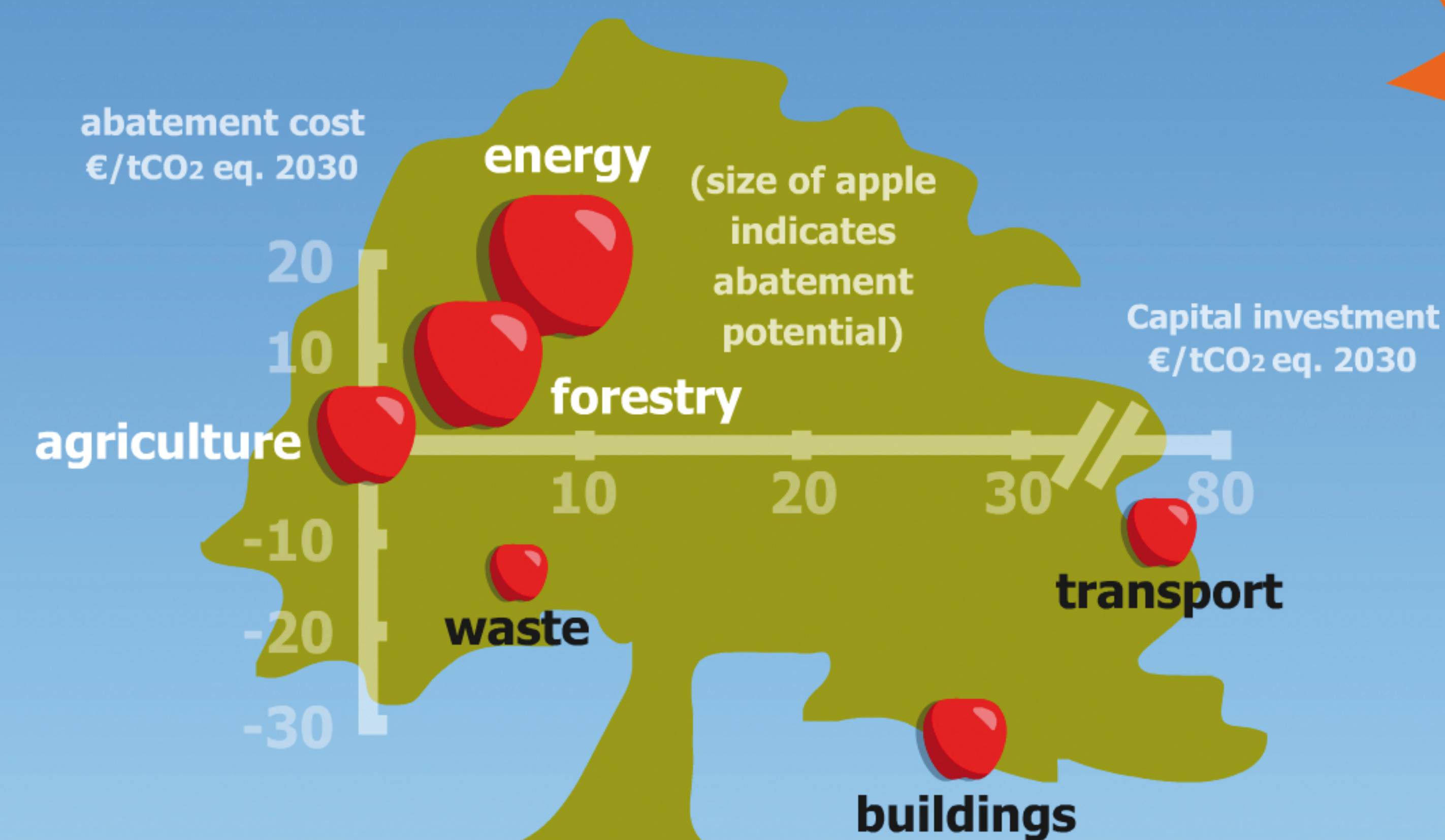# Megacities: Problem or Solution?

Recognizing the opportunities of urbanization for reducing CO_2 emissions

More than 70% of global CO_2 emissions is currently attributed to cities [3], while 50% of the world population lives in them. This seems to indicate that citizens have a larger carbon footprint than country-dwellers. However, the per-capita CO_2 emissions of most cities is lower than the national averages [3]. In fact, the high population density in cities can be an opportunity for reducing CO_2 emissions.

Urbanization especially allows for large reductions of CO_2 emissions in the *buildings, transport* and *waste* sectors.

Global CO2eq emissions per sector [1]:

forestry   energy

agriculture   waste
transport

industry   buildings

global GHG emission reduction potential [2]:

Buildings

Heating is the biggest source of operational CO_2 emissions of residential and commercial buildings [4]. More compact housing uses less energy for heating [5]. Furthermore, large appartment complexes are suitable for centralized heating facilities, including modern energy efficient technologies such as combined heat and power (CHP) plants.
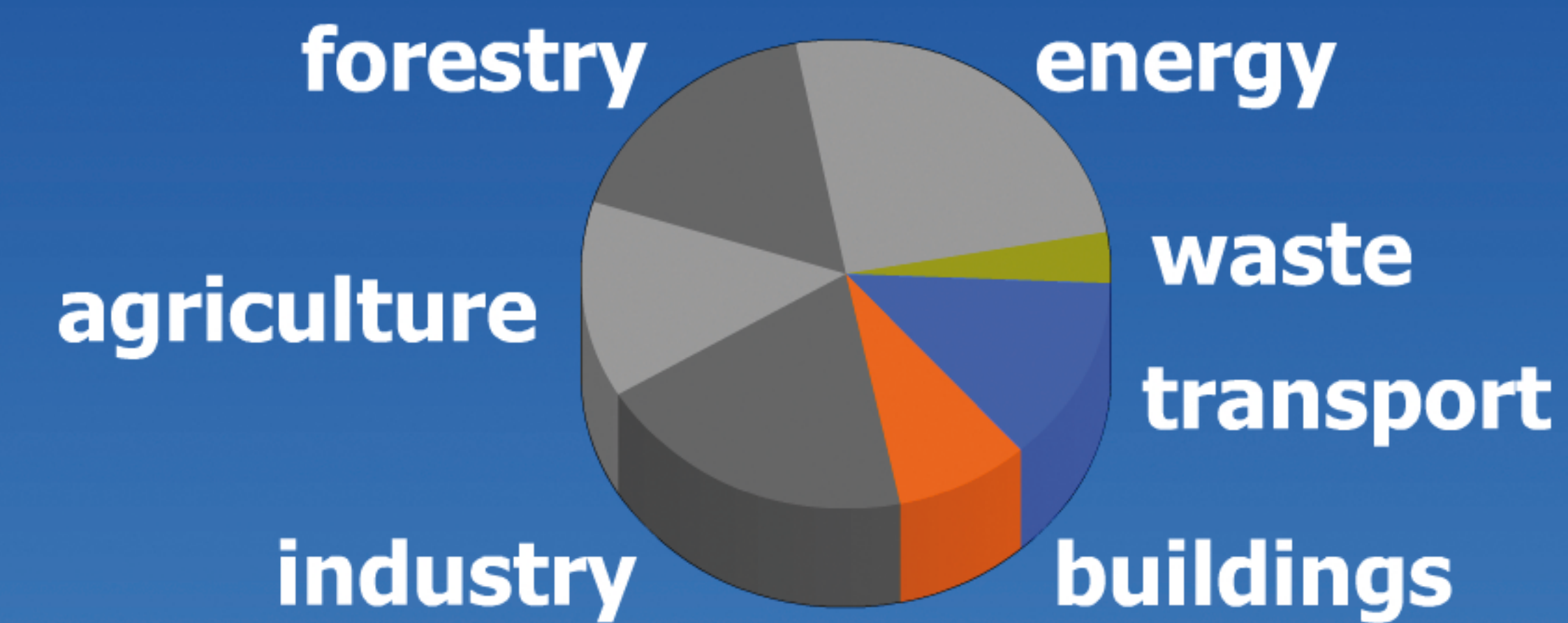
28%

abatement cost
€/tCO₂ eq. 2030

energy

(size of apple indicates abatement potential)

20

10

forestry

agriculture

Capital investment
€/tCO₂ eq. 2030

10   20   30   80

-10

waste

transport

-20

-30

buildings

Transport

Dense cities make for shorter travel distances. This makes them suitable for efficient public transport, which causes less CO_2 emissions than transport by private vehicles [5].
It also makes cities a good place for modern fuel efficient vehicles running on alternative fuels such as hydrogen or batteries, since typical limitations as topspeed and range pose no problems.

M   **H₂**

28%

The 'low-hanging-fruits' of CO_2 mitigation

The net costs for reducing CO_2 emissions in the buildings, transport and waste sector are assumed to be negative - meaning that cutting down on CO_2 emissions in these sectors will yield profits in the longer term. Graph adapted from [2].

Waste

Dense cities allow for efficient collection of waste and wastewater. Intensive recycling of useful materials such as metal, plastics and paper and using organic waste for composting can drastically reduce CO_2 emissions.
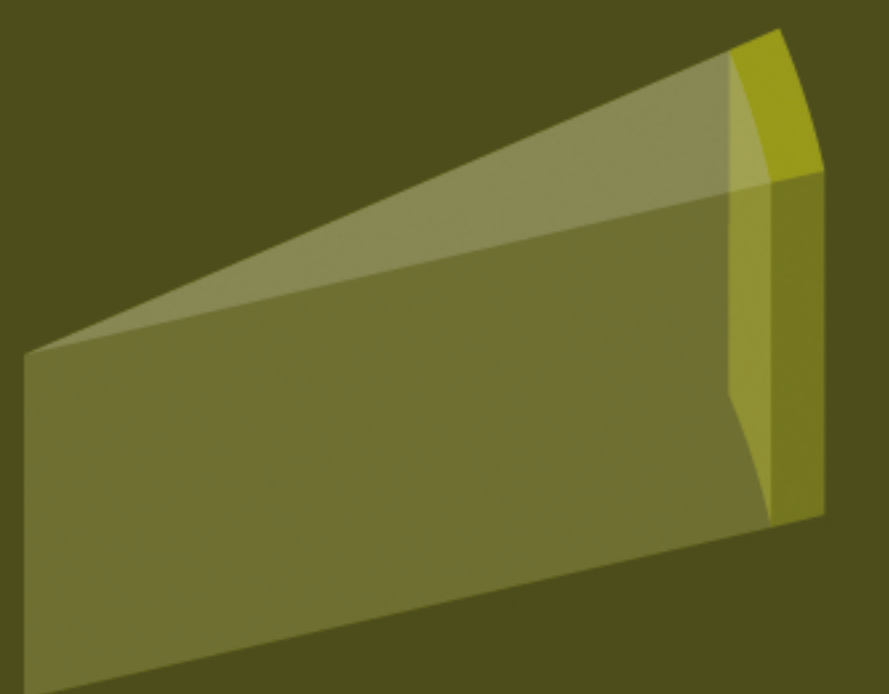Harvesting methane gas emitted from landfills and sewer systems can also be a profitable way of reducing GHG emissions [2].

87%

[1] source: IPCC (2007a), 'Climate change 2007: Mitigation of climate change'
[2] McKisney&Company (2009), 'Pathway to a Low-Carbon Economy'
[3] ICLEI (2010) 'Cities in a Post-2012 Climate Policy Framework: Climate Financing for City Development?', p. 12
[4] Diana ürge-Vorsatz , L. D. Danny Harvey , Sevastianos Mirasgedis & Mark D. Levine (2007): 'Mitigating CO2 emissions from energy use in the world's buildings'
[5] United Nations Human Settlements Programme (2011), 'Cities and climate change : global report on human settlements'

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