to 99% since the 1990s, meeting the heating demand of an increasing population while slashing emissions from heating energy use by over 70%. In the meantime, energy efficiency has improved continuously by utilising excess heat from combined heat and power plants (CHP), industry and waste water treatment. Over the years, the city also made a significant shift away from oil and coal to renewable sources as the primary energy for the district heating system, to reduce GHG emissions even further.

HOW SAN FRANCISCO REDUCES EMISSIONS BY GREENING ELECTRICITY SUPPLY AS WELL AS REDUCING ENERGY DEMAND



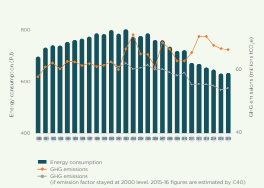
DECARBONISING THE GRID
SAN FRANCISCO

Emissions in San Francisco peaked in 2000 and have been progressively declining since. Significant emissions reductions have come from changes in electricity consumption, which accounts for nearly 30% of total energy use in the city, mostly in buildings. Considering its commitment to achieving 100% renewable energy by 2030, the city hall has been actively working with energy suppliers, businesses, communities and other tiers of government to push for a more sustainable future that utilises renewables. Today, 77% of all electricity supplying the city already comes from GHG-free sources, covering all city-owned buildings. Furthermore, two of California State's dirtiest and most inefficient fossil fuel power plants, located in San Francisco, have now been closed. CleanPowerSF, the city's Community Choice Aggregation programme, is also rapidly increasing its renewables portfolio and customer base.

TOKYO (A DIFFERENT ANECDOTE)

Tokyo has made significant progress in reducing energy consumption since the early 2000s. However, emissions impacts have been less evident. This is because the carbon intensity of electricity, which accounts for around half of energy use in the city, has increased by nearly 50% from 2000 levels as a result of large nuclear power plants being closed and replaced with mainly natural gas. With limited control over power generation, the city accelerated its energy efficiency policies and in 2010, introduced the world's first city level cap-and-trade carbon emissions scheme, mandating emissions reductions for large buildings. By 2016, energy consumption was 21% below 2000 levels, while total GHG emissions were 7% below 2003 levels. Nonetheless, had the grid carbon intensity remained constant, emissions would have followed a similar pattern.

TOTAL ENERGY USE AND GHG EMISSIONS IN TOKYO (1990 - 2016)



EVOLUTION OF GREENHOUSE GAS EMISSIONS FROM TRANSPORTATION IN PARIS

2004-2014

EMISSIONS ↓ -39%

CYCLE PATHS INCREASED BY 700%

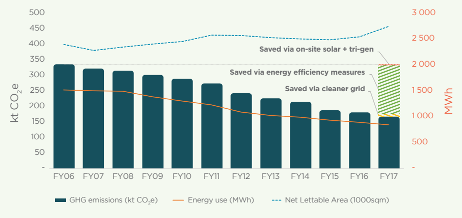
CREATION OF THE VÉLIB' 23 600 SELF-SERVICE BICYCLE-HIRE

LAUNCHED 24 KM TRAM LINES

ENHANCED MOBILITY NETWORKS
PARIS

Transportation is often the second largest source of GHG emissions after buildings, and the biggest source of air pollution in most cities. In the case of Paris, this is where emission reduction has been most evident since peaking in 2004. The city has been proactively promoting clean and active mobility, making significant improvement to public transport and cycling facilities over the last decade. A programme to remove diesel-powered vehicles from the commercial vehicle fleet – including refuse collection lorries – is also currently in progress.

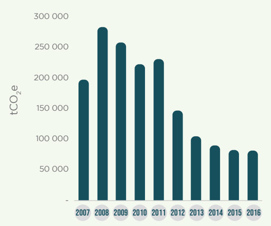
REDUCTION OF EMISSIONS FROM THE BETTER BUILDING PARTNERSHIP PROGRAMME



OPTIMISING ENERGY USE IN BUILDINGS
SYDNEY

Emissions in the City of Sydney peaked in 2007 and have dropped by a further 20% since, largely as a result of reduced energy use from the building sector, which contributes to over 80% of the city's emissions. The city has implemented a wide range of programmes, grants and incentives targeting building energy performance. City-owned buildings have undergone retrofitting projects, the use of clean energy has been scaled up and the city has established a Better Buildings Partnership, collaborating with property owners, managers and industry influencers. Representing more than half of Sydney CBD's commercial office floor space, the Better Buildings Partnership has achieved a 52% reduction in emissions in just over 10 years.

EMISSONS FROM LANDFILL IN VANCOUVER FROM 2007 TO 2016



62% WASTE DIVERTED IN 2016

AMOUNT COMPOSTED ↑ 90%

AMOUNT LANDFILLED ↓ 23%

LANDFILL GAS COLLECTION EFFICIENCY DOUBLED

IMPROVING WASTE MANAGEMENT
VANCOUVER

Waste management is a relatively minor contributor to GHG emissions at a global scale. Locally however, it can offer significant opportunities for emissions reductions and is one of the action areas that cities have more direct influence on. The City of Vancouver is a clear example of how this can be done, with improved waste management practices being an essential part of its vision to become the greenest city in the world by 2020. Between 2007 and 2016, Vancouver reduced the amount of waste sent to landfill by 23%, while seeing population grow by 10%. Over the same period, the city doubled the amount of waste composted and drastically improved the efficiency of the landfill gas collection system. As a result, emissions from landfill peaked in 2008, a year before the city's overall emissions peaked, and have reduced by 65 % since then.

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THE METHODOLOGY

Peaking GHG emissions means emissions reach a specific maximum level by a specific point in time before declining afterwards. With a long and continuous record of data series, the point when emissions switch from increasing to decreasing is considered the "peaking point". This analysis relies on emissions data reported by cities. A set of criteria has been developed, based on literature review, to identify and determine the cities that have peaked emissions:

1. ***The emissions reached a maximum level at least 5 years before the most recent inventory year.****
   Otherwise the change in emissions may be due to inter-annual variabilities caused by extreme weather or economic changes rather than indicating a long-term trend.
2. ***The latest inventory year is no more than 5 years old.***
   Otherwise it is not possible to confirm whether or not the peak has been reversed.
3. ***The emissions at peak level are at least 10% higher than the most recent inventory year.***
   Again, this is to eliminate "false" peaks due to economic changes etc. When looking at the average annual reduction rate in emissions in cities, the mean value is 2%, which is equivalent to a 10% reduction over a five-year period.
4. ***The city has made a public commitment to deliver further emission reductions.***

All criteria must be met in order to be considered as having peaked emissions.

Data sources and hierarchy

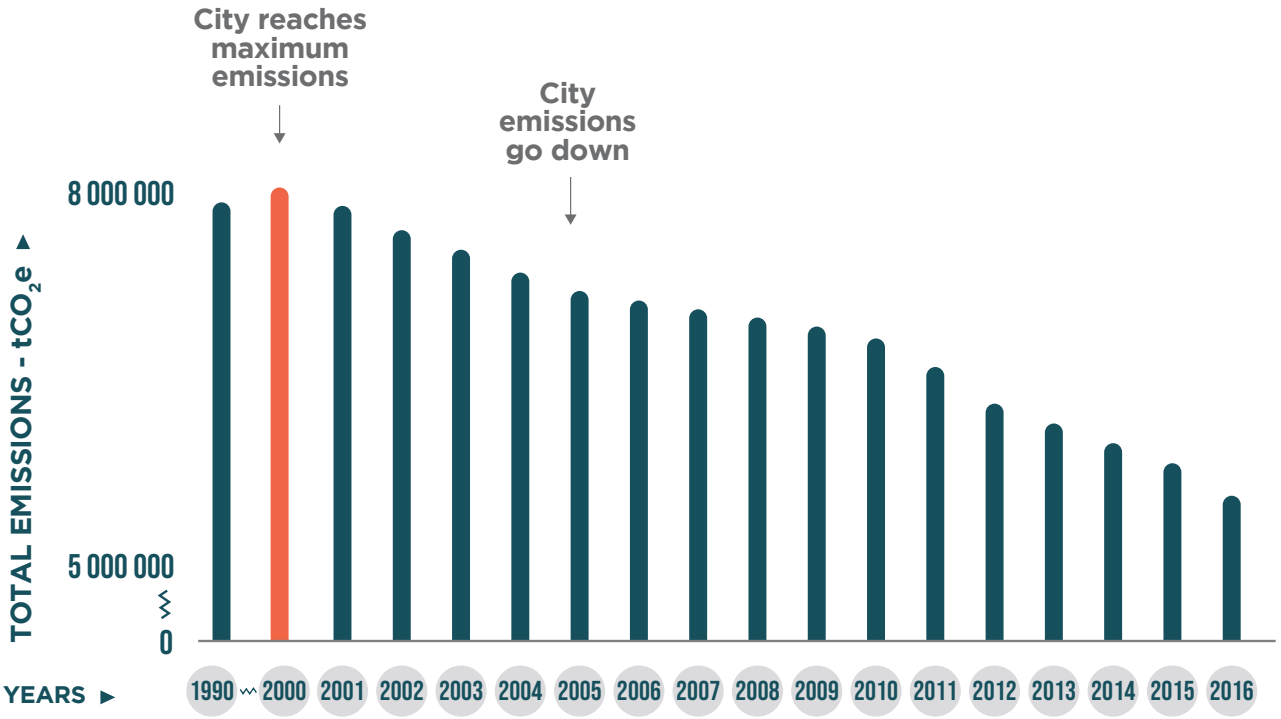
The preferred data source for this analysis are GHG emission inventories developed in line with the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC) standard. In the case where there are insufficient data points from GPC-compliant inventories, GHG emissions from published city climate action plans are used, followed by other data that cities have reported to the CDP or directly to C40.

GOT ANY QUESTIONS? Contact our team at measurement@c40.org

*Exception was made for Oslo based on the scale of reduction and climate actions taken in recent years

FIGURES (A CLOSER LOOK)

WHAT DOES PEAKING LOOK LIKE?



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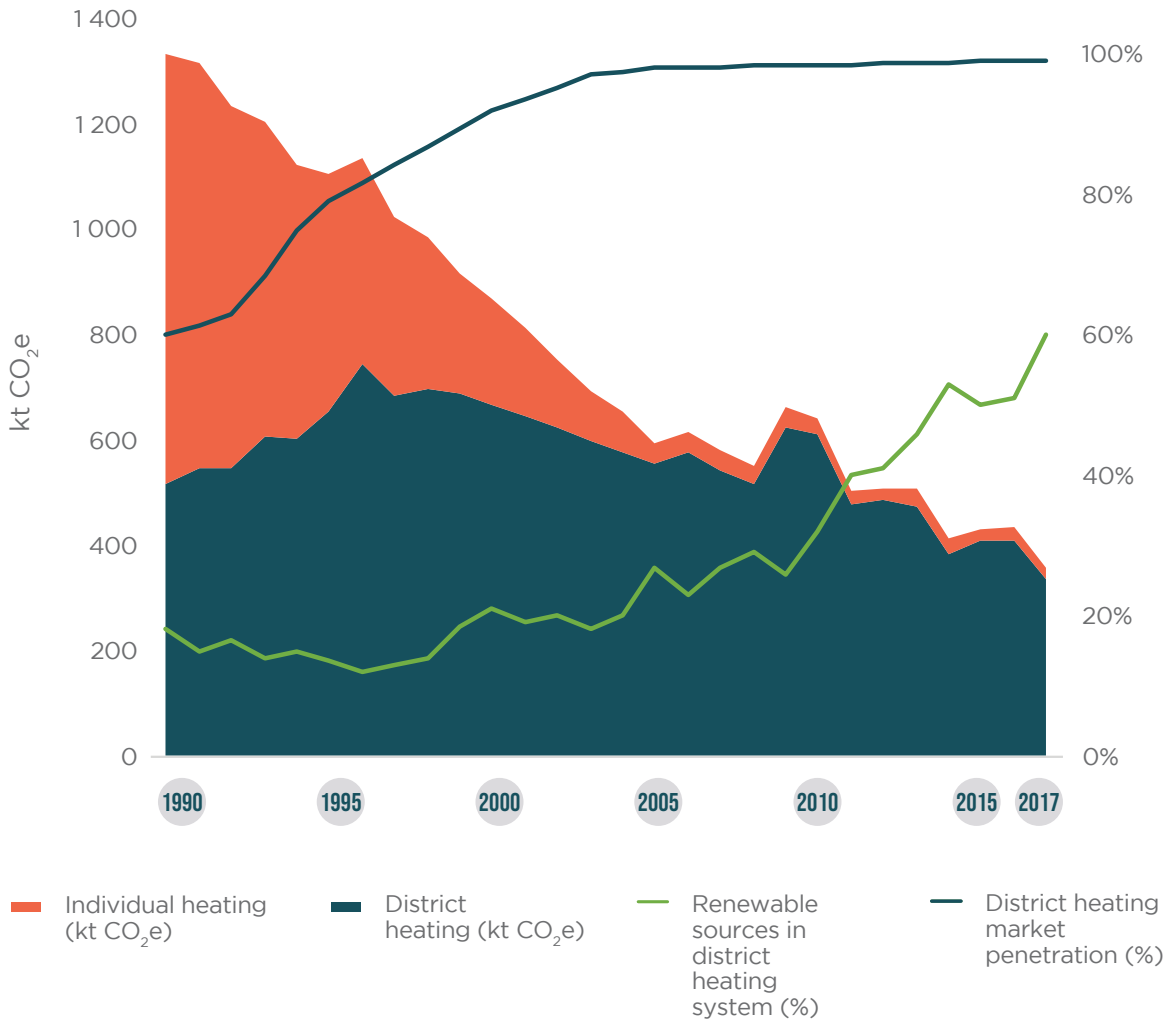

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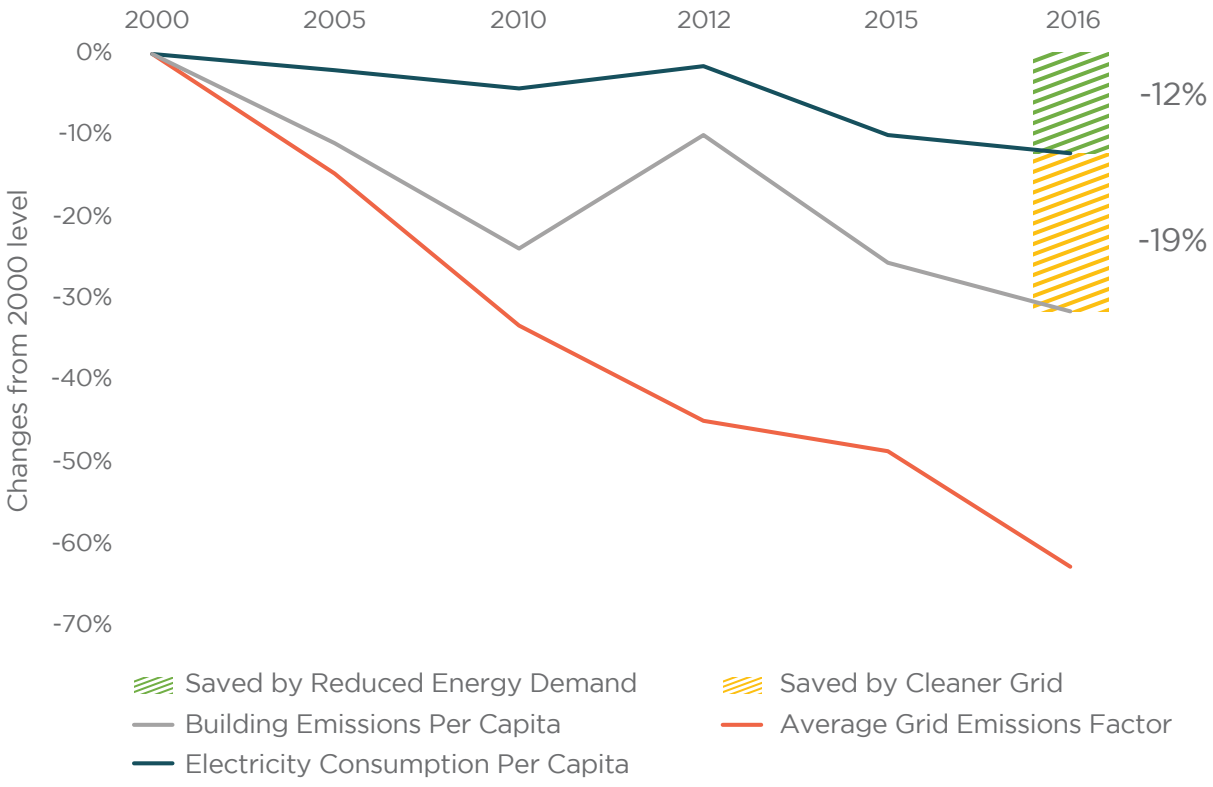

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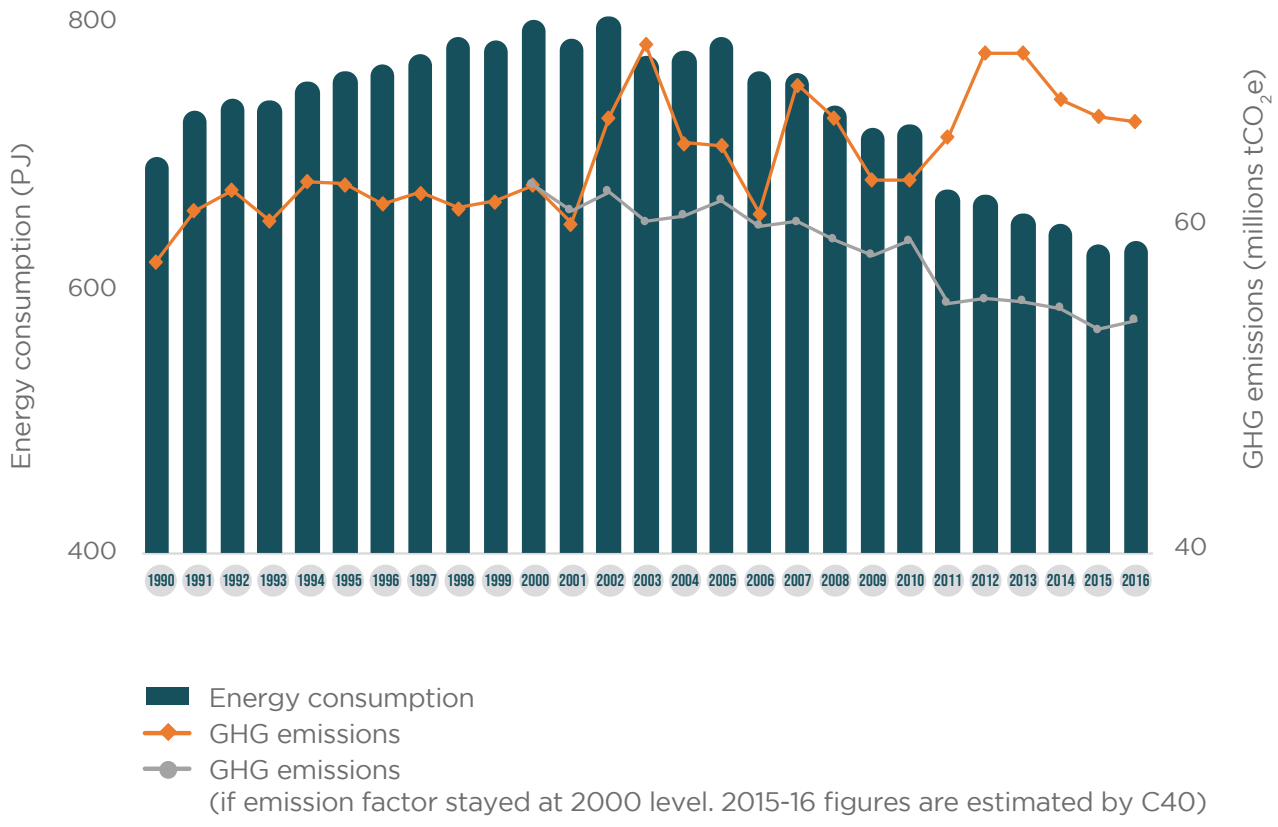

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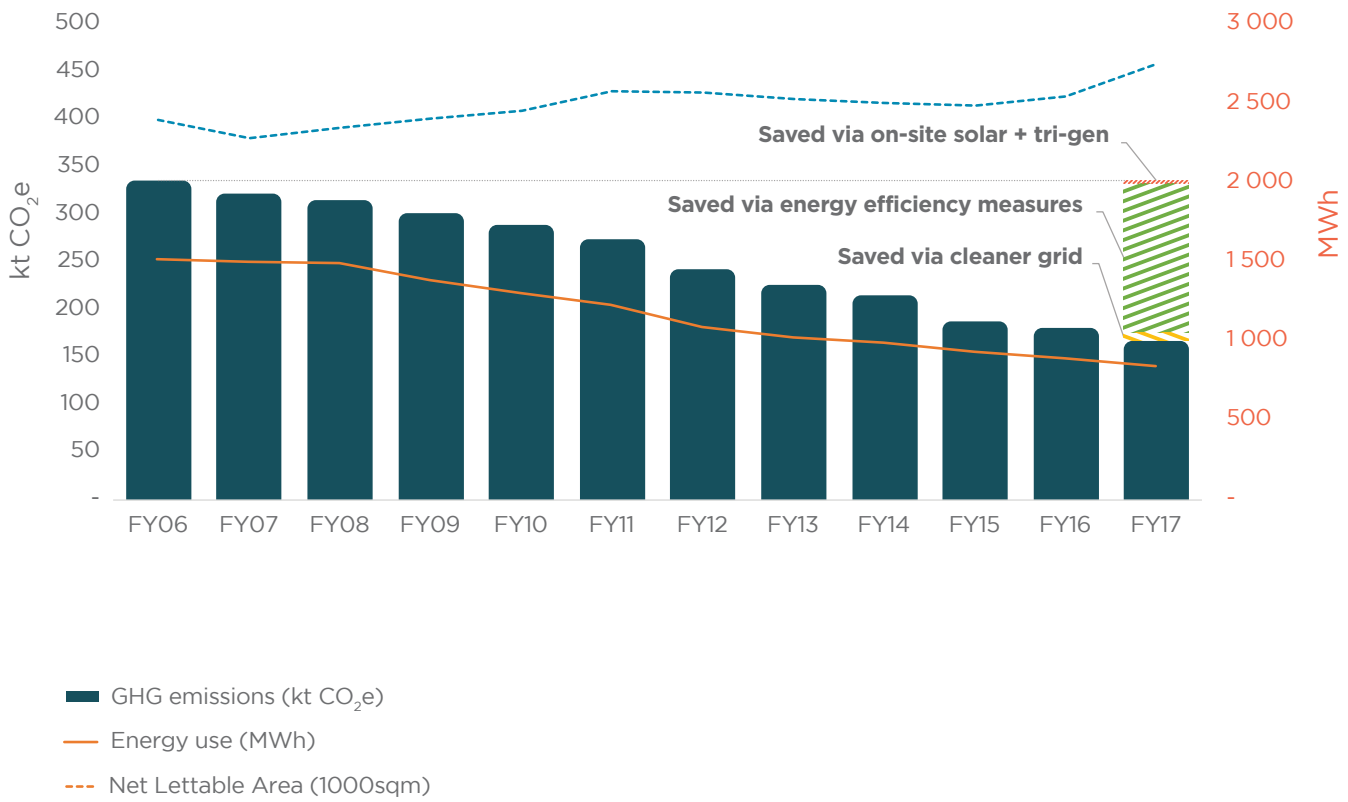

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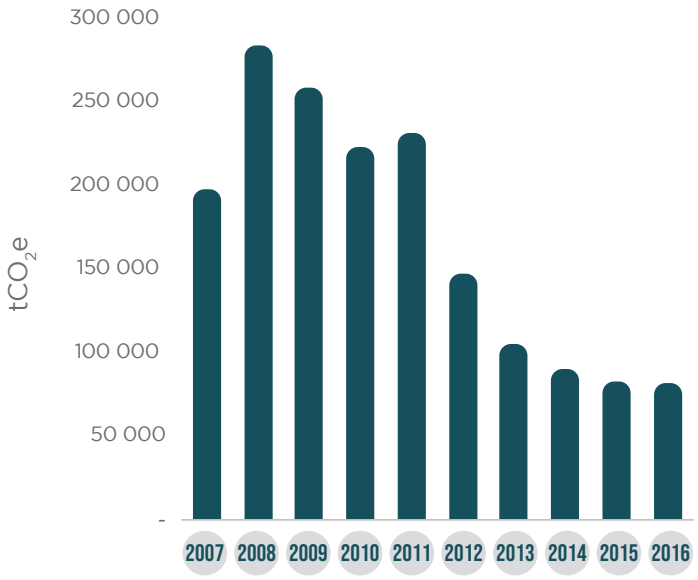

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