



**International  
Energy Agency**  
Secure  
Sustainable  
Together

# World Energy Outlook, Energy Efficiency and Cities

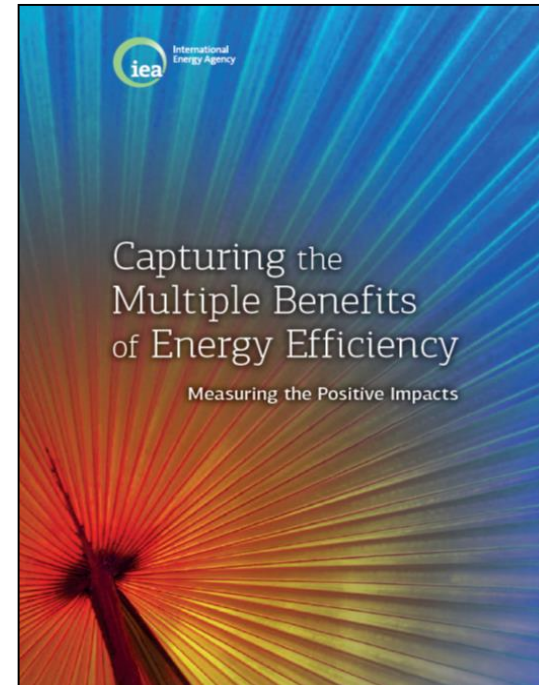
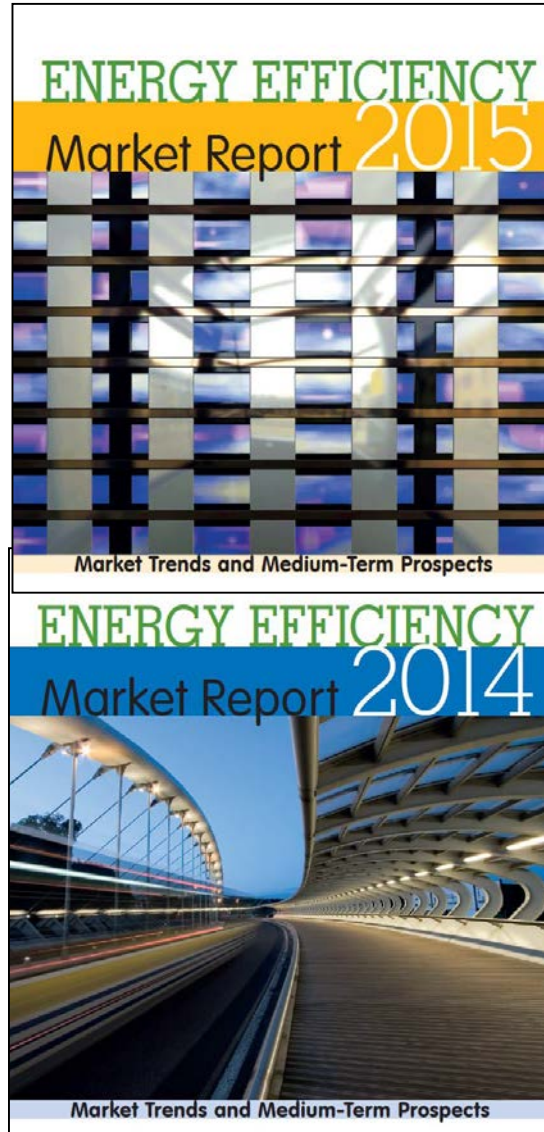
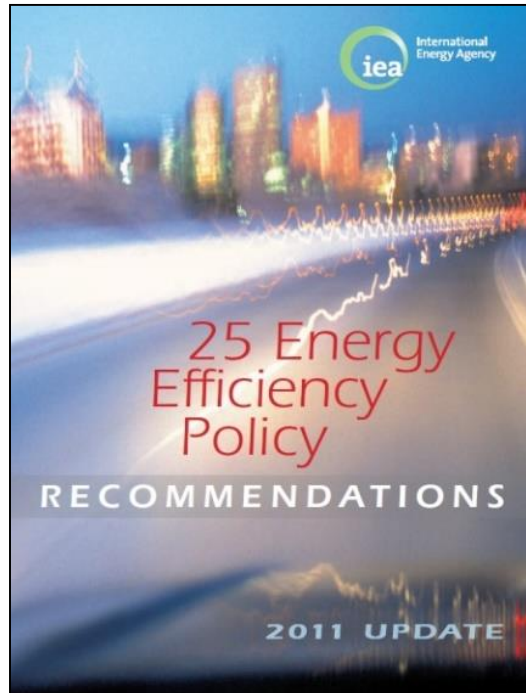
*Brian Motherway*

*Head of Energy Efficiency Division*

*International Energy Agency*

*International Conference on Energy Efficiency in Cities*

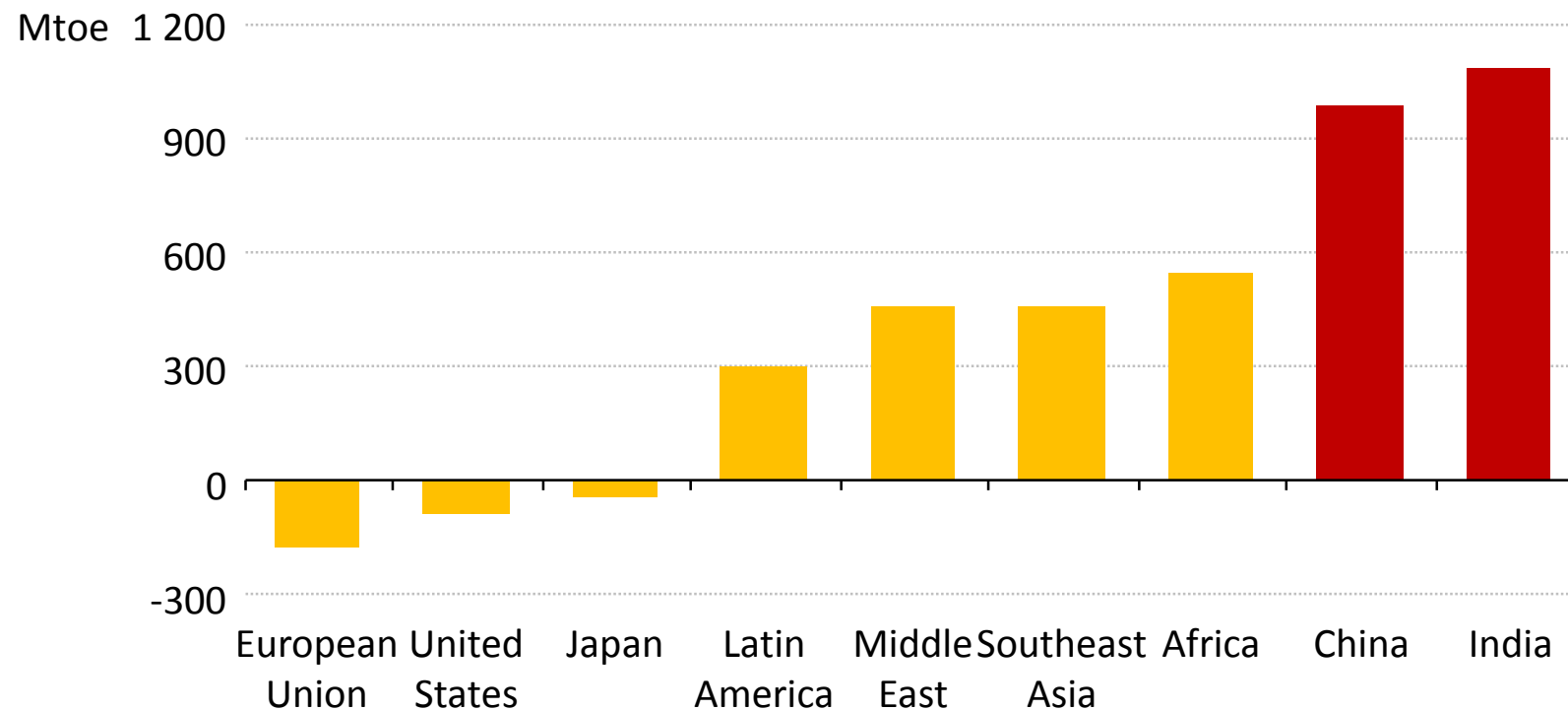
# IEA and Energy Efficiency



# The start of a new energy era?

- **2015 saw lower prices for all fossil fuels**
  - Oil & gas could face second year of falling upstream investment in 2016
  - Coal prices remain at rock-bottom as demand slows in China
- **Signals turned green ahead of key Paris climate summit**
  - Pledges of 150+ countries account for 90% of energy-related emissions
  - Renewables capacity additions at a record-high of 130 GW in 2014
  - Fossil-fuel subsidy reform, led by India & Indonesia, reduces the global subsidy bill below \$500 billion in 2014
- **Multiple signs of change, but are they moving the energy system in the right direction?**

## Change in energy demand in selected regions, 2014-2040

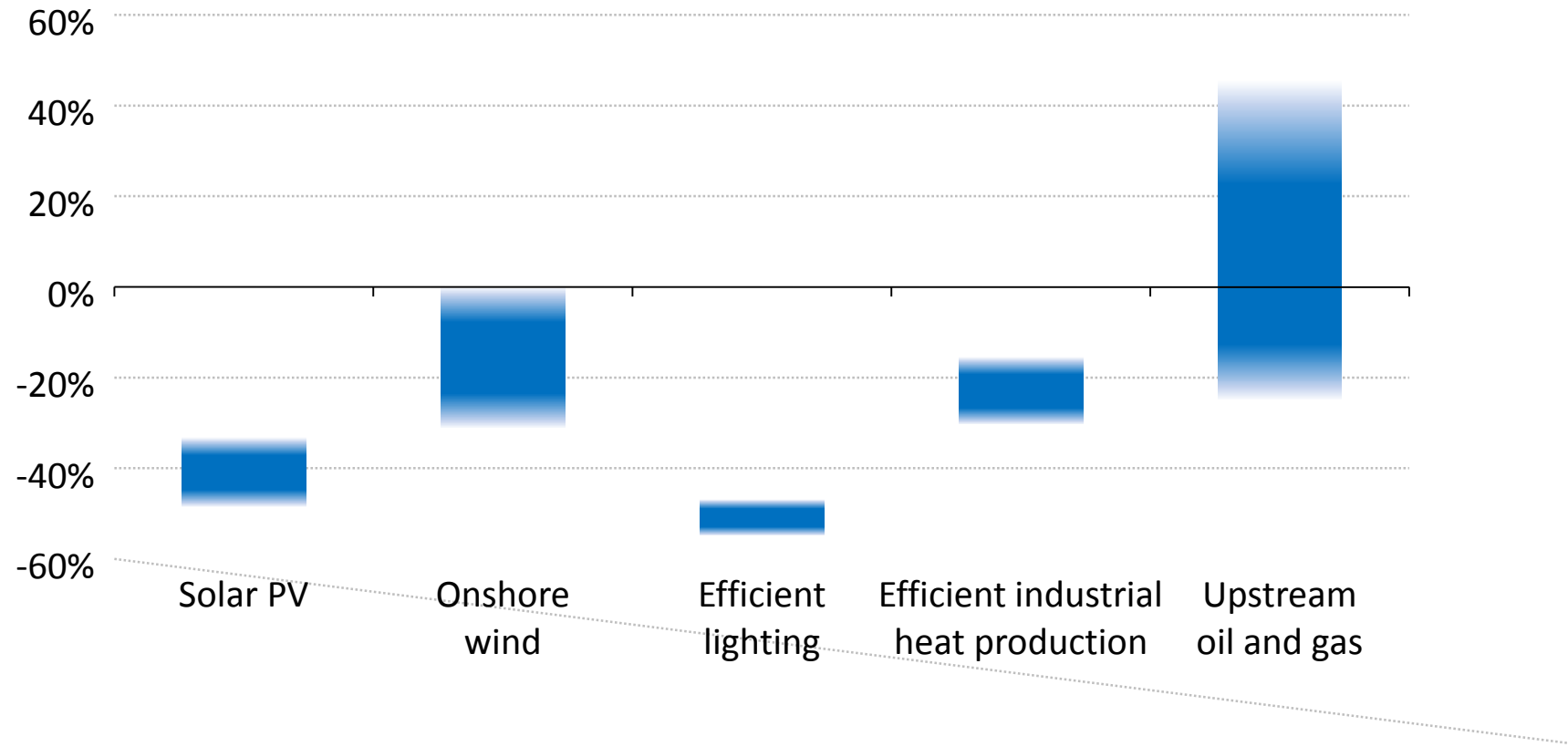


***By 2040, India's energy demand closes in on that of the United States, even though demand per capita remains 40% below the world average***



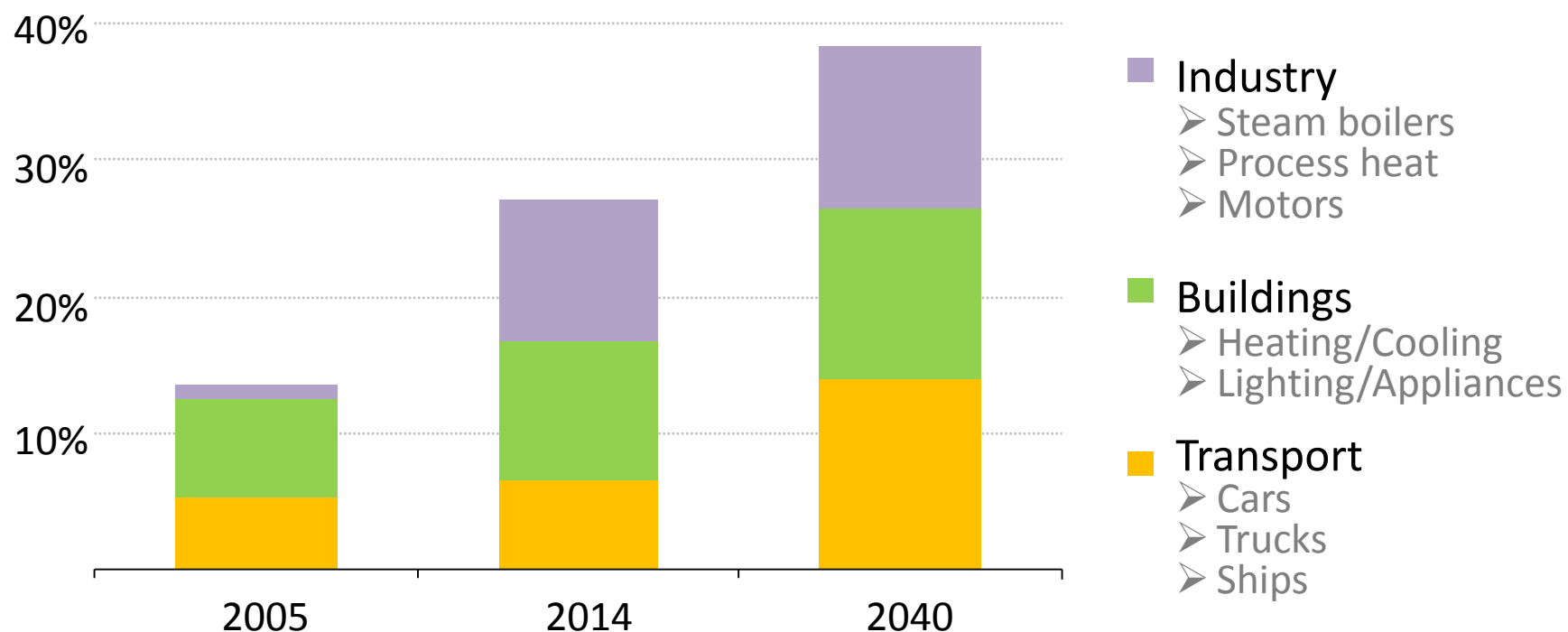
# Policies spur innovation and tip the balance towards low-carbon

## Costs in 2040 for different energy sources/technologies, relative to 2014



# Efficiency measures on the rise, but significant potential still exists

## Share of global mandatory efficiency regulation of final energy consumption



***Energy efficiency policies are introduced in more countries and sectors;  
they continue to slow demand growth but more can be done***



# ENERGY EFFICIENCY IS OF GROWING IMPORTANCE



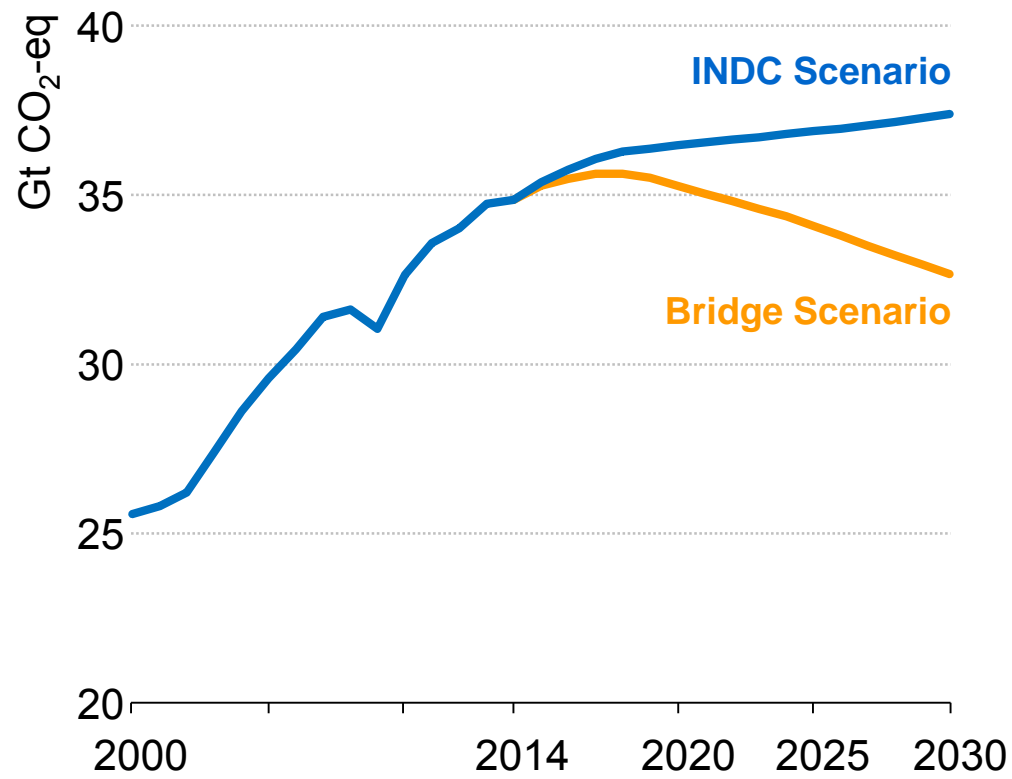
## 195 Nations agreed

*(...) to uphold and promote regional and international cooperation in order to mobilize stronger and **more ambitious climate action** by all Parties and non-Party stakeholders, including civil society, the private sector, financial institutions, **cities and other subnational authorities, local communities** and indigenous peoples*

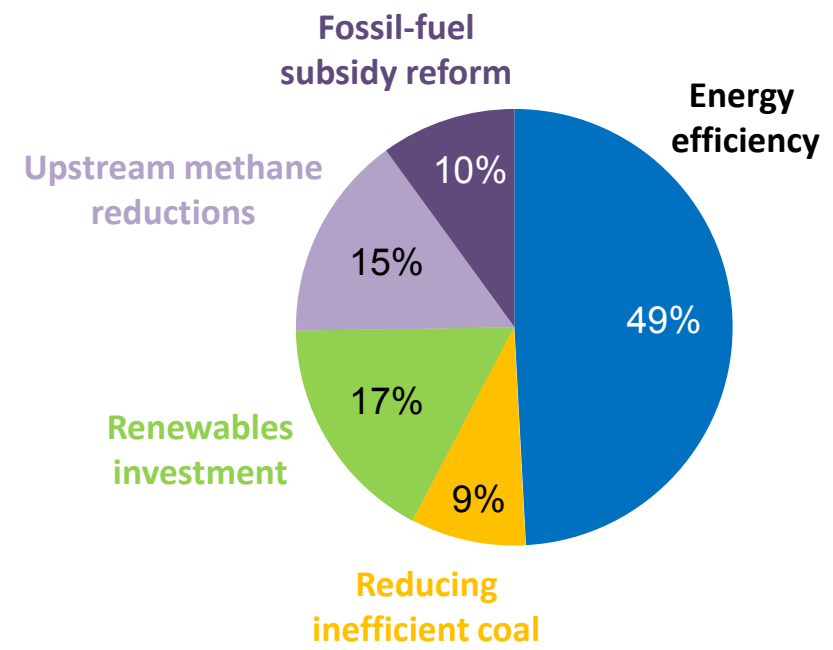


# The IEA's Bridge Scenario

Global energy-related GHG emissions



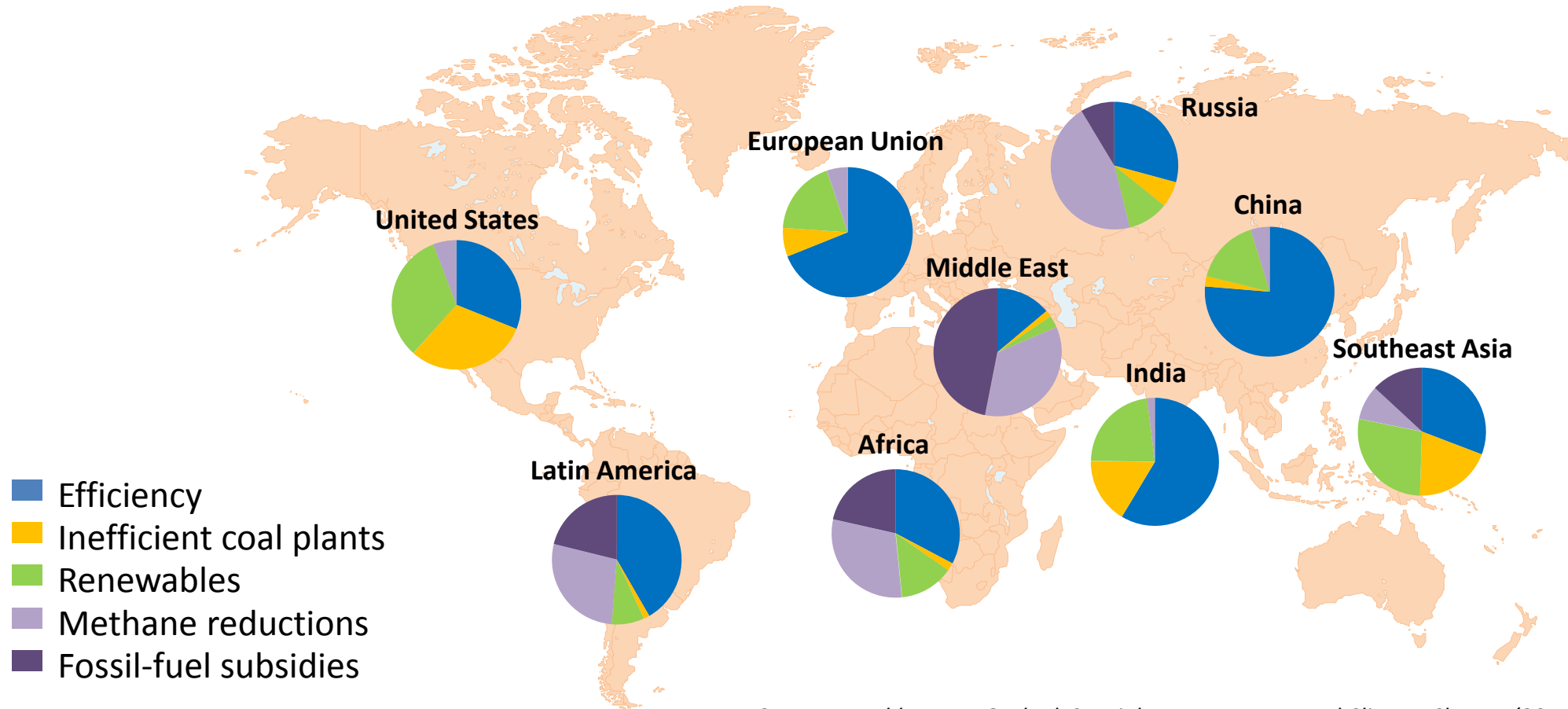
Savings by measure, 2030



Source: World Energy Outlook Special Report: Energy and Climate Change (2015).

**Five measures – shown in a “Bridge Scenario” – achieve a peak in emissions around 2020, using only proven technologies & without harming economic growth**

# IEA's Bridge Scenario by Region

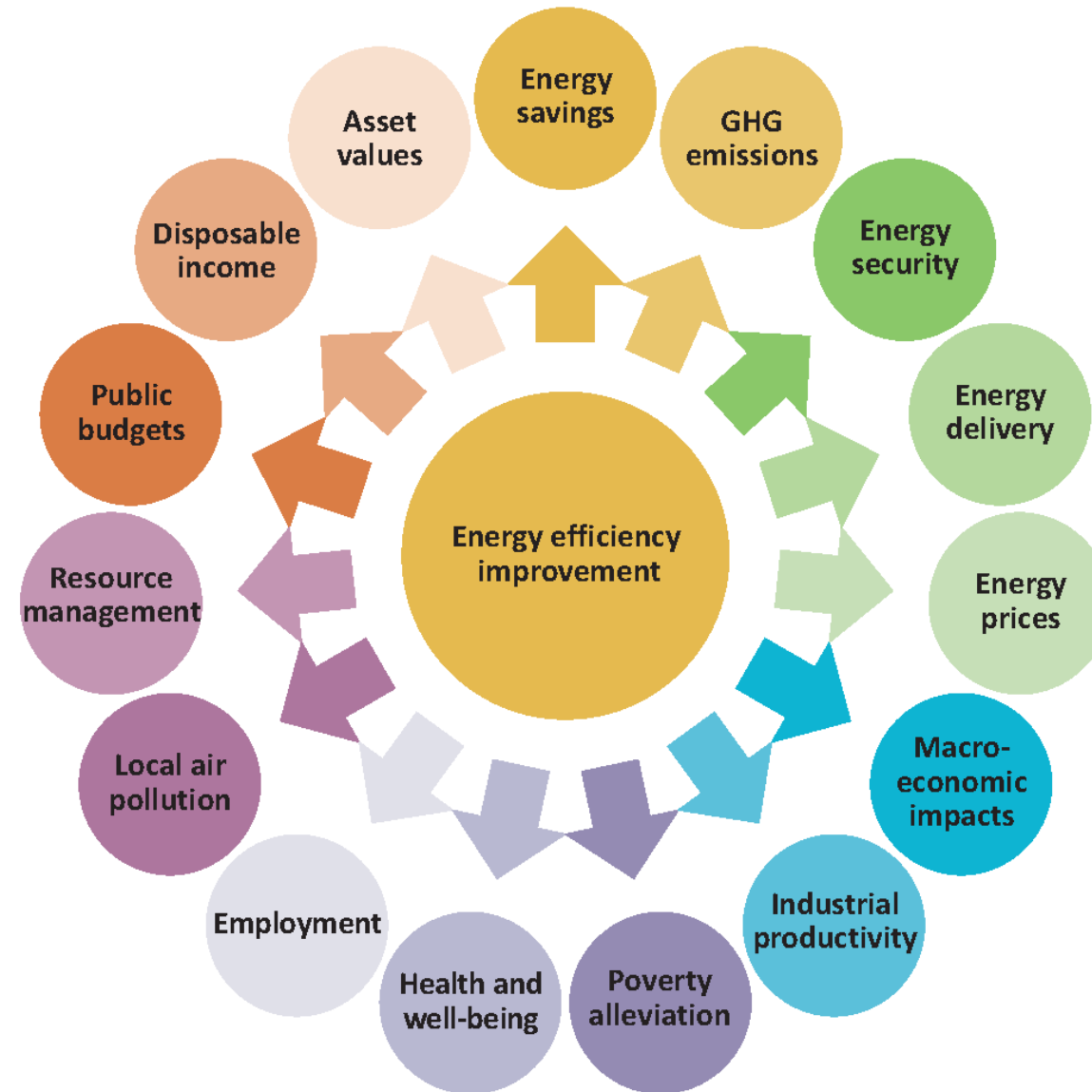


Source: World Energy Outlook Special Report: Energy and Climate Change (2015).

***The measures in the Bridge Scenario apply flexibly across regions, with energy efficiency & renewables as key measures worldwide***

# The Multiple Benefits of Energy Efficiency

***Energy efficiency is a means to support economic and social development at national and local level***



Source: *Capturing the Multiple Benefits of Energy Efficiency* (2014).

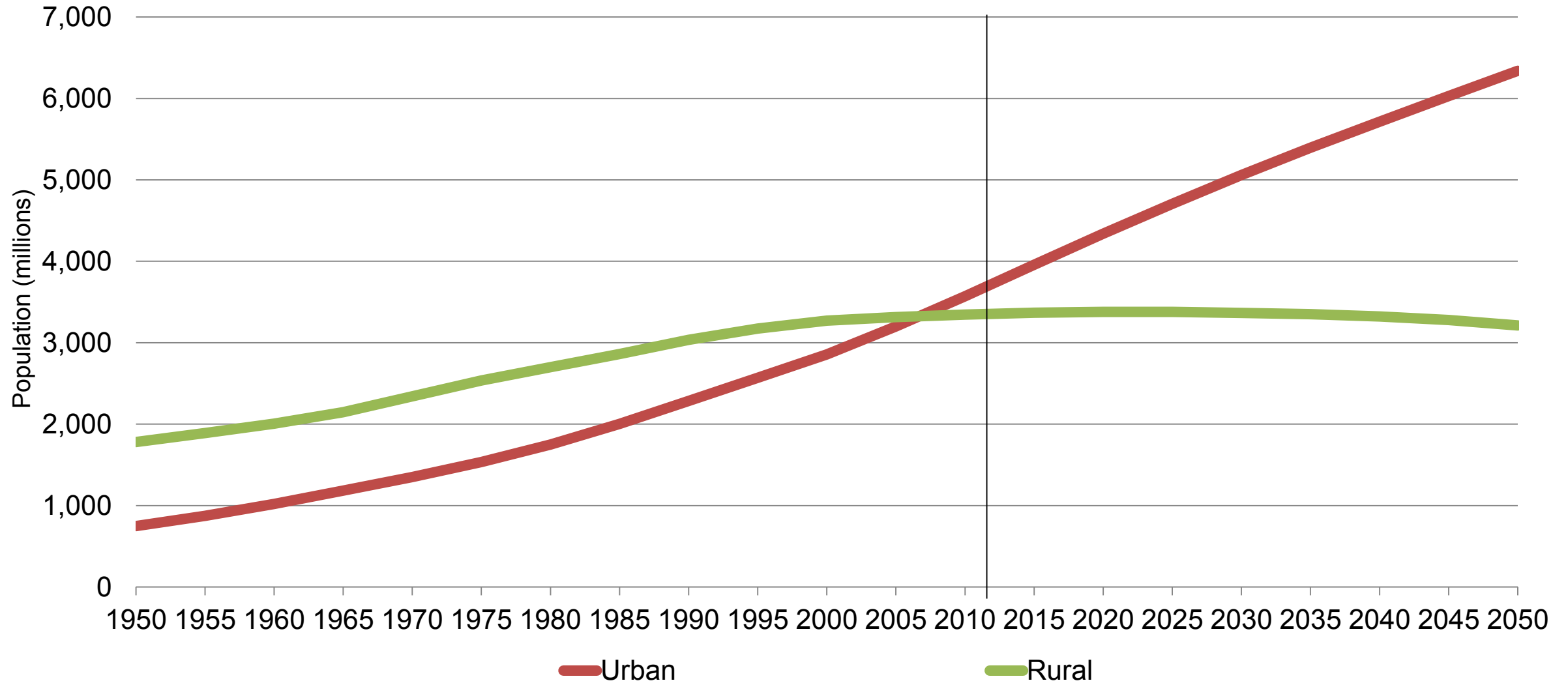


# CITIES ARE UNIQUELY IMPORTANT





# Growing urban populations










Source: United Nations, Department of Economic and Social Affairs, Population Division (2014). *World Urbanization Prospects: The 2014 Revision*

HOME » NEWS » EARTH » ENVIRONMENT » CLIMATE CHANGE

## Megacities will save mankind, not doom it

Today's cities might seem gridlocked by traffic and choking in air pollution, but urban planning might actually be our only hope

 290
 
 0
  38
  328
  Email



### The new era of urban humanity

Most people now live in cities, the UN declares, and more will follow, perhaps marking the 21st century as the Urban Era. Why the attraction to cities? Perhaps it shows rising hopes for progress.

By the Monitor's Editorial Board | JULY 11, 2014

[Save for later](#)



## Seeing mega-cities in a fresh light

**A SHIFT IN THOUGHT** With most of humanity now living in urban areas, architecture's most important award, the Pritzker Prize, has gone to a Chilean whose housing designs reflect the view of the urban poor: that cities are islands of promise and opportunity, not problems to be fixed.

By the Monitor's Editorial Board | JANUARY 14, 2016

[Save for later](#)



How the rise of the megacity is changing the way we live

The rapid increase in the number of cities home to more than 10 million people will bring huge challenges ... and opportunities

[Click here for a graphic charting the rise of the megacity](#)

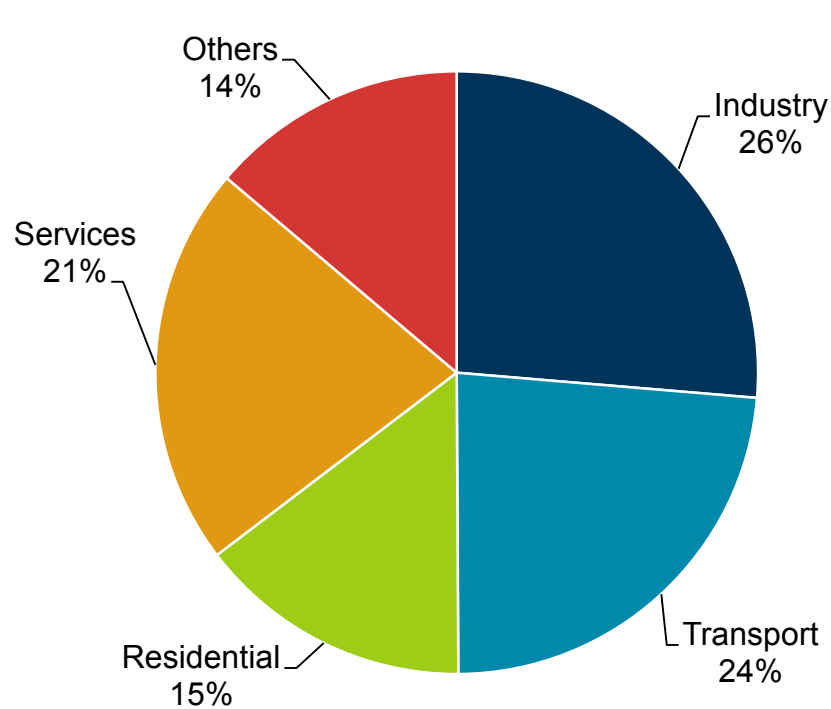




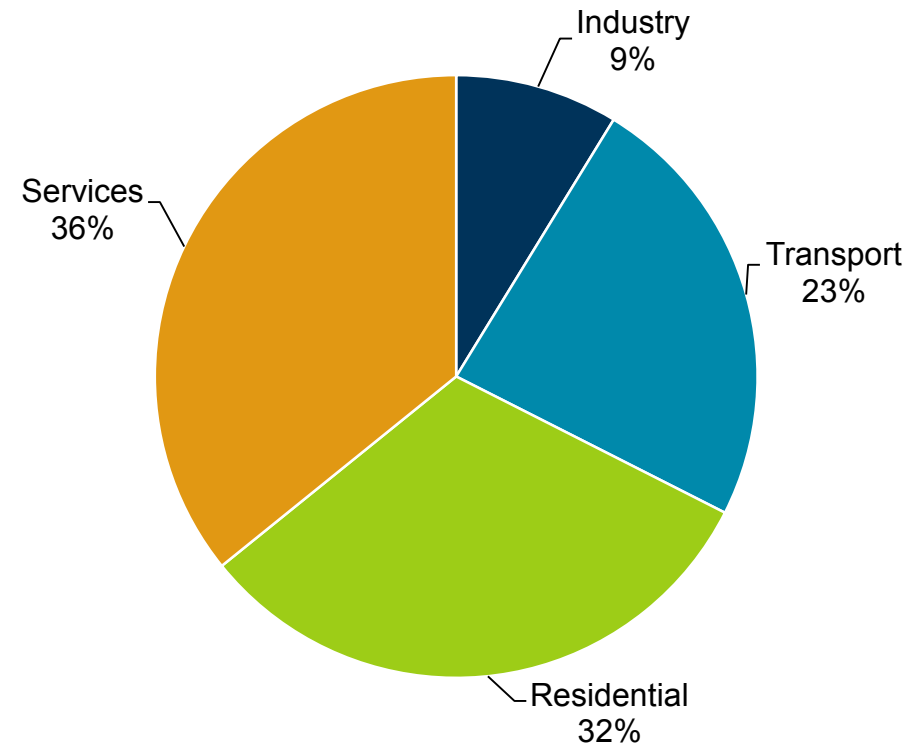
# Distinct energy patterns

## Japan Vs Tokyo

### Total Final Energy Consumption



**Japan (2013)**



**Tokyo (2012)**

Source: Energy Efficiency Market Report 2015

# The national and the local

- Cities have influence, but are often takers of national policy and structures
- National policy needs to enable cities, but that is not always the same as devolving
- There is always room for innovative action by cities

## Distinct characteristics

- Key implementers and enforcers of national policy
- Policy innovators, when allowed
- Close to the action
- Capacity to act

## Distinct roles

- Land-use and transport planning
- Service delivery
- Energy management



## Energy Management

- Energy Data Collection and Analysis
- Energy Management Systems for Municipalities
- Public Lighting
- Public buildings and fleets

## Enacting

- Building Energy Codes
- Building Retrofit Programmes
- District Heating
- Awareness Campaigns

## Enabling

- Energy Efficiency Funds and Incentives
- Pilot Projects
- Public-Private Partnerships & Energy Service Companies
- Public Procurement


## Underpinning

- Integrated Planning
- Cross-Government Engagement (vertical & horizontal)

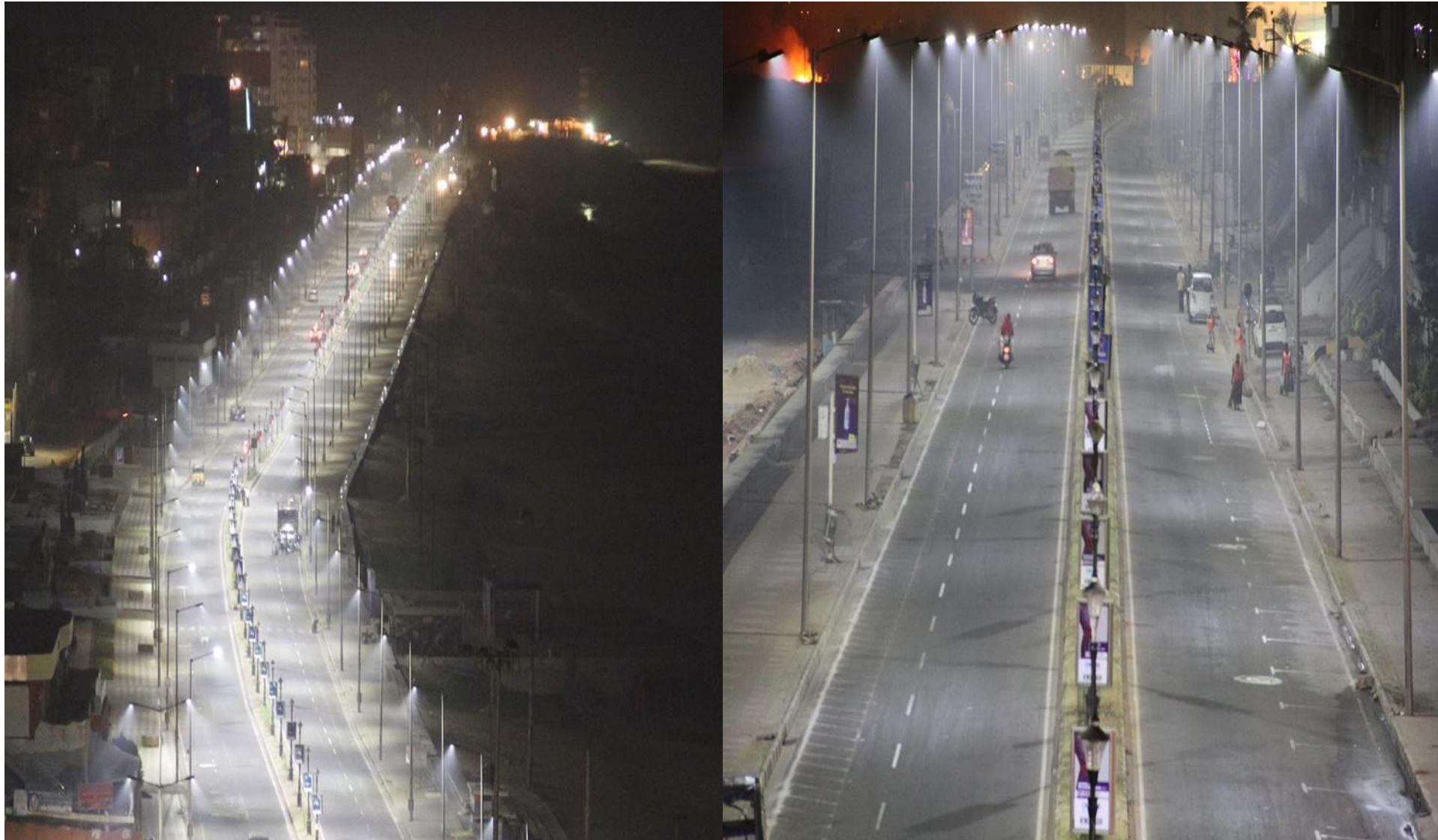
# Energy Efficiency in Cities - India





- Government-owned Super ESCO 
- Street Lighting Programme aims to replace **35 million inefficient light street lights**
- **302 urban local bodies** have registered
- No additional investment by municipalities – ESCO-financed paid back through savings
- Results to date:
  - **600,000 street lights replaced since January 2015**
  - **11.5 million USD cost reduction**

# Energy Efficiency in Cities - India



Source: Energy Efficiency Services Limited, Vizag Street Lighting Project

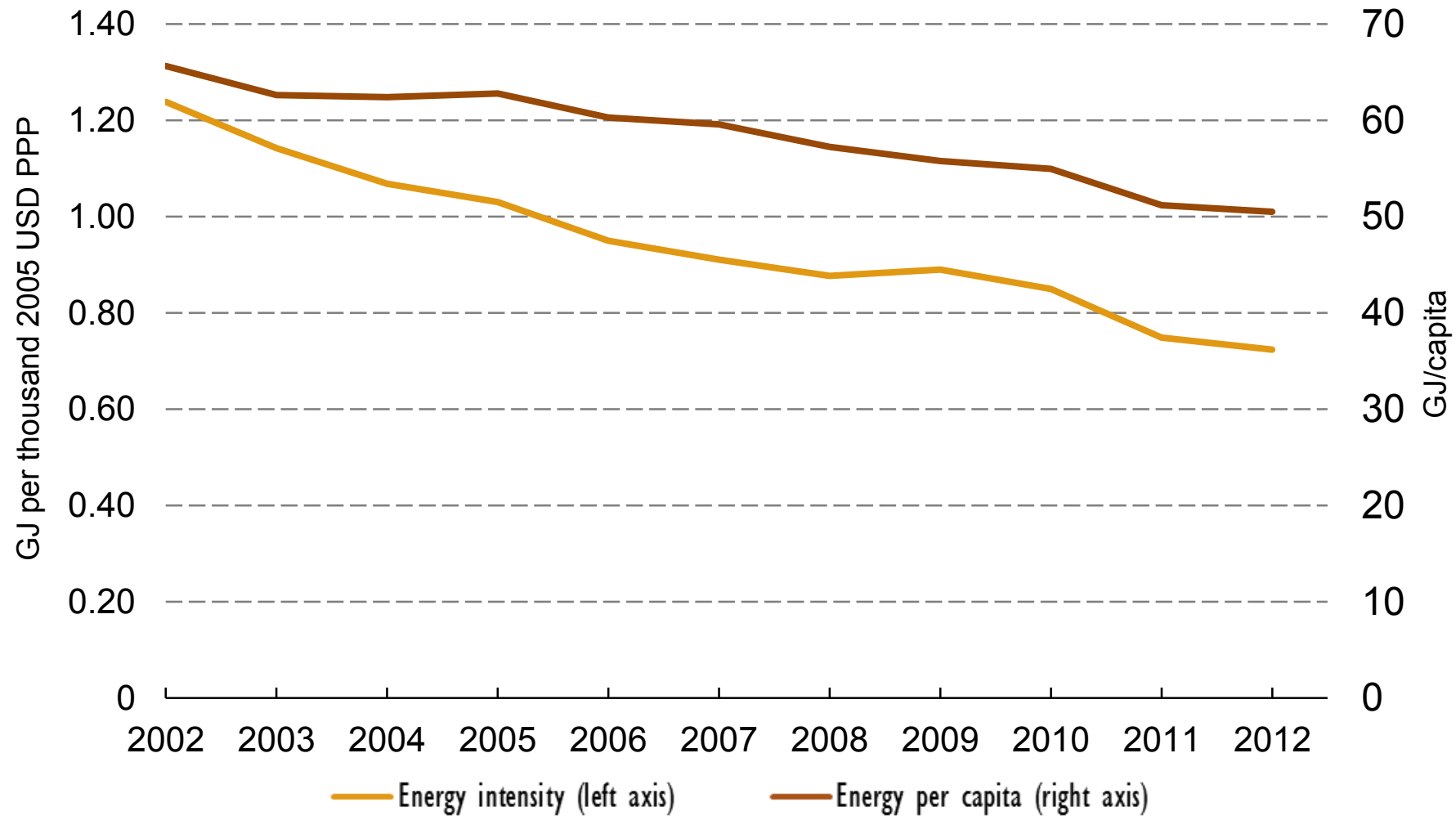


# Energy Efficiency in Tokyo, Japan





# Energy Efficiency in Tokyo, Japan



Source: Energy Efficiency Market Report 2015

- How did **Tokyo's Metropolis Prefecture** become one of the most energy efficient cities in the world?
  - Target to cut **25% of its GHG emissions by 2020 from 2000 levels**, primarily using energy efficiency
  - Key policies:
    - Land-use Planning
    - Cap and Trade Program for large emitters
    - Green Building Program for new residential buildings
    - District Plan for Energy Efficiency



# Energy Efficiency in Los Angeles, US



- **City Leadership** in setting stringent municipal building policies
- Green Building Ordinance required new municipal buildings to be LEED silver certified in 2002.
- In 2008, extended to residential households
- Influenced California's 2010 building code – first state-wide mandatory green building code in the US
- Shows cities can be leaders in innovation and policy



## Amsterdam's Energy Atlas - Buildings

**Verbruik Electriciteit**

- Totaal verbruik | Uitstoot CO2 per blok
- Gemiddeld verbruik per m2
- Voor totaalstatistiek

*De verbruiksgegevens zijn over 2012 en geclusterd voor minimaal 5 aansluitingen en daarmee niet individueel herleidbaar. Lees verder de Toelichting onderaan Legenda.*

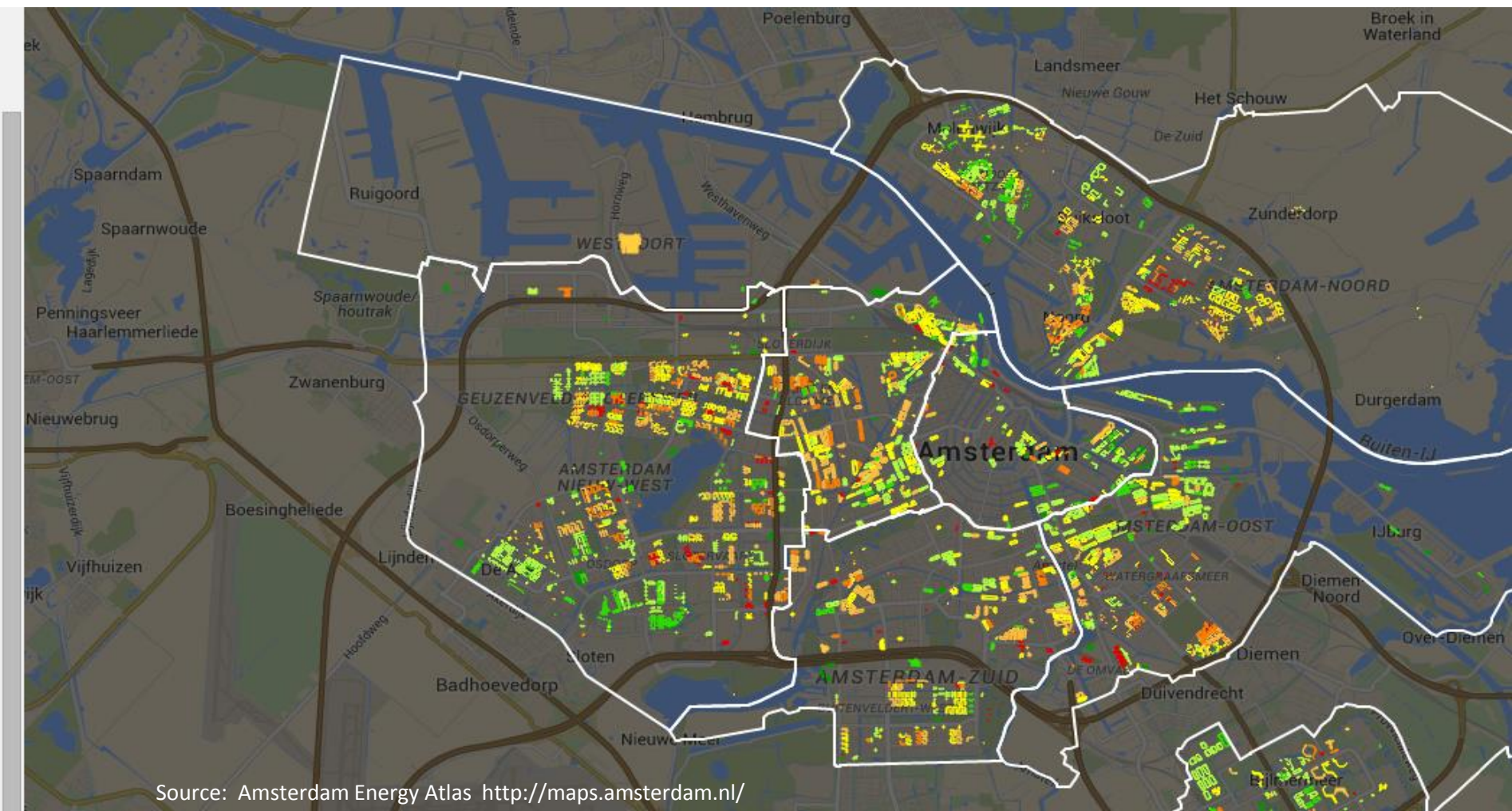
**Energie labels**

- Leveranciers elektriciteit

- > Energiekaart Zon en Wind
- > Energiekaart Bodem en water
- > Energiekaart Afval en restwarmte

Gemiddeld per blok

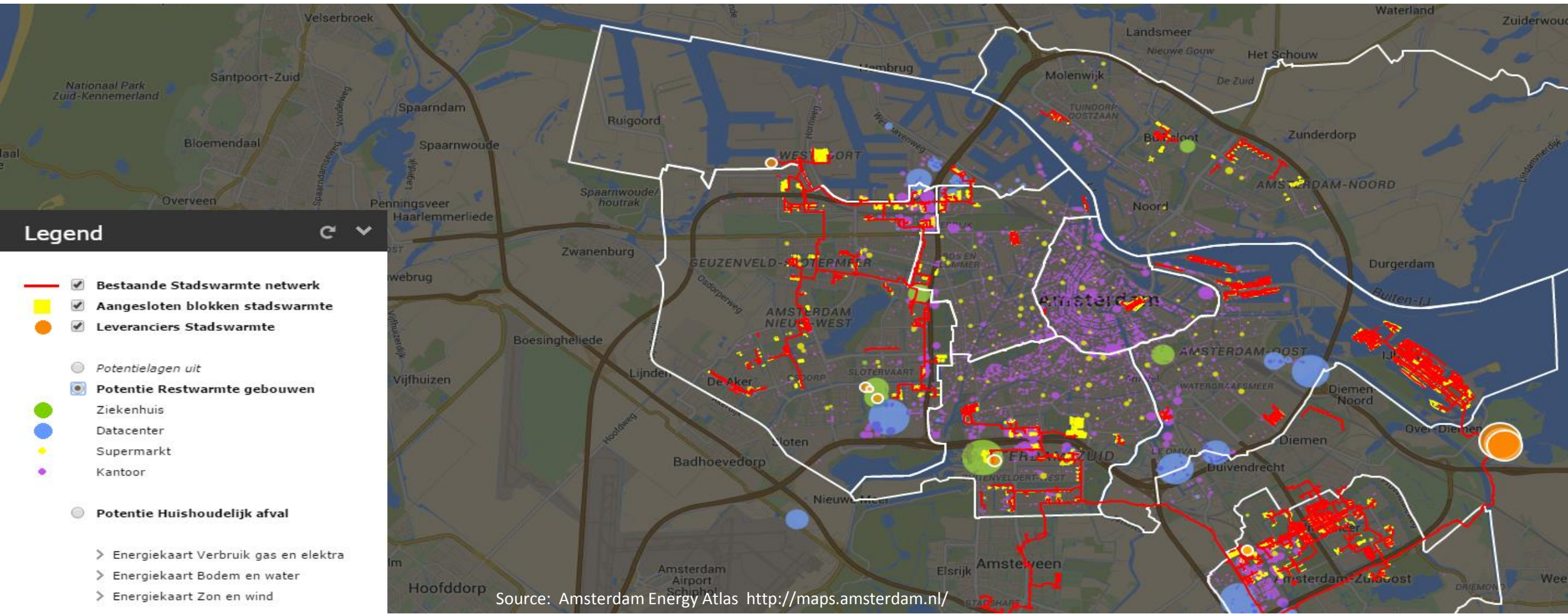
Green	A, A+ of A++
Light Green	B
Yellow-Green	C
Yellow	D
Orange	E
Red-Orange	F
Red	G



Source: Amsterdam Energy Atlas <http://maps.amsterdam.nl/>

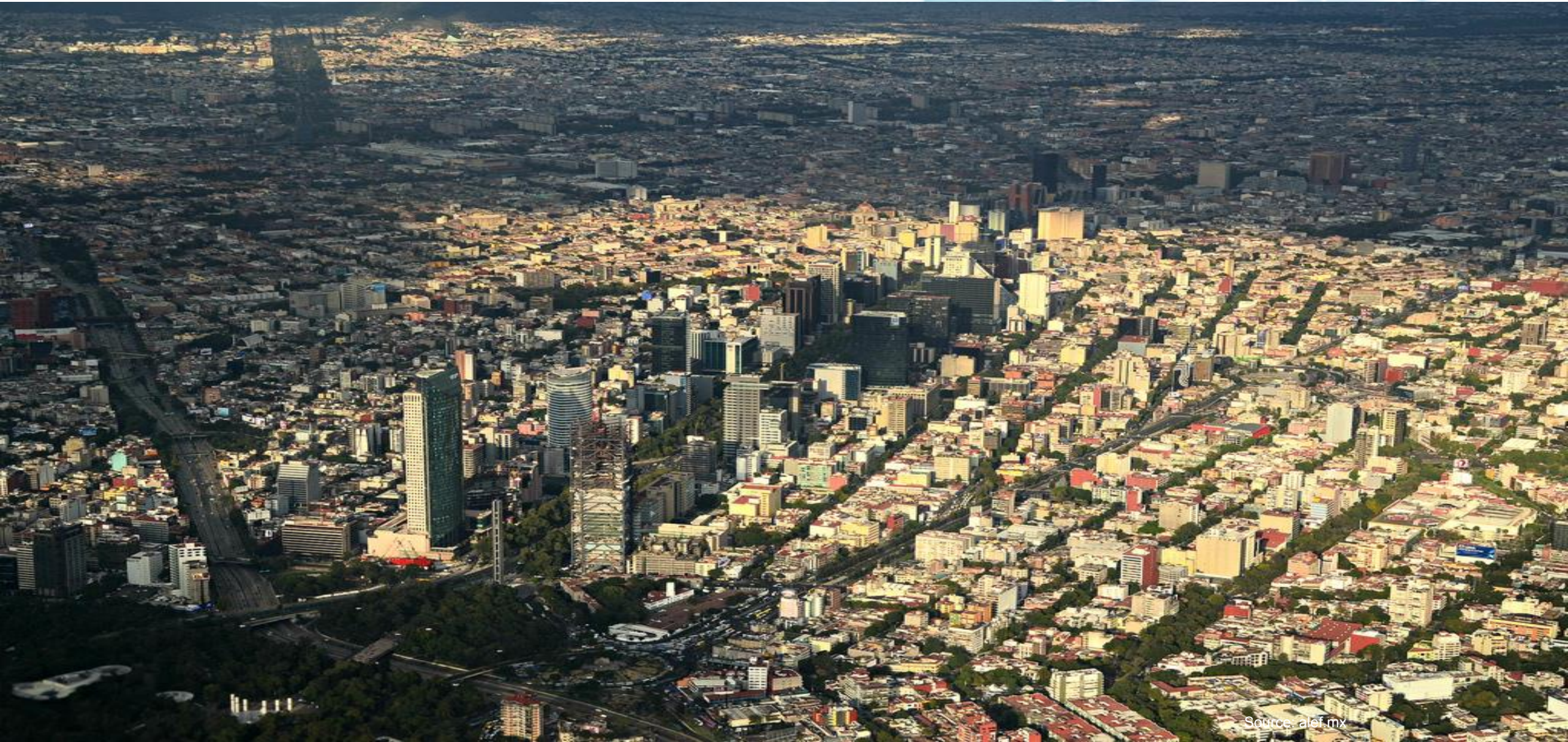


## Amsterdam's Energy Atlas – Waste Heat





# Energy Efficiency in Mexican States and Cities





- EcoCasa
- BRT system in Mexico City, León and others
- FIPATERM Programme in Mexicali State
- Green Mortgage
- National Municipal Public Lighting Programme
- Cool Roofs Programme
- And many others



- **Alignment is key – all elements working towards the same goals**
- **Integration**
  - Vertical
  - Horizontal
- **Using all tools available**
- **Understanding energy patterns means understanding priorities**

# Cities can innovate

- **Can take action at smaller scale and faster pace**
- **Use procurement and purchasing power**
- **Stimulate new finance and business models**
- **The value of connections with citizens**

- **Cities are key to energy sustainability**
- **Strategies must take account of their particular energy patterns and governance models**
- **National policy should align and enable**
- **Cities can be the engine of innovation and action**





**International  
Energy Agency**  
Secure  
Sustainable  
Together

# World Energy Outlook, Energy Efficiency and Cities

*Brian Motherway*

[brian.motherway@iea.org](mailto:brian.motherway@iea.org)

 [@BrianRMotherway](https://twitter.com/BrianRMotherway)