

# The climate change challenge in the Stockholm region

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Michael Viehhauser  
Stockholm County  
Council

 **Regionplane- och trafikkontoret**  
STOCKHOLMS LÄNS LANDSTING

Office of  
Regional Planning  
and Urban Transportation,  
Stockholm County Council



# Contents of the presentation

- The Stockholm region
- Stockholm region's energy = climate challenges
- Some innovative examples
- Conclusions

# The County of Stockholm today

- 1.9 million inhabitants
- 810 000 dwellings
- 90 000 summer residences
- Land area 6 500 km<sup>2</sup>
- 180 km from north to south
- 10 % urban areas
- 14 % developed land
- 60 % agriculture and forest



# Energy related goals for the Stockholm region

- Overarching vision: long-term sustainable development for the region
- One of five guiding strategies:  
Develop efficient systems and structures
- Priority actions:  
Settlement structure  
Transport system  
Housing construction  
Technical infrastructure



(Regional plan of 2001)



# Climate change as challenge and cross-sectoral task



2007



2010

## Programme for new Regional Plan 2010:

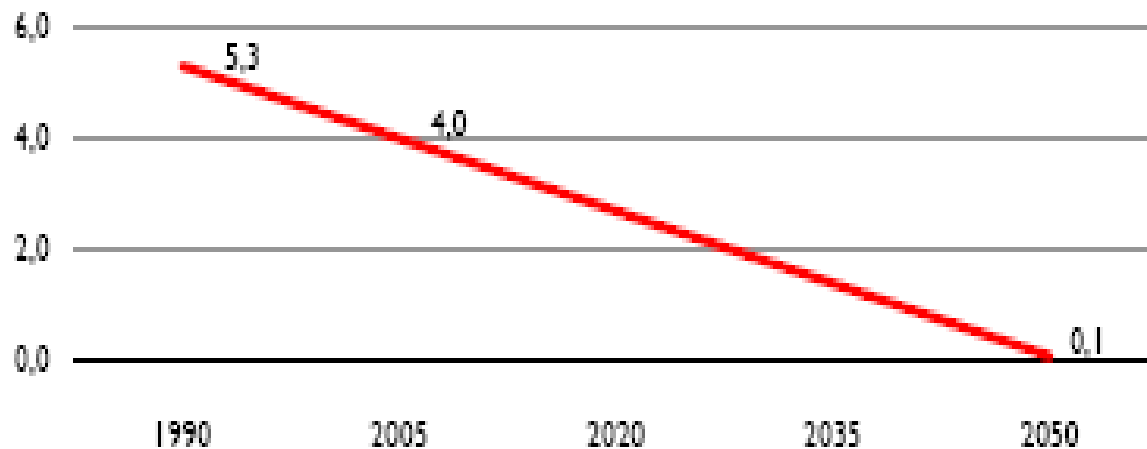
- Mitigation combined with economic growth
- Vulnerability / robustness and adaptation

Goal 2050: Resource effective region ...

but no distinct mitigation goal for the County so far!

# City of Stockholm "fossil free" until 2050

Planned reduction of CO<sub>2</sub> emissions for entire City of Stockholm



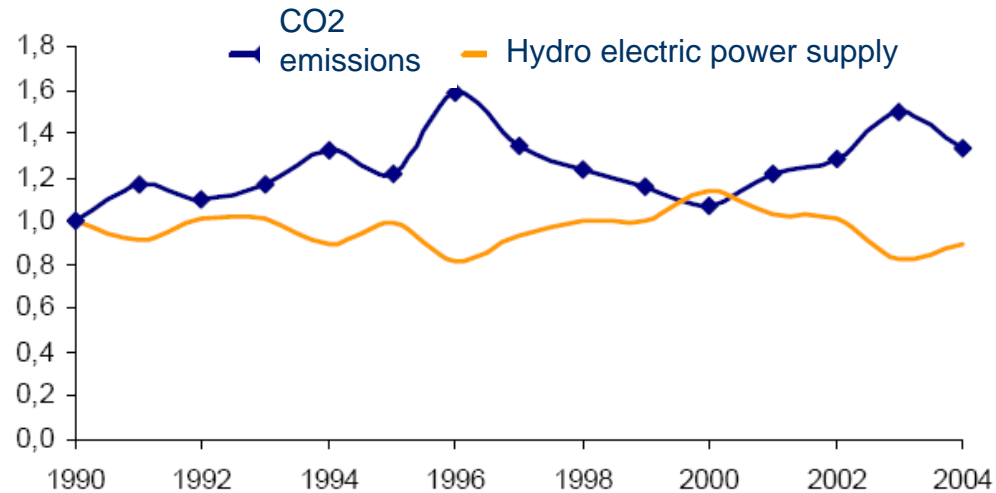
Figur 2. Klimatmålen 2005 - 2050 jämfört med basåret 1990.

## Swedish energy system's particularities

Total energy supply  
(630 TWh in 2006)

CO<sub>2</sub> neutral energy  
forms (total 63 %):

- Nuclear (33 %)
- Biofuels (18 %)
- Hydro-electric power (12 %)



Source: STEM, 2007

But still 31 % Crude oil and 4.5 % Coal/coke

High conversion losses in nuclear power production = 65 % !

Solar and wind power weakly developed (< 0,2 %)

# Particularities of Stockholm regions energy system

- High share of biofuels
- No natural gas system
- Few big energy users (heavy industry), third sector 85% of economy
- District heating 75% of heat demand
- Single family houses: Electricity used for heating
- Increasing biogas production
- Low use of wind and solar power
- Transport sector as "head ache"



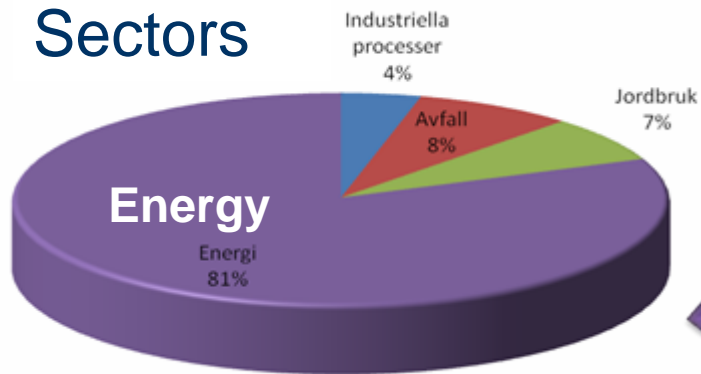
Picture: Bengt Gustafsson



# Stockholms County CO<sub>2</sub>-ekv emissions

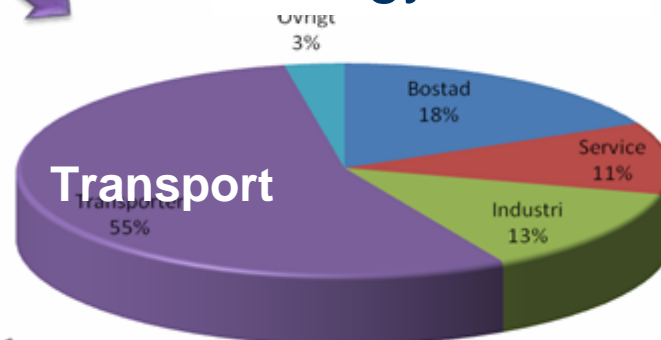
(from energy use in the County)

## Sectors



**2003: 8.7 million. ton CO<sub>2</sub> ekv.**  
**Per capita: 4.6 ton/år**

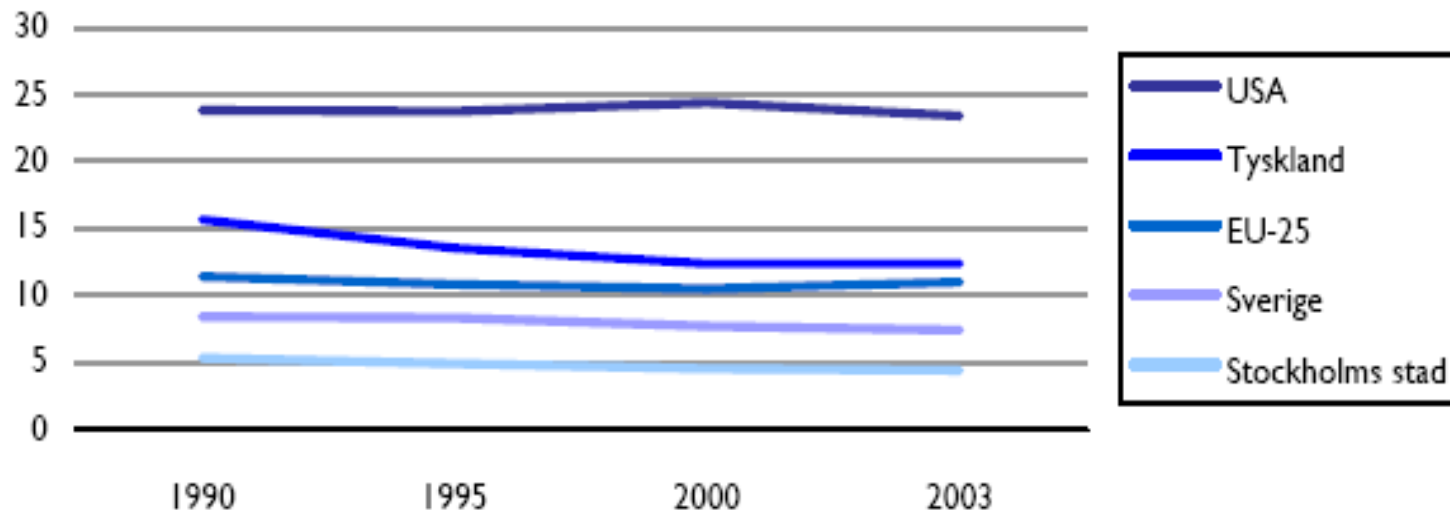
## Energy sector



## Transport



## City of Stockholm (CO<sub>2</sub>-ekv emissions) in an international perspective



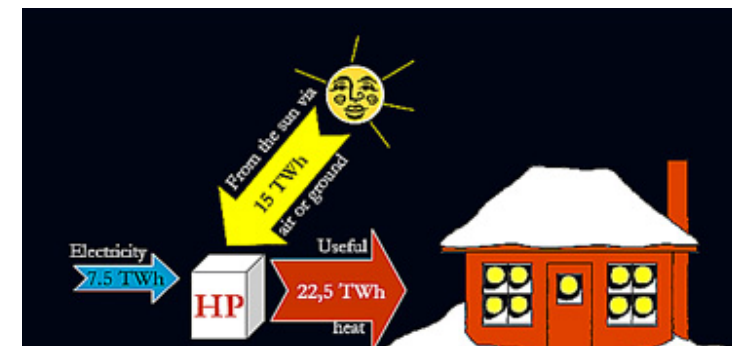
Figur 6. Utsläpp av koldioxidekvivalenter per invånare. Källor: Stockholms stad, UNEP/IPCC data för Sverige, Tyskland och USA. World Resource Institute data/CAIT för EU-25,

## Feasible mitigation ways

Regional planning in Stockholm advocates e.g.

- Big and effective technical solutions for heating
- Heat-power generation
- Intensified cooperation of public and private sector
- Targeted action in the transport sector

### Major District Heating Systems in the Stockholm Region



# Stockholm County Public Transport Fossil Fuel Free by 2020

- 75 % of rush hour travels
- Metro & Commuter trains run on "green electricity"

## Buses:

- 30 biogas buses today
- + 120-130 biogas buses to the year 2009
- 380 ethanol buses today  
+ planned new procurement
- = 410 out of 1,800 buses (23%)
- = 30 % by 2009
- Goal: 100% by 2020





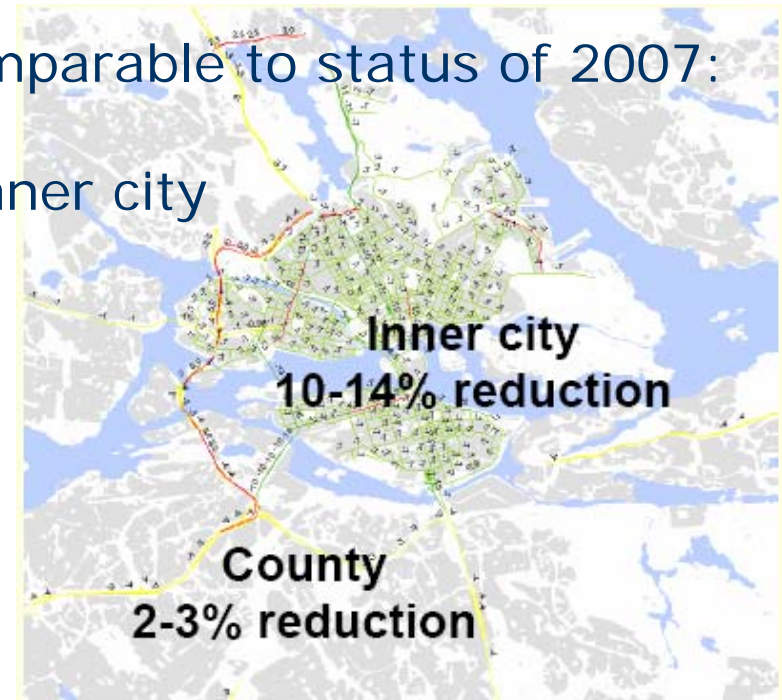
# Congestion charges in Stockholm

Results of the test phase 2006 – comparable to status of 2007:

Goal: 10-15 % less traffic to/from inner city  
Was 20-25%

Increased accessibility  
Queue times down 30-50%

Decrease emissions  
14% less in inner city and 2,5%  
in total for County



- Climate effects large for a single measure
- An important step towards national mitigation target

# "Green approaches" to Arlanda airport

Background: "CO<sub>2</sub> roof" for entire airport incl. Aviation

Pioneering scheme since January 2006

Principle is simple: taking foot off the gas while going down...

Partially funded by the European Union, joint effort by Sweden's Luftfartsverket (LFV) and Scandinavian Airlines

New routing system enable pilots to reduce the noise levels, exhaust gases and fuel consumption:

- 100kg and 150kg of fuel or 400 kg of CO<sub>2</sub> per landing

Technical system also provides a more accurate estimated time of arrival and benefits for ground handling services



# Conclusions

- Energy use and climate change is high on the political agenda and opens for new comprehensive strategies
- Swedish national frameworks help planners to act
- Nation wide solutions may not in each case fit metropolitan areas
- Many different sectors must be engaged in different ways
- Traffic sector most problematic in Stockholm
- Planning work requires to some extent new perspectives:
  - new way of presenting preconditions
  - new way of presenting consequences
  - interplay market actors and public sector