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Climate change action plans for municipalities - case study of urban development and mitigation

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Program

- Climate change - challenges for municipal planning
- Links between urban planning and climate change mitigation
- Case: Urban development in Copenhagen
 - Example of calculating CO₂ emissions and economic consequences of urban planning measures
- Other examples ...
- CO₂ – one part of the whole!
 - Synergies between CO₂-means and other planning objectives

Two important legs in the climate change challenge for the municipalities



Climate change challenges the municipalities on two fronts:

1. Mitigation of further climate changes through reduction of green house gases from municipal activities and geography and
2. Adaptation to climate change, like extreme weather events including storms, erosions and flooding.

The third leg: The process and implementation

The third leg includes e.g.:

- Public participation
- Partnerships
- Coordination between climate change action plan and other planning
- Implementation of the actions.



Cities and climate mitigation

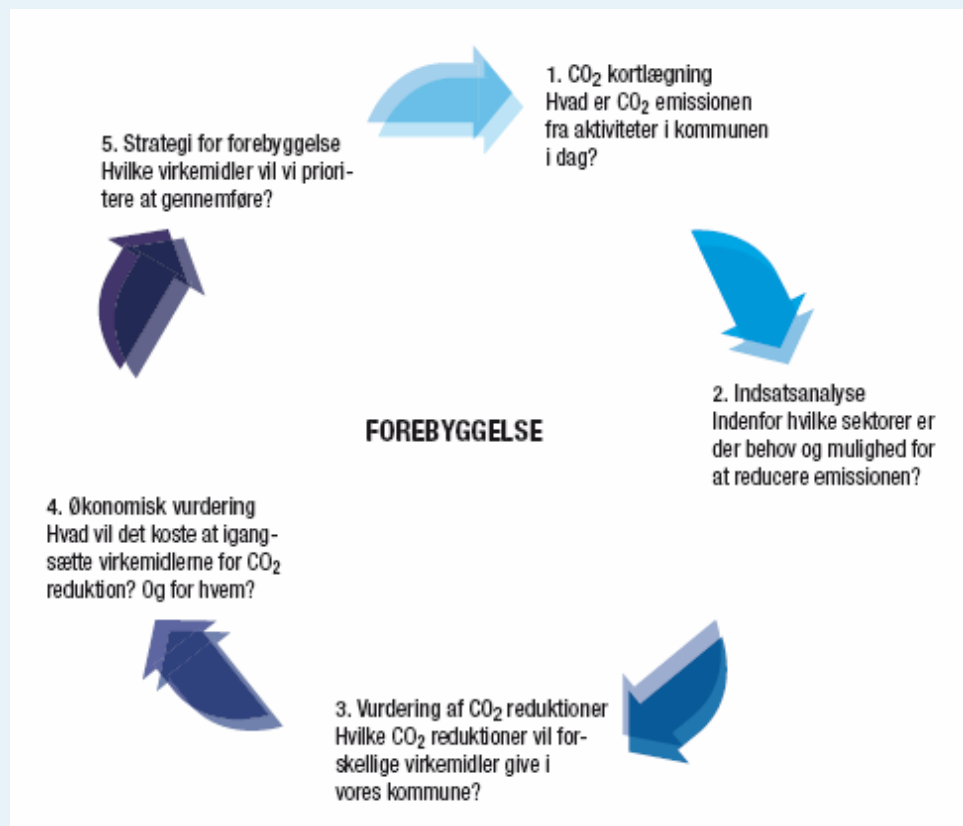
- Cities require significant energy to e.g. **infrastructure**, to **production**, to **transport**, to **lighting**, **heating** and **cooling** of buildings.
- Cities represents a significant energy use, **but has the possibility to change** the way, the energy is produced/used and how much is used and thereby reduce the impacts for climate change.



Examples of means in urban planning

- Buildings (heating, cooling, electricity...)
- Transport (modal split, vehicle miles traveled, fuel type...)
- Land use (density, mix of uses, green...)
- Localization of functions (housing, industry...)
- Other (waste, water use, landscaping, parking pollicy...)

Mitigation



Urban development means assessed in Copenhagen

- Localization in relation to city centre
- Localization in relation to stations
- Urban density
- Parking norms
- Low energy areas
- Greening
- Street lightning
- Waste reduction

Transport



Cases under each mean

Mean	Cases		
Lokalization of new development areas	0 – 1,5 km	1,5 – 4 km	4 – 8 km
Station closeness	100 % occupation	50 % / 50 %	100 % housing
Urban density	185 %	370 %	-
Low energy areas	Passive houses	Energy class II	Energy class I
Parking norms	P-norm 1:200	P-norm 1:500 In station areas	P-norm 1:500 In station areas with carsharing
Greening	Green roofs	-	-
Street lightning	Change to low energy lamps		
Waste reduction	Cube collection: Metal and plast	Residential collection: Metal and plast	-

Example of assessment of CO₂ reduction: Parking norms

- Determination of reduced parking norms in new urban areas, including car free areas.
- CO₂ effect is expected to be primarily a consequence of a reduced car transport.
- Basis:
 - Model for the linkage between p-norms and car transport
 - Calculation of potential areas of new urban areas
 - National CO₂ calculator

	<i>tons reduced CO₂ per year</i>
P-norm Max. 1:150	1.139
P-norm Max 1:200	2.289
P-norm 1:500 car free areas	963
P-norm 1:500 car free areas with car sharing	1.078

Example of calculation of economic consequences: Parking norms

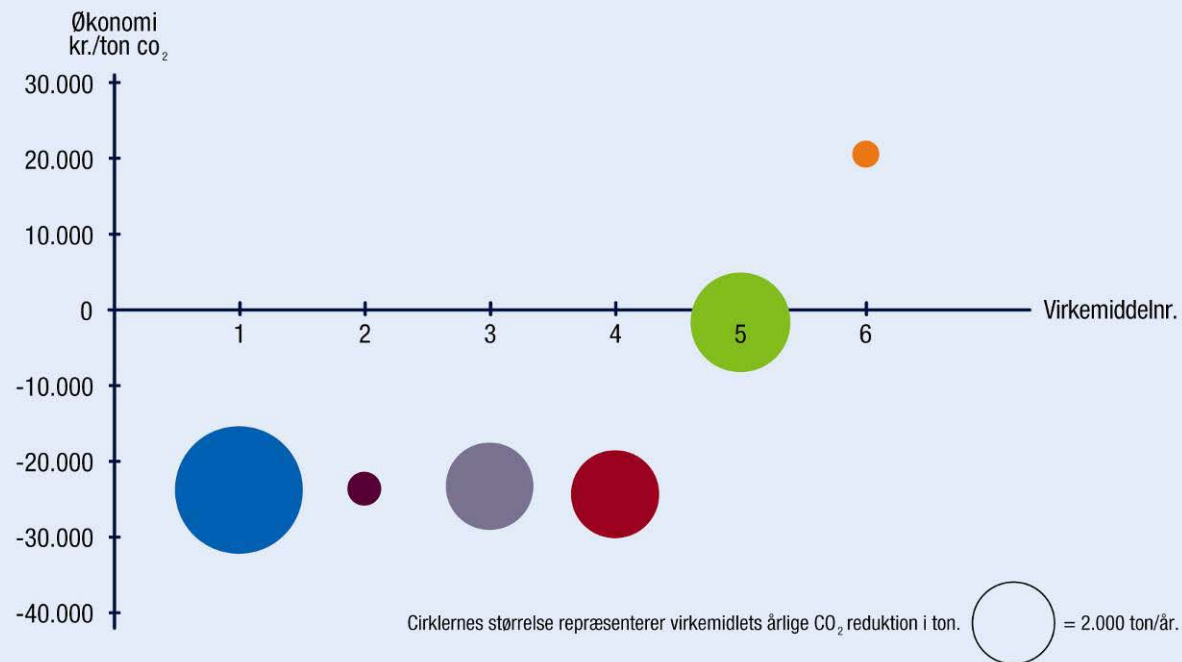
The economic calculations includes the following parameters:

- Costs involved in car transport
- Costs involved in train transport
- Costs involved in bus transport
- Costs involved in bicycle transport
- **Savings** by choice of alternative transport instead of car



	1:150 (max-norm in all new urban development areas)	1:200 (max-norm in all new urban development areas)	1:500 (Car free in the station-close areas)	1:500 (Concept with car sharing)
Savings kr/ton CO ₂	24.194	24.064	23.293	23.337

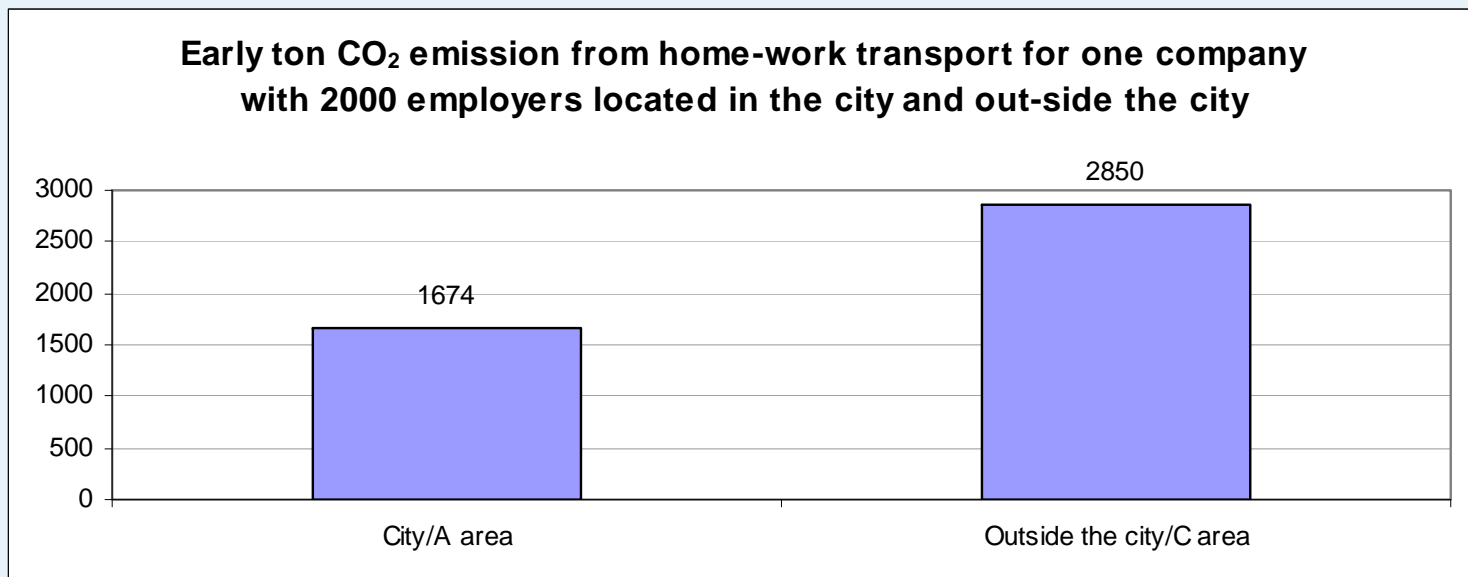
Assessment of urban development means



- Climate friendly urban development principles (higher density, localization at stations, reduced max parking norms)
- Urban density (180 %)
- Localization close to stations
- Parking norms (1:200)
- Low energy housing (Energy class I)
- Green roofs

Other examples of urban plannings relation to climate change mitigation/I

- Localization of companies in larger and medium size cities
 - Ca. 40 % reduction by locating in the city instead of out side the city



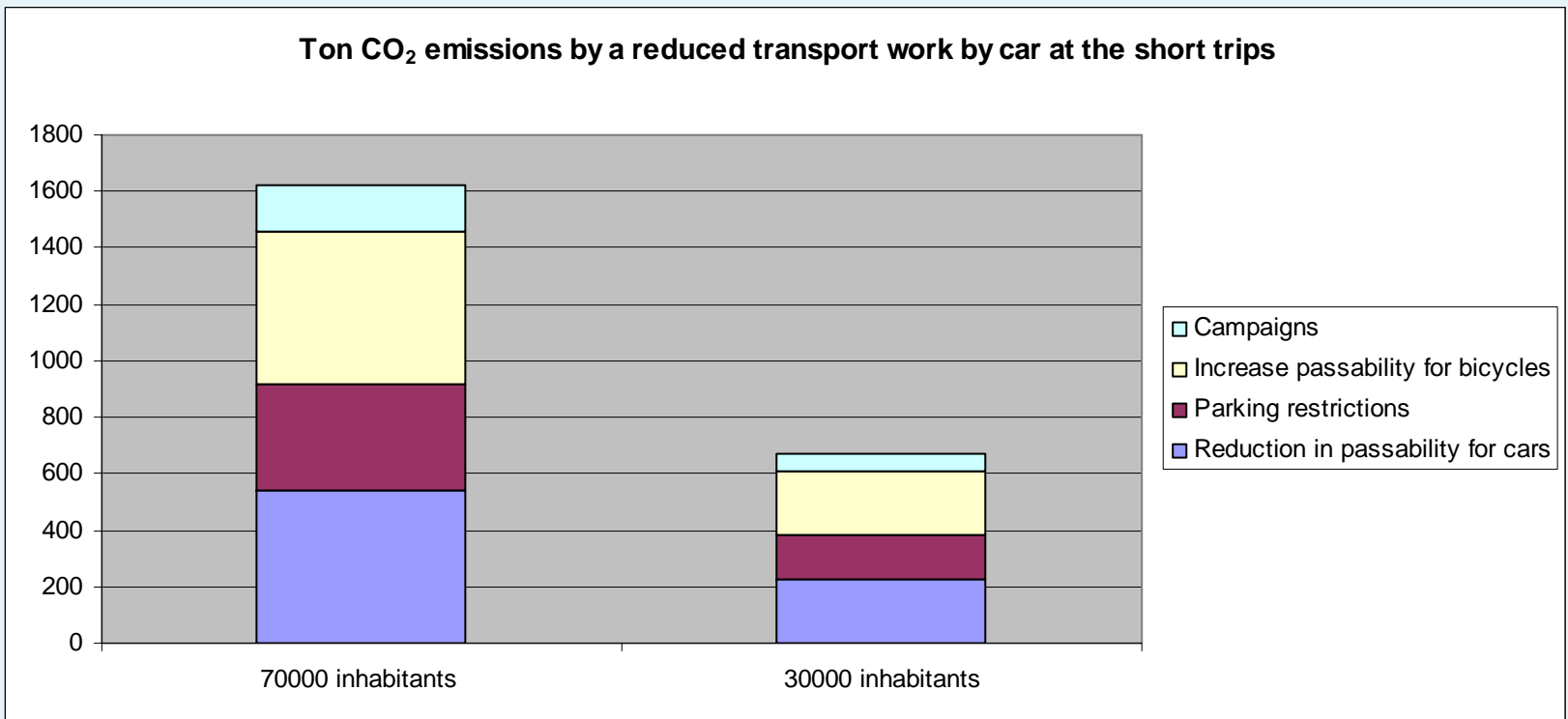
Other examples of urban plannings relation to climate change mitigation/II

- Transfer of transport from car to bicycle on short trips
- By implementation of:

Reduction in passability of cars	Parking restrictions	Increased passability for bicycles
<p>E.g.</p> <ul style="list-style-type: none">▪Zones with speed restrictions - 40 km/h or 30 km/h.▪One-way traffic.▪Speed restrictions through e.g. visual road layout, signs.	<p>E.g.</p> <ul style="list-style-type: none">▪Reduction of central parking and establishing new parking at the city-center edge.▪Increase of parking rates.▪Time restriction on central parking places.▪Free parking for electric cars	<p>E.g.</p> <ul style="list-style-type: none">▪One-way traffic not for bicycles.▪Bicycles allowed to drive before cars▪Routes reserved for bicycles.▪Norms for bicycle parking.

Other examples of urban plannings relation to climate change mitigation/II

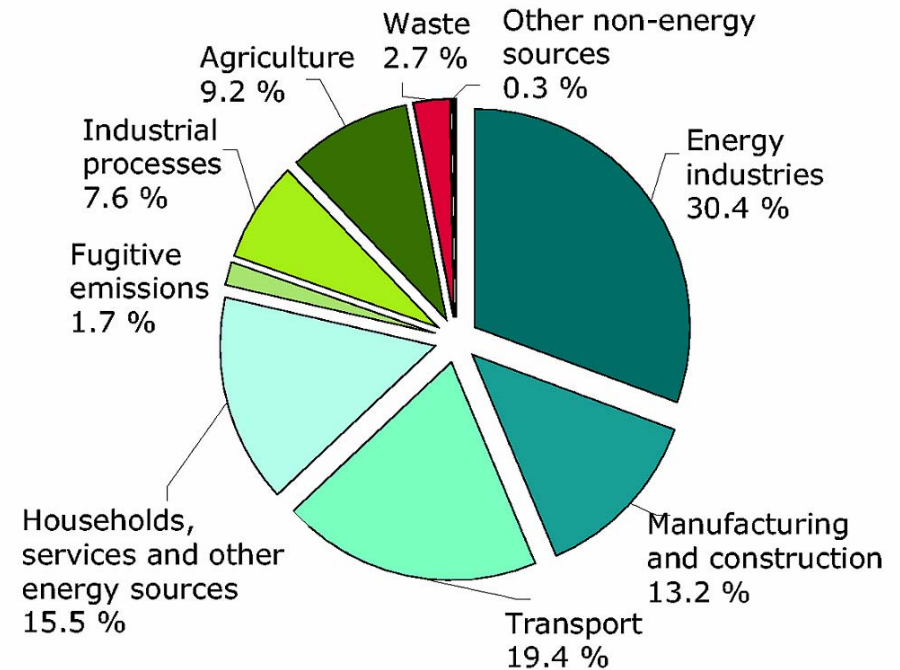
...car transport is reduced by 9 % at the short trips - and thereby a reduction in CO₂ emissions:



Conclusion: Urban planning and climate change mitigation

Planning and urban development means can:

- Reduce CO₂ emissions
 - Especially in relation to transport related emissions!
- Can be implemented now - not necessary to wait for technological development, change of legislation etc.
- It is possible to integrate and calculate the mitigation effect of municipal planning and urban development

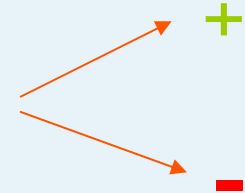


Climate change mitigation is one part of the whole!



Mitigation needs to be viewed and assessed

in relation to other interests



Examples of potential conflicts and synergies:

- **Increased urban density to reduce car dependency**

- Can reduce open spaces to enable water inundation and thereby conflict climate change adaptation
- Can reduce solar earning and passive solar heating and thereby be an obstacle to passive houses and increase the energy demand for electric lighting

- **Green roofs/other greening of buildings can reduce the need for cooling and heating**

- Can support climate change adaptation due to reduction of storm water runoff
- Recreational value
- Improve air quality, e.g. for particles

Strive for synergies and make sure of 'the whole'!

Thank You for Your attention!