

Sustainability
 -Environmental
 -Economic
 -Social

Monocentric city

Polycentric city cluster with "satellite centres"

Transport for London
Congestion charging
Central ZONE
 Mon - Fri
 7 am - 6 pm



AG2804 Transport, Communication and Sustainable Development (TCSD)

AH2303 Transport and Sustainable Development (TSD)

Jointly taught by:

- Division of Environmental Strategies Research (fms)
 - Jonas Åkerman (responsible for AG2804)
- Division of Transport Engineering, Economics and Planning
 - Joel Franklin (responsible for AH2303)



Some basics of transport

- Transport = derived demand (i.e., not primary)
- Derived from the separation of activities in space (industrialised society)
 - Residence
 - Work
 - Food
 - Leisure
 - Healthcare etc.
- Cheaper & faster transport has enabled more and more specialisation in
 - Production & services
 - Occupations
 - Space & land-use



Measures of transport

- Tons carried
- Passengers carried
- Passenger-kilometres (p-km)
- Ton-kilometres (t-km)
- Vehicle- kilometres (v-km)



Environmental and health impacts of transport

- Emissions of greenhouse gases lead to climate change
- Local air pollution
- Noise
- Land-take and potential landscape damage due to roads, parking lots, railways etc
- Potential deforestation from bio energy extraction
- Traffic accidents
- Motorisation contributes to welfare diseases



Walking the dog...





Oil stands for more than 90% of energy used for transport globally



Two big challenges related to transport

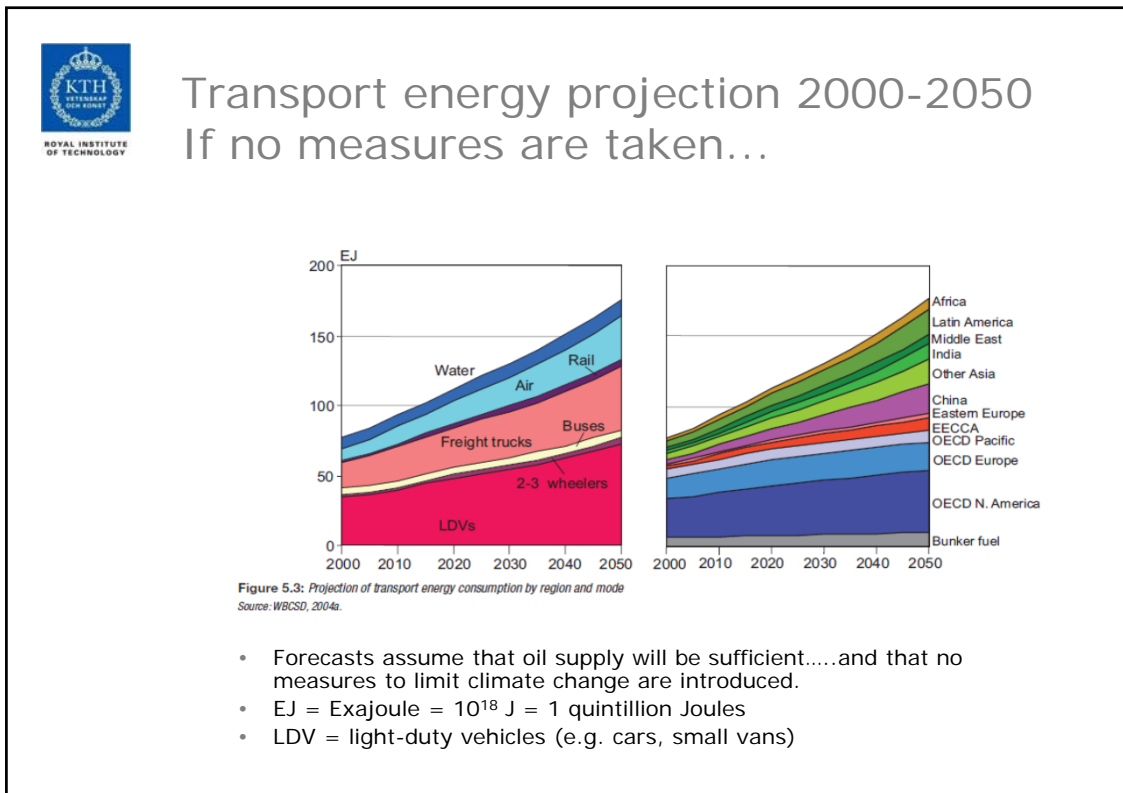
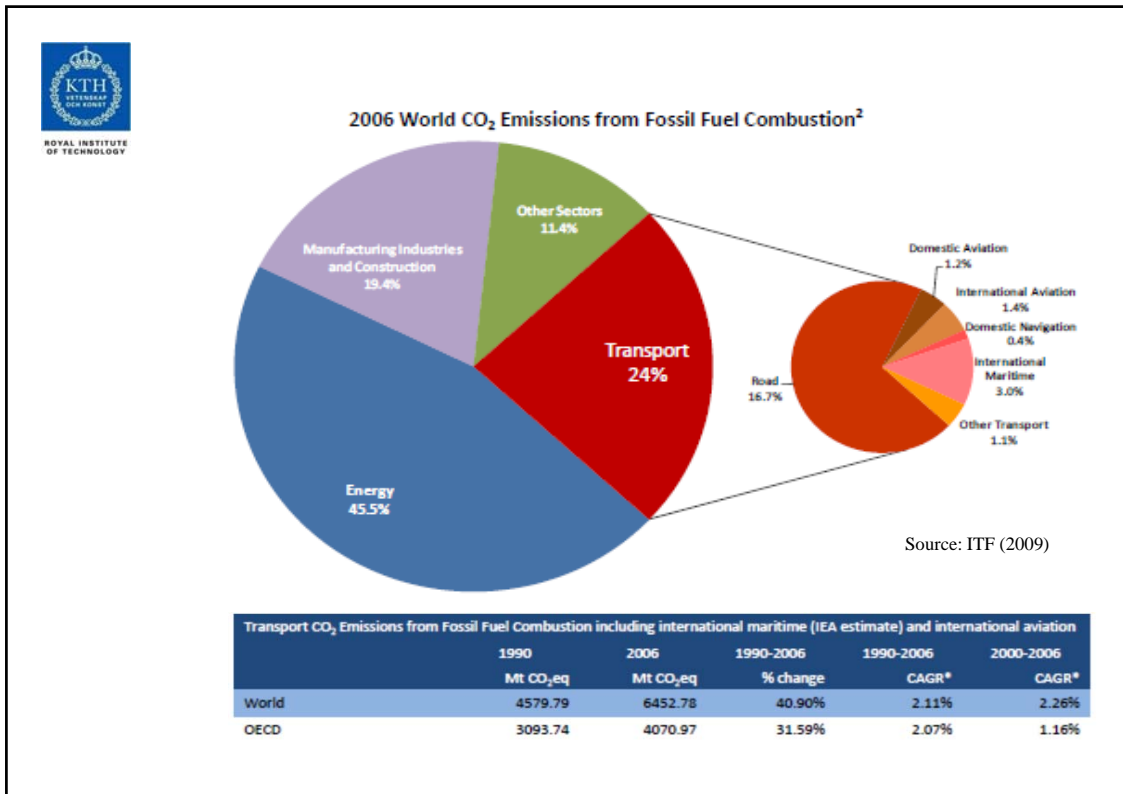
1. Climate change

Heavier precipitation,
more intense and longer droughts....



2. Increasing scarcity of oil







Emissions reductions needed to limit global warming to 2 degrees

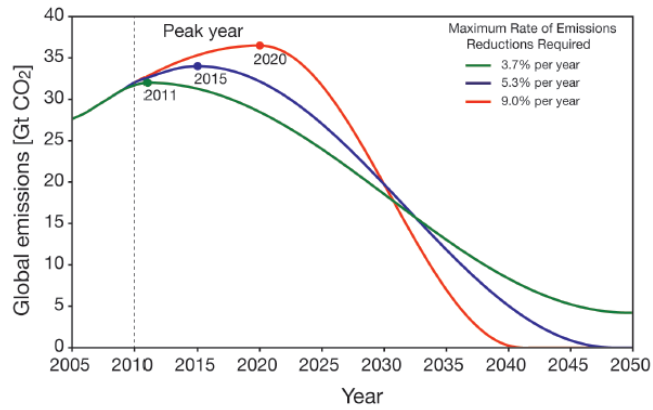
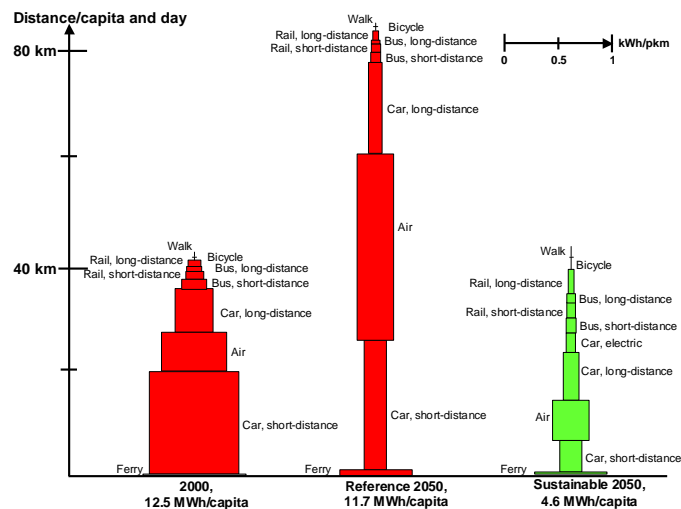


Figure 22. Examples of global emission pathways where cumulative CO₂ emissions equal 750 Gt during the time period 2010-2050 (1 Gt CO₂ = 3.67 Gt C). At this level, there is a 67% probability of limiting global warming to a maximum of 2°C. The graph shows that the later the peak in emissions is reached, the steeper their subsequent reduction has to be. The figure shows variants of a global emissions scenario with different peak years: 2011 (green), 2015 (blue) and 2020 (red). In order to achieve compliance with these curves, maximum annual reduction rates of 3.7 % (green), 5.3 % (blue) or 9.0 % (red) would be required (relative to 2008). (Source: German Advisory Council on Global Change; WBGU 2009).



Swedish travel volume for 2000 and two scenarios for 2050 (From backcasting study by Åkerman & Höjer)





Sustainability concepts

- Brundtland definition:
Sustainable development "**meets the needs of the present without compromising the ability of future generations to meet their own needs**"
(World Commission on Environment and Development, 1987)
- Robert Solow:
"**Sustainable development is an obligation to conduct ourselves so that we leave to the future the option or the capacity to be as well off as we are**" (Solow, 1993)



Three dimensions of sustainability

- **Environmental** (limit emissions and use of fossil energy, use renewable resources in a sustainable way, maintain ecosystem services)
- **Economical** (economic development, use of transport system for economic development)
- **Social** (health, social equity and well-being etc)



Three dimensions of sustainability

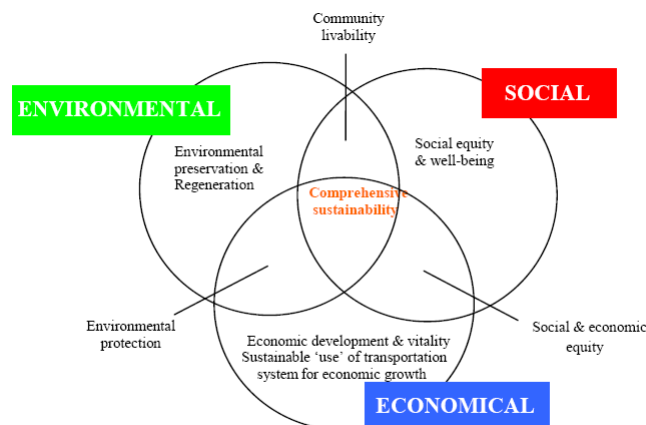
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- **Social** (health, social equity and well-being,)

Group discussion

1. How are these three dimensions related to each other (Short-term vs Long-term)?
2. Are they equally important?



Three dimensions of sustainability





Sustainability

Weak or strong?

- Using natural capital, like fossil energy and natural resources, we create man-made and human capital
- Can this capital in some sense *compensate for* the used-up or degraded natural capital? (*Example: can more factories compensate for degraded agricultural land?*)
- If this is the case, then we can adopt the "**weak sustainability**" criterion
- However, maybe there is a *lower limit* for certain resources (stable climate, biodiversity, soil to grow food etc), below which we cannot go without jeopardising sustainability?
- If this is the case, then we have to adopt "**strong sustainability**"



Relations between sustainable development and transport

- Transport contributes to **economic development** by making division of labor possible (*However, the value of increasing transport is generally decreasing with volume of transport*)
- Transport may also contribute to **social goals** (improving quality of life), making it possible for people to perform activities at different places and socialize
- Transport contributes to the depletion of **natural resources and to climate change**
- Transport may decrease **quality of life** by local emissions, noise and cities dominated by car traffic



Equity aspects of Sustainability

- Intra-generational (*within this generation*)
- Inter-generational (*between this and future generations*)



Emissions of GHG for different regions

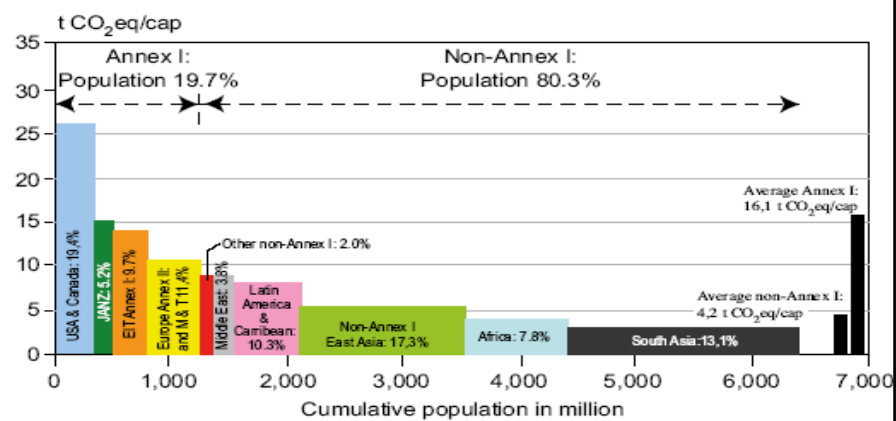


Figure TS.4a: Distribution of regional per capita GHG emissions (all Kyoto gases including those from land-use) over the population of different country groupings in 2004. The percentages in the bars indicate a region's share in global GHG emissions [Figure 1.4a].



Group discussion

- What factors should be considered in order to set up **just targets** for greenhouse gas emissions (say in 2050) for different regions/countries in the world?
- For instance, should one take into consideration differences between countries regarding the following factors?
 - climate
 - historic emissions
 - availability of renewable energy resources/person
 - level of infrastructure development



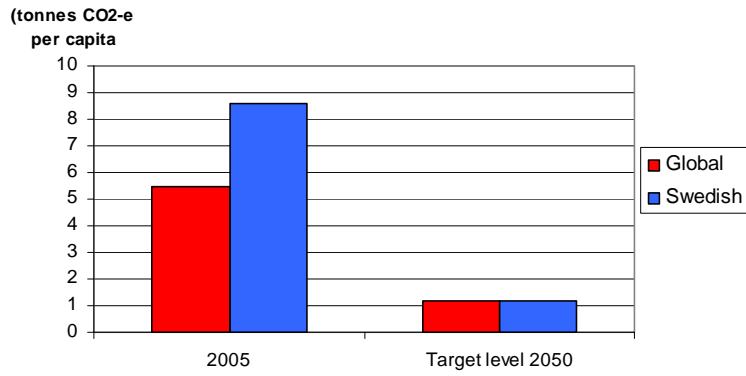
The example of Sweden

– Possible reasons for adjusting target level

- Cold climate → **Higher** emission target (maybe...)
- Much renewable energy resources → **Lower** emission target
- Medium/high historic emissions → **Slightly lower** target



Target levels for emissions 2050 in order to keep global warming below two degrees
 (-80% per capita globally, -87% for Swedes)



Sources: Stern, Nicholas (2006), STERN REVIEW: The Economics of Climate Change; EEA (2005), Climate change and a European low-carbon system.

Monocentric city

Polycentric city cluster with "satellite centres"



Approach to the Course

- Problems & Goals
 - Identify and differentiate between specific aspects of sustainability
 - Problematize these aspects, considering their interdependencies
 - Concretize these aspects in the domain of human travel (both persons and goods) and transport systems
- Solutions
 - Identify possible solutions
 - Develop detail of how they would be implemented
 - Assess their potential, accounting for:
 - Complexity of the real world
 - Longevity of effects
 - Business, technological, and human aspects
- Policy
 - Propose policy conditions that support Sust. Transp.



Overview of the Course

Intro

- Intro: Sustainability Concepts

Problems and Goals

- Transport and Climate Change
- Local Transport Emissions and Physical Health
- Road Ecology and Urban Fringe Effects

Solutions

- Energy Futures
- Bioenergy, Climate and Development. Francis Johnsson
- Vehicle Technology and Fuels
- Sustainable Travel behaviour
- IT and Travel /EIA, SEA etc
- Built Environment and Travel Behaviour
- Transport and Land Development
- Backcasting scenarios

Policies

- Urban and regional policy
- National and Global policy
- Study Visit Royal Seaport
- Project Assignment seminars



Requirements to pass the course

1. **One project assignment** (3.5 ECTS credits): short paper on one of the themes of the course, to be presented and discussed in a seminar. (Graded A-F)
2. **Reflection** of own contribution to project assignment
3. **Four individual assignments** (4.0 ECTS credits). (Graded A-F)



Project assignment – Proposal for a public policy workshop on “Transport and sustainable development”.

- Groups formed: **Tuesday, March 31**
- Subject reported: **Tuesday, April 14**
- Written project report: **Friday, May 15**
- Each group will make an **oral presentation** at one of the four seminars in May. The four time slots are:
 - **May 19: 9-12 and 13-16**
 - **May 21: 9-12 and 13-16**
- **Group Membership**
 - Groups of **two** students. You are free to form the groups amongst yourselves, with a few restrictions:
 - The group members must come from different *countries*.
 - If possible, the group members should represent different *continents*.
- **Individually**, you will hand in a written reflection on how the group work functioned and on other groups' presentations.



Four Individual Assignments

- Written assignments of maximum 500 words (1 A4 page)
- These topics will also be discussed orally
- The assignments should be discussed a specific issue and reflect the lectures and the course literature



Plagiarism

Def: "submitting someone else's work as one's own"

Examples:

- **Copying** of text, drawings/diagrams and pictures without citing the **source**
- Copying **other students' work** without acknowledgment
- Using **ideas**, data or other material **without specifying** the **source**
 - *Exception: general knowledge*
- **Summarising** or rewriting a text without **essentially** changing the original
 - *Exception: general knowledge*
- Too close **cooperation** with other students when it is not endorsed
- **Translating** without stating the original source



Plagiarism cont.

- Handbook "Guiding students away from plagiarism"
- www.kth.se
 - Student
 - Student Support
 - Student Rights
 - Cheating and Plagiarism
- Also intended for students to read
- **Assignments will be checked for plagiarism**



Course literature

- **Required** literature will be put on Course Web, according to theme.
- ***List is still being updated***
- **Slides from lectures** will be put on Course Web after the lectures
- All readings will be available
 - either from Course Web directly,
 - or from the Internet (link),
 - or from KTHB on-line scientific journals (e-journals)



Course administration

- KTH's Course and Program Pages
 - Go to www.kth.se
 - Log in using your kth.se-account
 - Find the course **AH2303/AG2804** under **Courses**
 - **Calendar:** syllabus, schedule, literature list, survey, course evaluation (for later)
 - **Documents:** lecture slides, literature, links...(Not yet updated)
 - **Assignments:** the 4 short assignments, and the group project
 - Check regularly!