

# ACHIEVING

# ZERO

The background of the word 'ZERO' is a collage. It features a newspaper clipping with the headline 'What would best drive?' and sub-headlines 'American' and 's a'. Below this, there is a red circle and the text 'The New York Times' and 'The Guardian'. Another part of the clipping mentions '13 November' and 'ST'. At the bottom of the clipping, it says 'The American car' and 'in the top of' and 'as in the top of' and 'guzzling four-wheel-drive vehicles, is a lot to'. To the right of the clipping, there is a photograph of a car's interior, showing the dashboard and steering wheel.

Edward Mazria FAIA / FRAIC  
Architecture 2030

# 'What would Jesus drive?' gas-guzzling Americans are asked

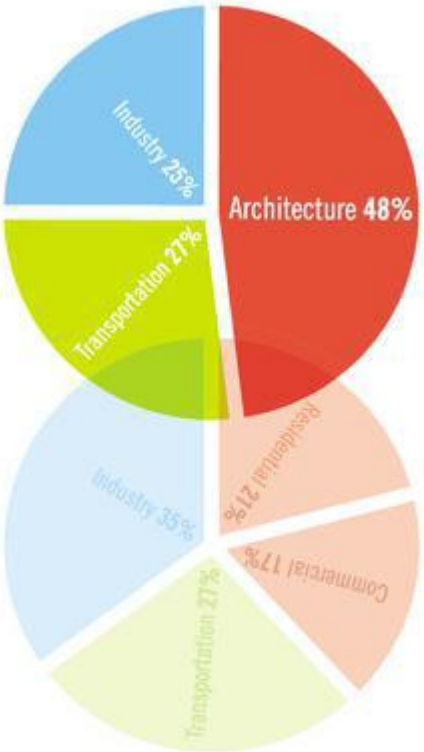
Oliver Burkeman in New York

The Guardian, Wednesday 13 November 2002 21.08 EST

The Midwestern United States, equally devout in its worship of God as in its worship of gas-guzzling four-wheel-drive vehicles, is about to be asked to choose between the two.

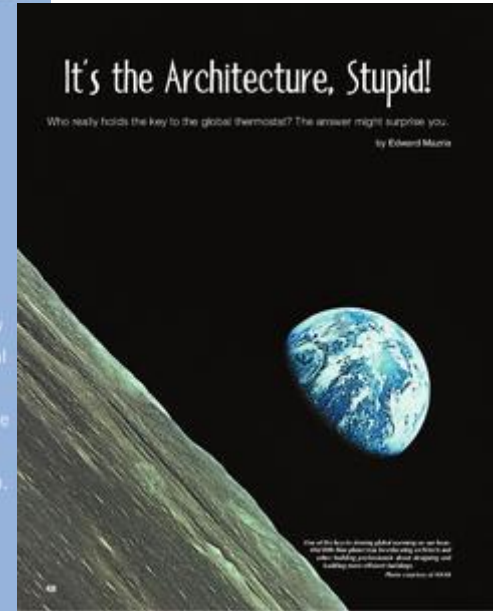
"What Would Jesus Drive?" is the slogan dominating a television advertising campaign about to blanket cities in Iowa, Indiana and Missouri, along with the southern state of North Carolina.





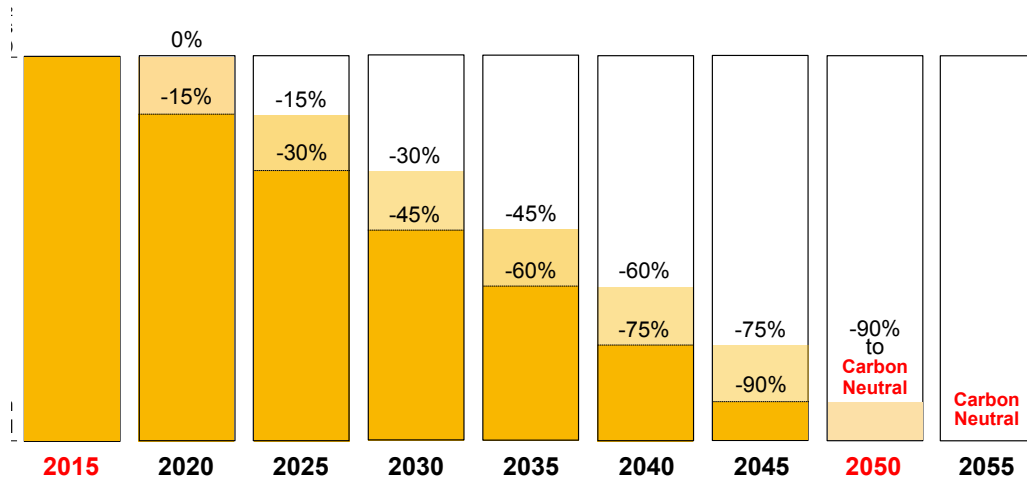
U.S. Energy Consumption by Sector

October 2003



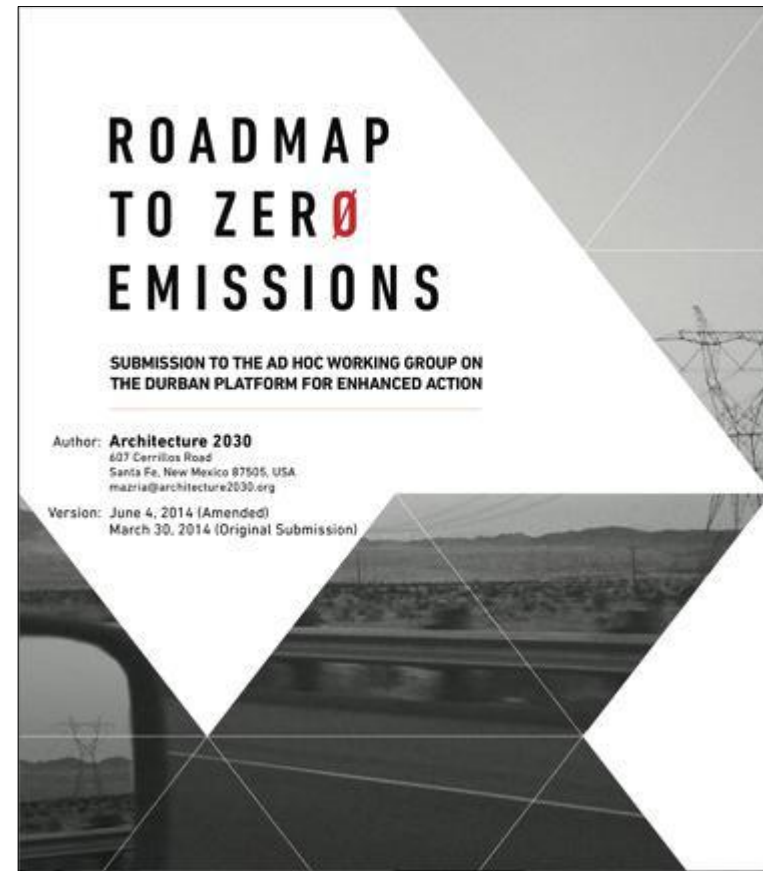
2006 - 50%  
2010 - 60%  
**2015 - 70%**  
2020 - 80%  
2025 - 90%  
2030 - carbon neutral





## Roadmap 2050

Total Building Sector CO<sub>2</sub> Emissions Targets 2015 - 2050



Organization of Economic Cooperation and Development (OECD CCXG), Paris  
UN Framework Convention on Climate Change (UNFCCC), Bonn



# METROPOLIS

## *World Architects Pledge Zero Carbon by 2050*

August 14, 2014  
Martin C. Pederson  
Durban, South Africa

The International Union of Architects (UIA), representing over 1.3 million architects in 124 countries, announced that it had unanimously adopted the **2050 Imperative**, a declaration that supports **phasing out all CO<sub>2</sub> emissions by the middle of the century.**



The UIA has announced that its members have adopted the 2050 Imperative, which hopes to phase out carbon-emitting buildings by the middle of the century. The move could produce more projects like Ronald Lu and Partners' Zero-Carbon Building in Hong Kong.



# CHINA ACCORD

October 22, 2015

## **52 International and Chinese Firms Sign Historic Accord to Tackle Climate Change**

Firms pledge to design cities, towns, urban developments, new buildings, and major renovations in China to low carbon/carbon neutral standards



# Zero Emissions by 2050

*how to decarbonise the built environment*

December 09 - Paris

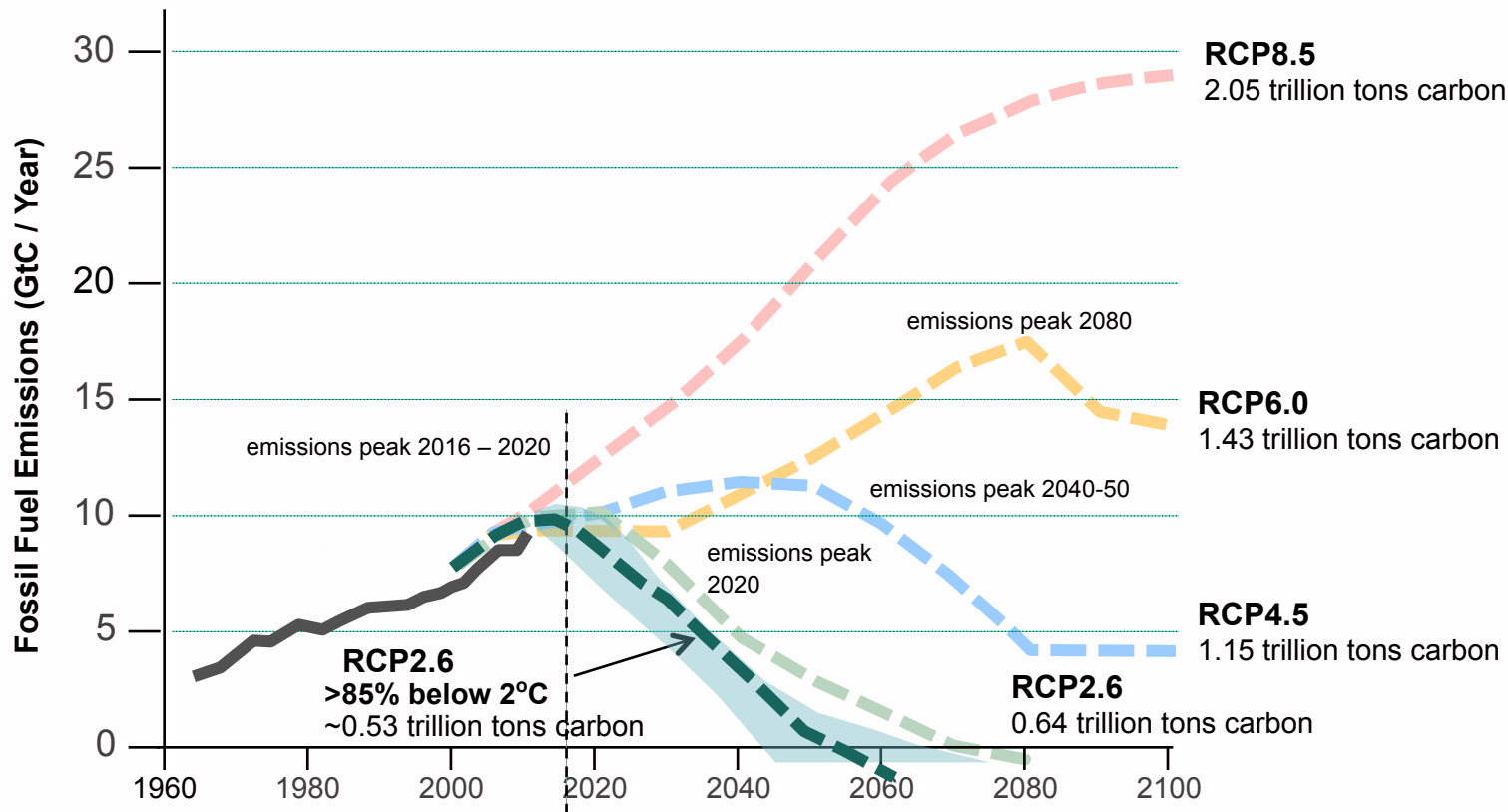




## LONG TERM GOAL:

To keep global average temperature increase  
“well below 2°C above pre-industrial levels and to pursue efforts  
to limit the temperature increase to 1.5°C.” December 12, 2015



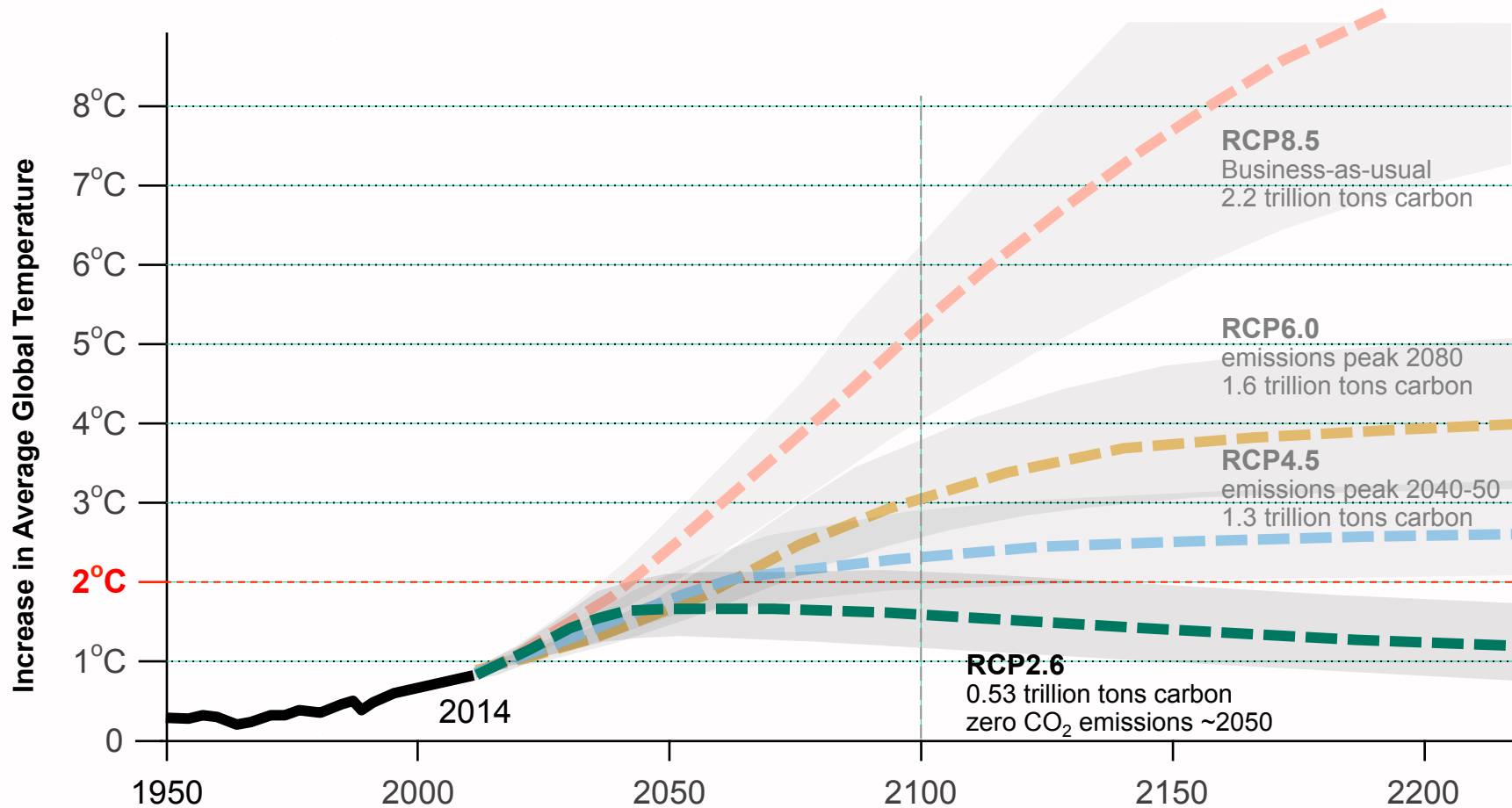


## Pathways for Fossil Fuel Carbon Emissions to 2100

Source: IPCC 2013, Representative Concentration Pathways (RCP); Stockholm Environment Institute (SEI), 2013; Climate Analytics and ECOFYS, 2014.

Note; Emissions peak and cumulative carbon budgets are for fossil fuel CO<sub>2</sub>–only emissions.







By 2030, world population is expected to be

**8.3 billion**

an increase of 1.1 billion people.






By 2030, world *urban population* is expected to increase by

**1.1 billion**

absorbing the entire population growth estimate.





Cities are responsible for approximately

**75%**

of all human-produced global greenhouse gas emissions.

UN Habitat



The percent of greenhouse gas emissions in cities attributed to

# Buildings:

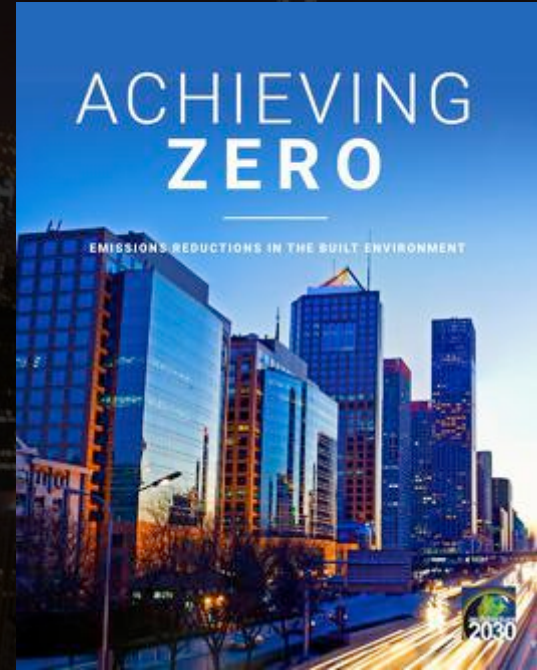
CITY	% emissions buildings
New York City	71%
Seoul	63%
Atlanta	66%
London	79%
Washington DC	76%
Sydney	84%
Vancouver	56%
Copenhagen	66%
Boston	73%
Los Angeles	54%



# ZNC

Zero Net Carbon

A highly energy efficient building that produces on-site, and/or procures, enough carbon-free renewable energy to meet all building energy consumption annually.

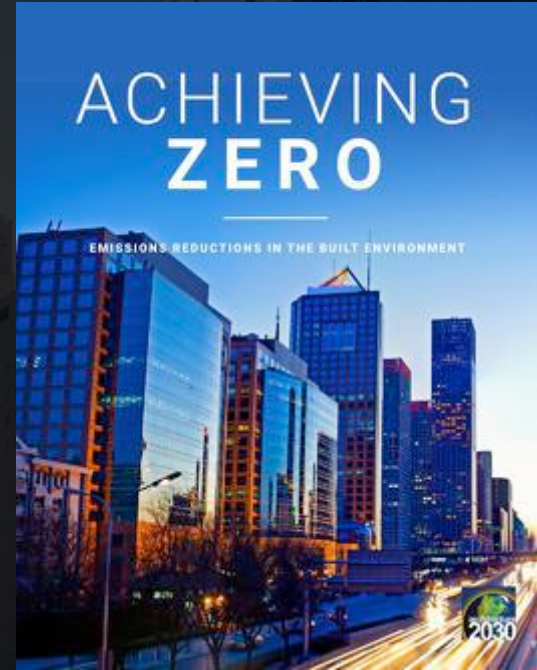


**high-performance  
new building design**

**deep efficiency renovations**

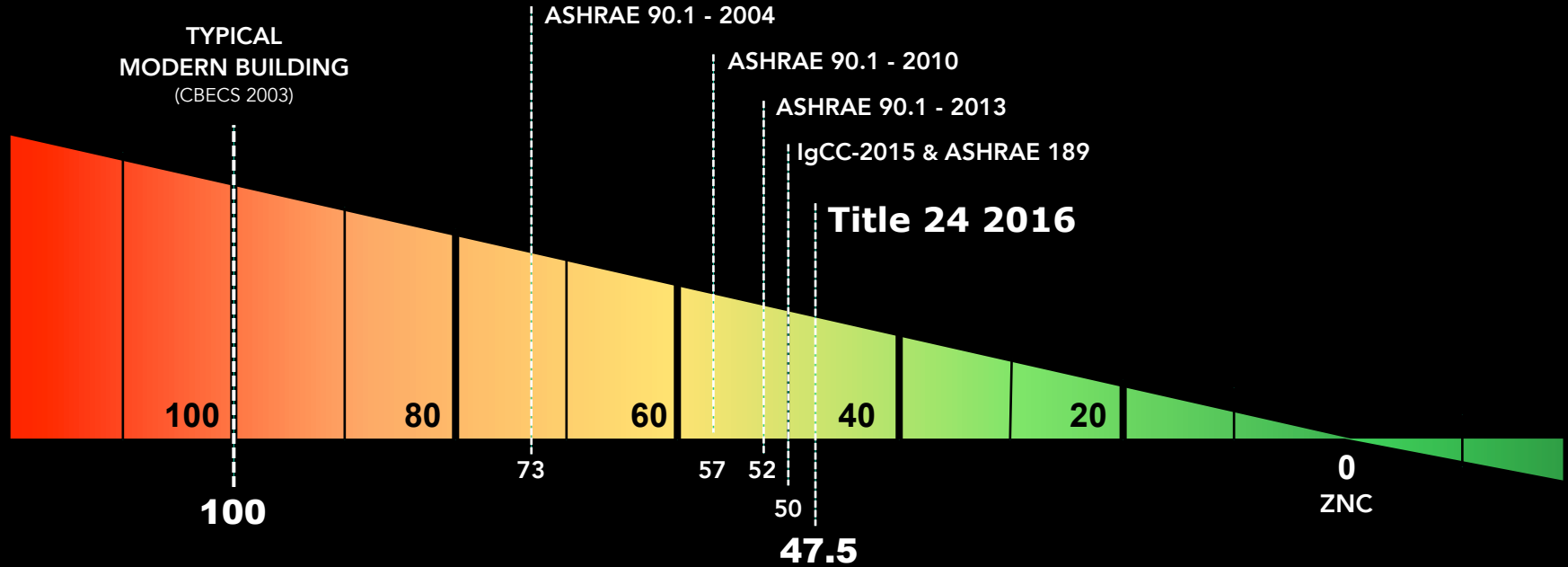
**+**

**renewable energy**



# ZERO<sub>Tool</sub>

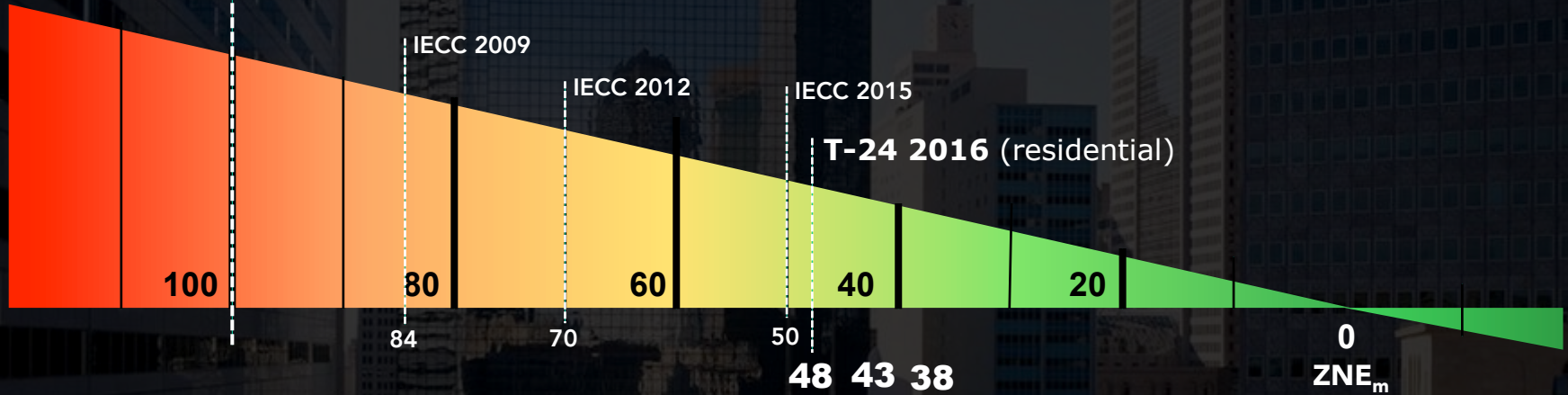
(Commercial)





# ZERO<sub>Tool</sub> (residential)

TYPICAL  
MODERN BUILDING  
(IECC 2006)



2016 Palo Alto Reach Code (PV)  
2016 Palo Alto Reach Code

# ZERO Tool

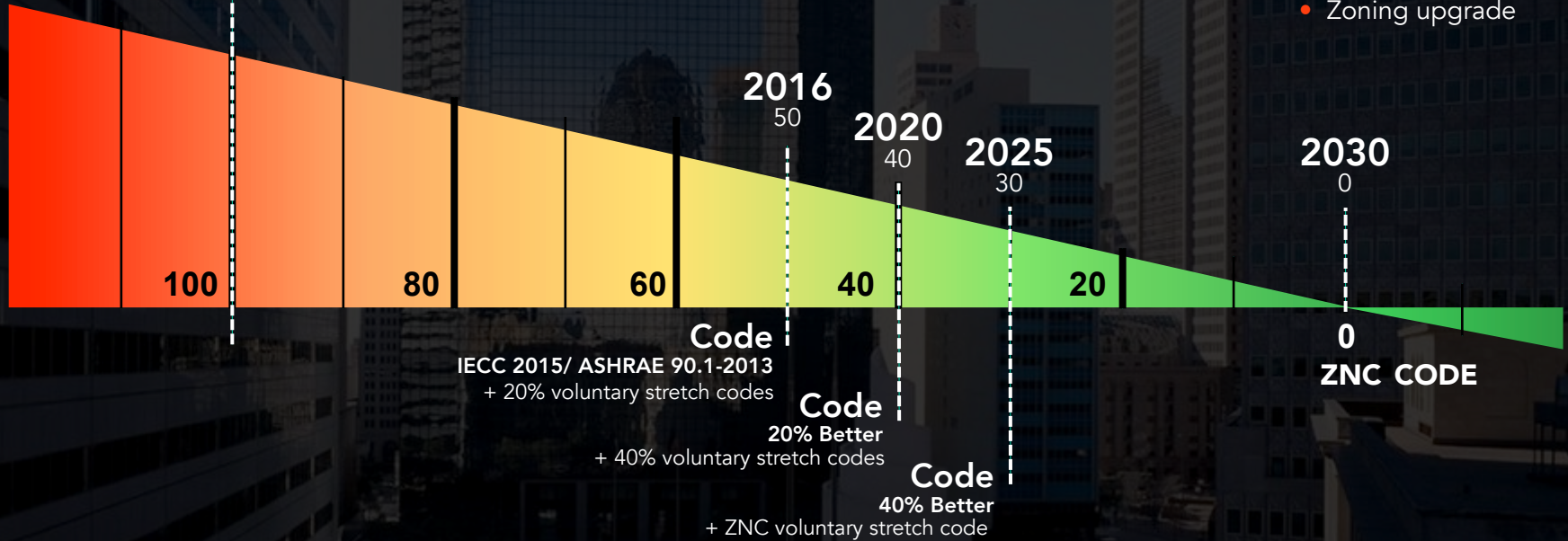
(residential / commercial)

## VOLUNTARY STRETCH CODES



- Fast track permitting
- Density bonus
- Tax credits / deductions
- Rebates / reduced fees
- PACE financing
- On-bill repayment
- Zoning upgrade

**TYPICAL  
MODERN BUILDING**  
(CBECs 2003, IECC 2006)







Building Energy  
**CODES**  
+ stretch codes,  
certifications



Building Construction  
**INTERVENTION POINTS**

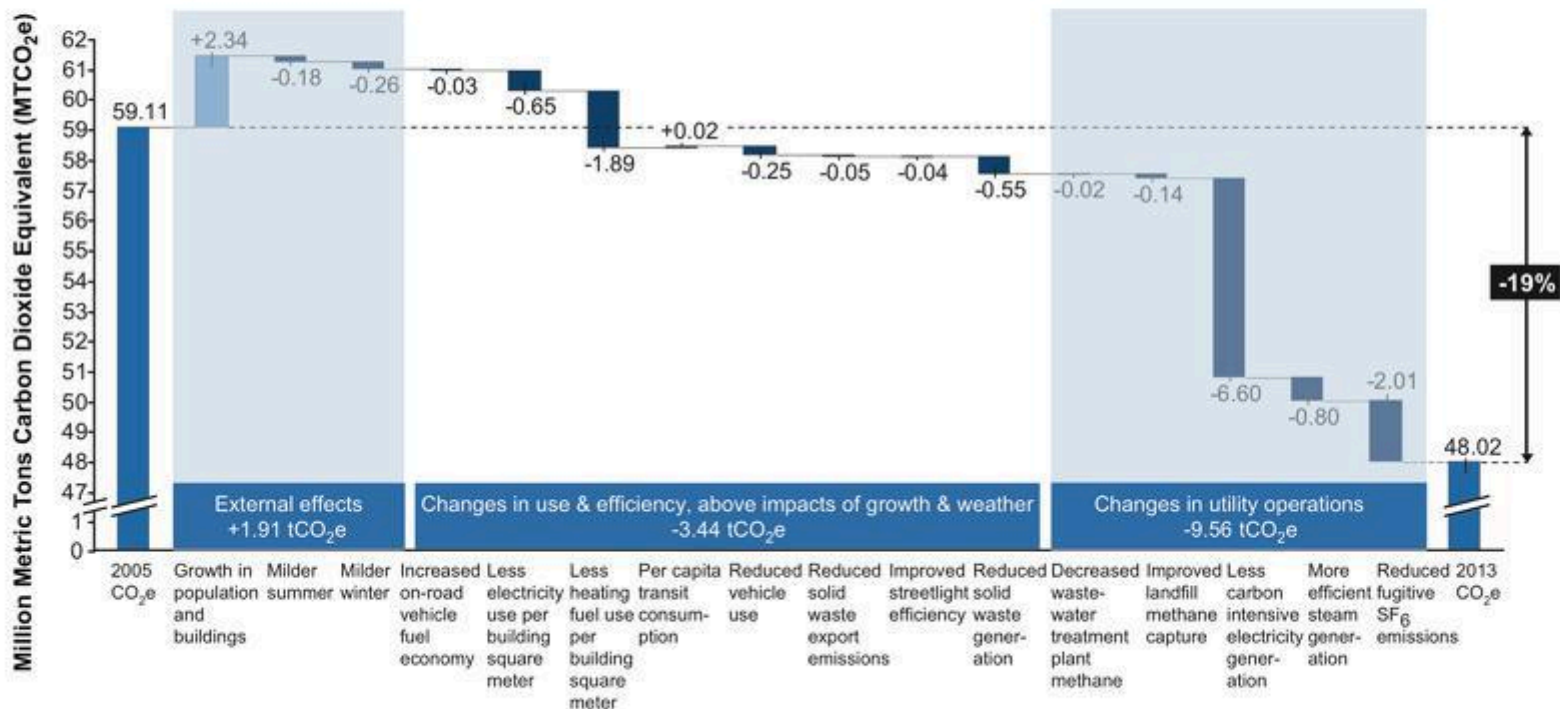
- New Buildings
- Major Renovations
- Zoning or Use Change
- **Building Purchases**



**RENEWABLE ENERGY**

- Regulation / Incentives
- Demand
- Market
- Finance

## New York City's Greenhouse Gas Emissions Drivers of Change, 2005-2013

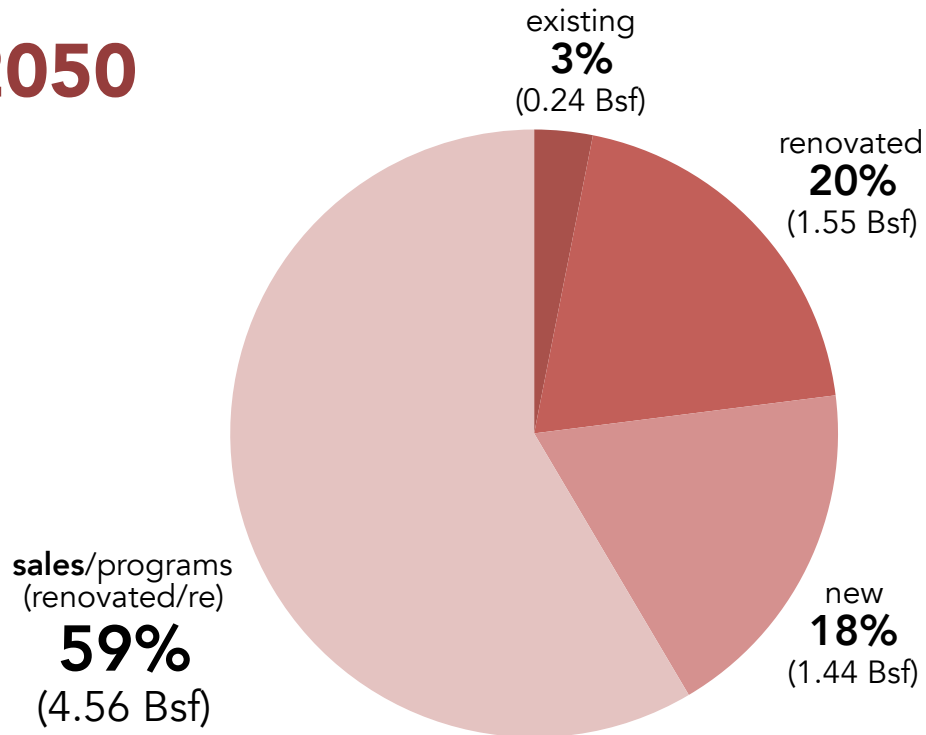


Source: New York City Mayor's Office of Long-Term Planning and Sustainability

# NEW YORK CITY

ACHIEVING  
ZERO

2050



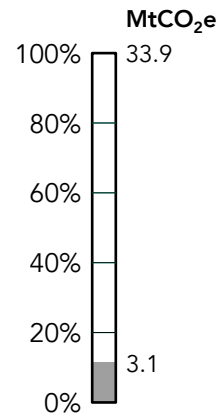
TOTAL BUILDING STOCK

**7.80 Billion sf**

Building Energy Code: ZNE Code

City-owned buildings = 0.28 Bsf  
NYC Housing Authority = 0.11 Bsf

## GHG Emissions







This Plan will  
create approximately  
\$5.8 billion dollars  
in construction  
each year, and create

**82,780**  
new jobs ***annually.***

Construction  
industry jobs:

**32,855**

Indirect jobs:

**26,232**

Induced jobs:

**23,693**



## TAX REVENUE FOR THE CITY

This Plan will create about

**\$500 million**

In City tax revenue ***annually.***

- renovate public housing
- fund training programs
- incentives for stretch codes



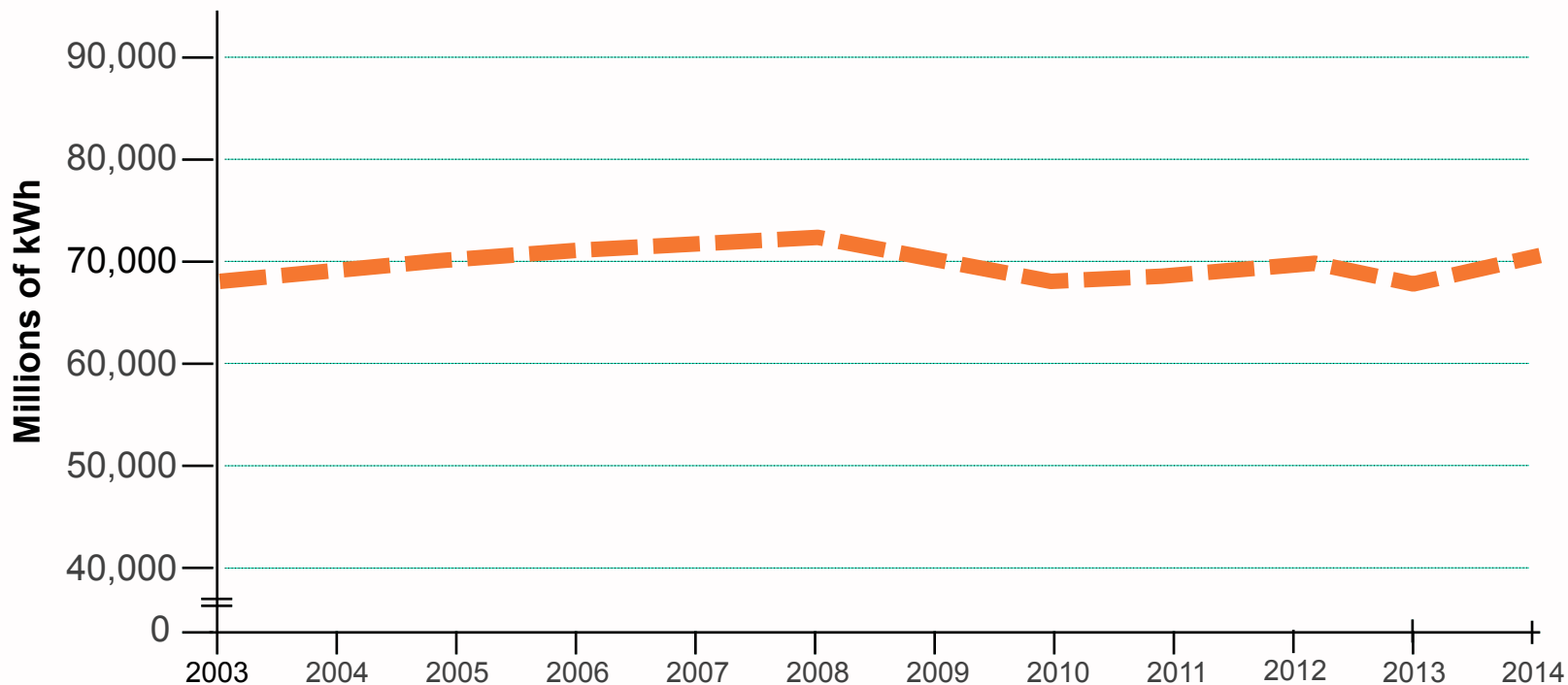


## HITTING THE MARK

This Plan will:

- reduce Building Sector GHG emissions by 30.8 MtCO<sub>2</sub>e, or **91%** by 2050.





## LOS ANGELES COUNTY ELECTRICITY CONSUMPTION (Buildings)

Source: California Energy Commission



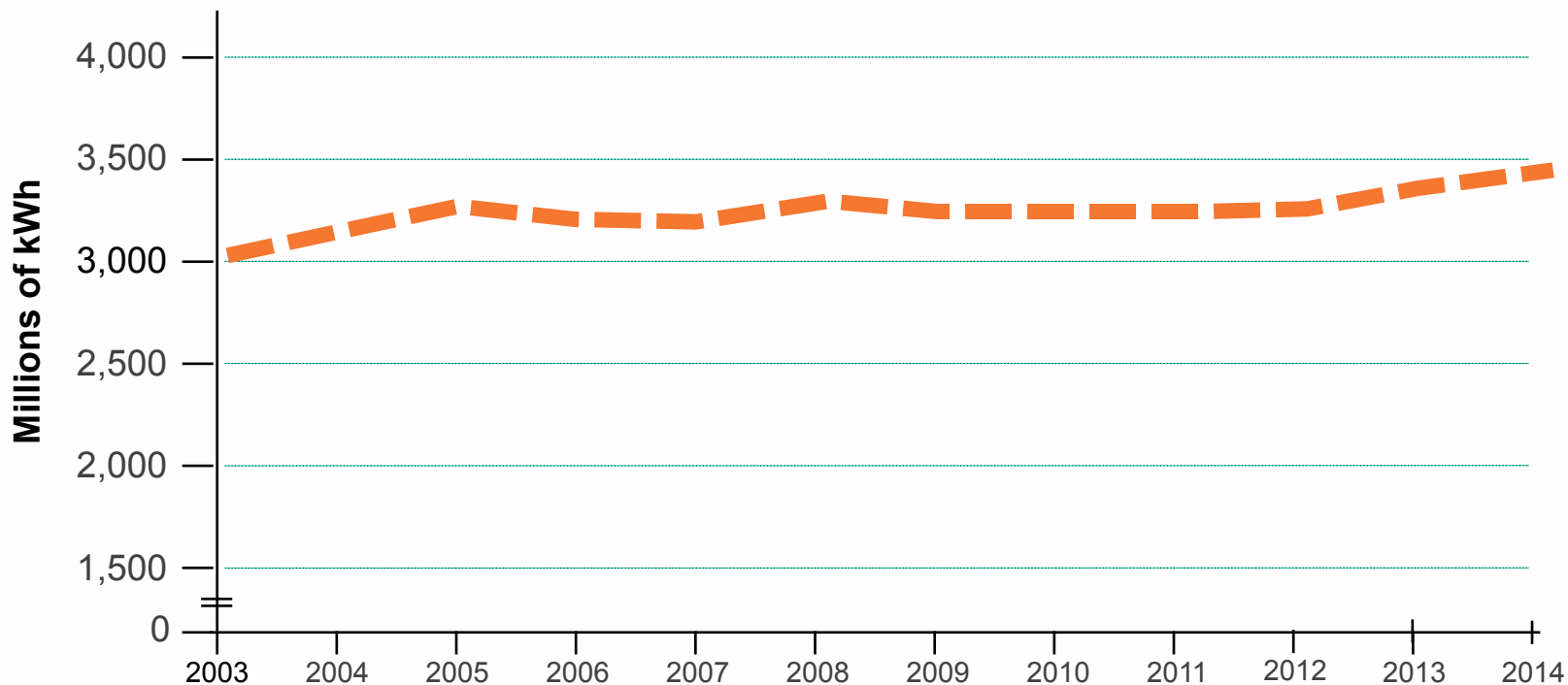


## LOS ANGELES COUNTY GAS CONSUMPTION (Buildings)

Source: California Energy Commission



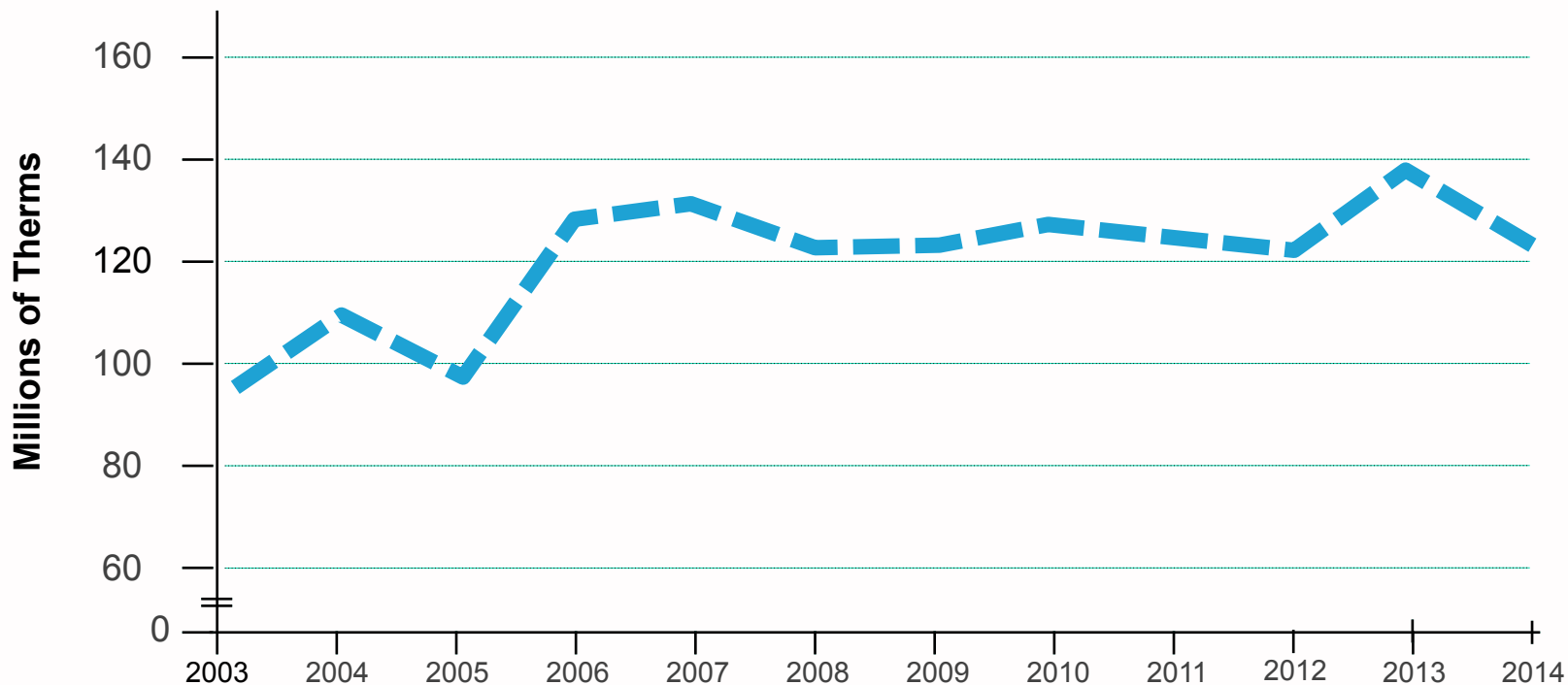




## SANTA BARBARA COUNTY ELECTRICITY CONSUMPTION (Buildings)

Source: California Energy Commission





## SANTA BARBARA COUNTY GAS CONSUMPTION (Buildings)

Source: California Energy Commission

