



## Smart Society Conference

30–31 January 2018 Sundsvall

# DENSE, SPARSE, HIGH, LOW, EARTH OR MOUNTAIN? BUILDING PATTERNS AND DIGITALISATION IN A HEATED CLIMATE

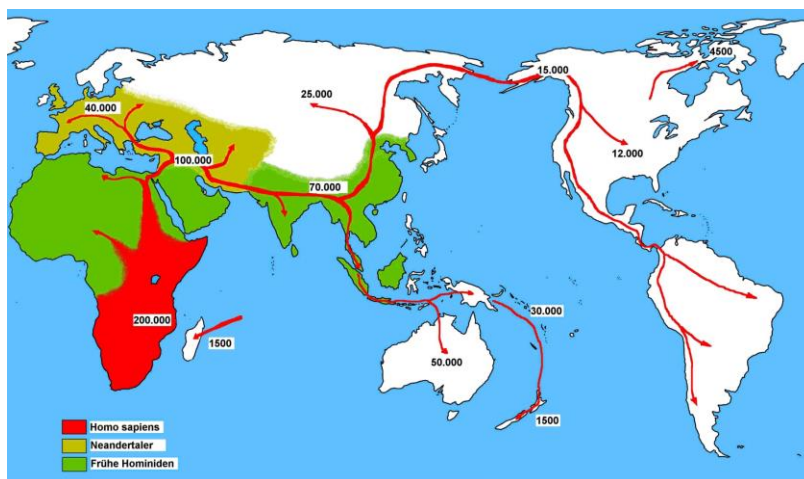
Lars Westin

Professor in Regional Economics  
Centre for Regional Science (CERUM)

Umeå University



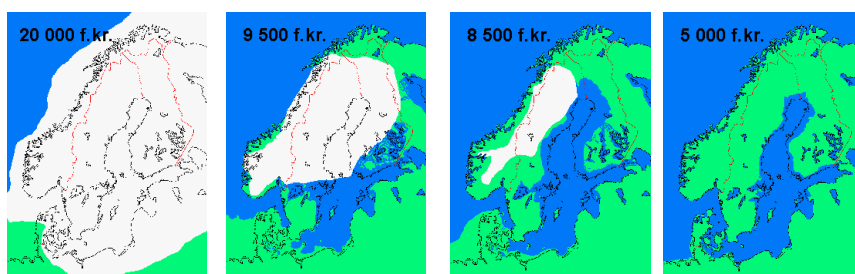
## ON THE MOVE DURING 200 000 YEARS



SOURCE: SO-RUMMET

# GETTING HEATED 1

## ICE AGE AND CLIMATE CHANGE



LAND RAISE Louis Agassiz, Otto Torell around 1860



# THE ADVANTAGE OF CITIES

## THE NEOLITHIC REVOLUTION

### 10 000 YEARS AGO

**“THE HILLY FLANKS”**



Figure 8.1. The Fertile Crescent, encompassing sites of food production before 7000 B.C.

## TWO CENTRES: WEST AND EAST EURASIA

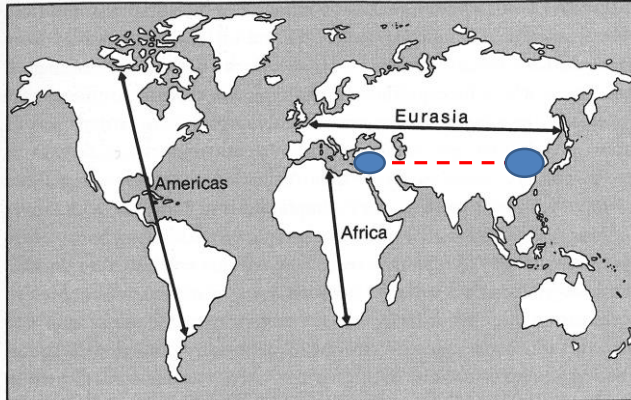


Figure 10.1. Major axes of the continents.

## GEOGRAPHY GAVE WEST AN ADVANTAGE ... FOR A WHILE...

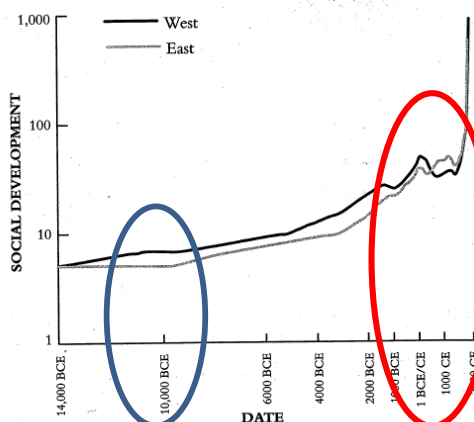
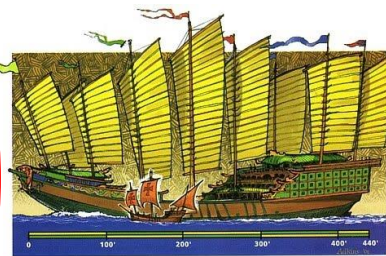


Figure 3.7. The growth of social development, 14,000 BCE–2000 CE,



CHINA: ADVANTAGE,  
EXPLORATION AND  
ISOLATION - 1433 A.D.

## GETTING HEATED 2 1781 STEAM



James Watt

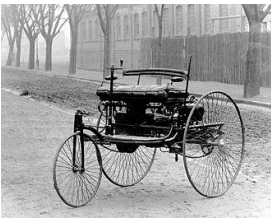


## PUBLIC TRANSPORT

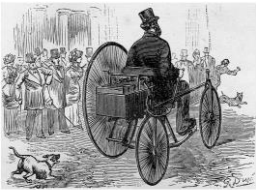


# THE INDIVIDUAL CAR

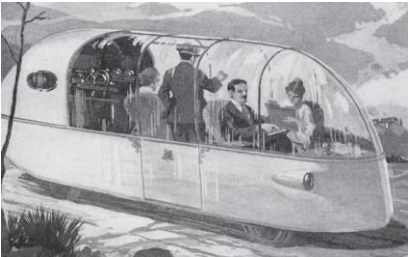
1801 Puffing Devil



GASOLINE  
Karl Benz  
1885



Electric Car 1881



VISION 1918: ONLY A FINGER!

# THE COMPACT CITY



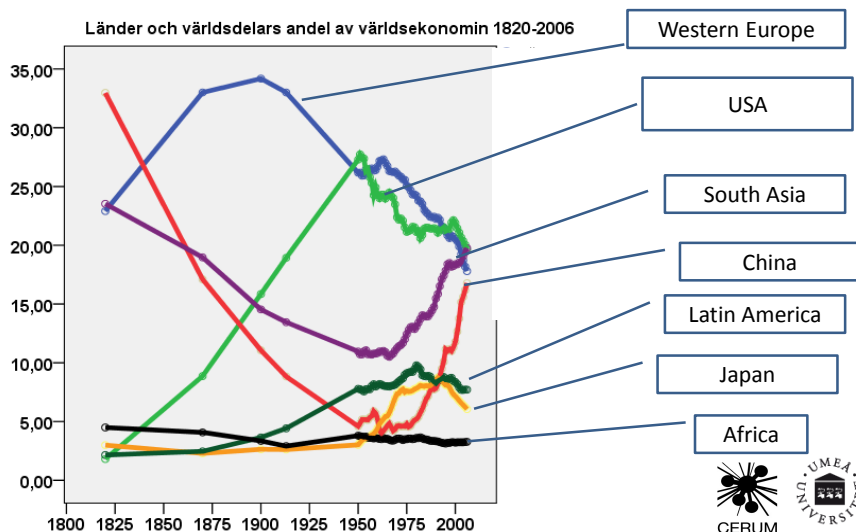
LONDON



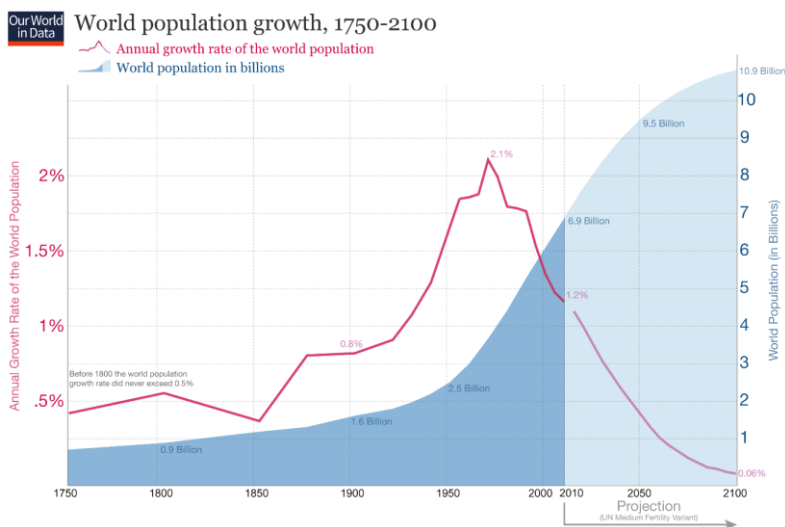
HONG KONG

# “You ain’t seen nothing yet”

Källa: Maddison GDP (PPP) och Nils-Gustav Lundgren



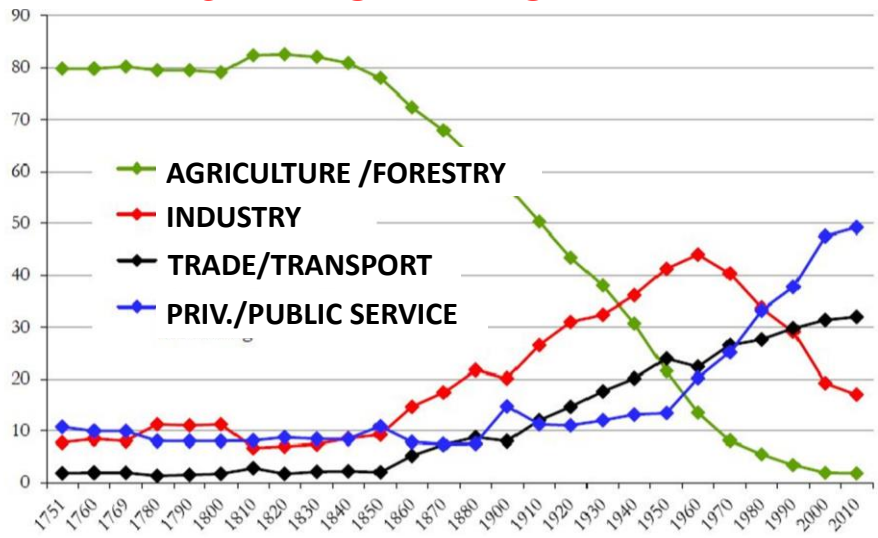
## WORLD POPULATION DECLINE



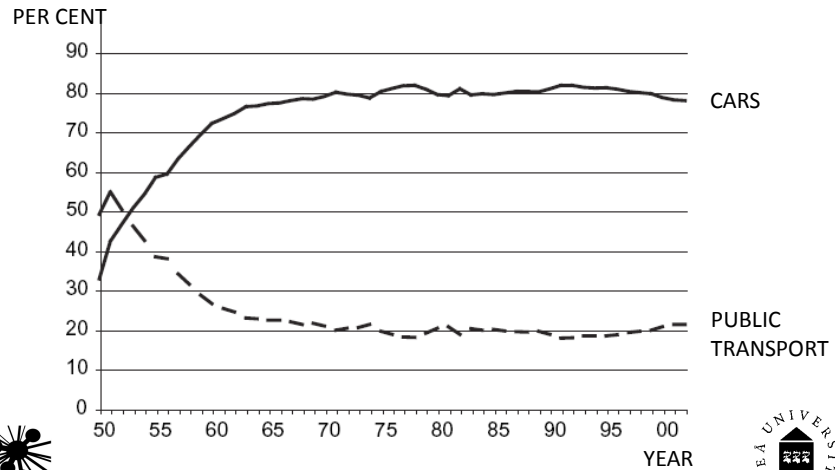
Data sources: Before 1940: Kremer (1993) – “Population Growth and Technological Change: One Million B.C. to 1990”; After: UN Population Division (2012), including population projection (medium variant). The data visualization is taken from OurWorldinData.org. There you find the raw data and more visualizations on this topic. Licensed under CC-BY-SA by the author Max Rose.



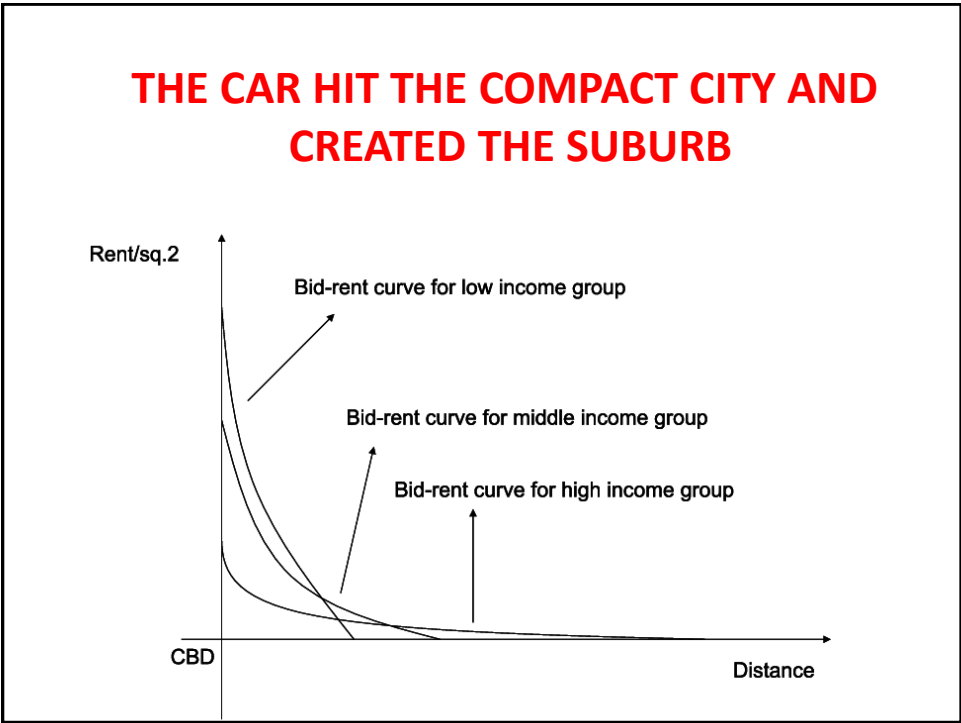
# STRUCTURAL CHANGE SHARE OF EMPLOYMENT



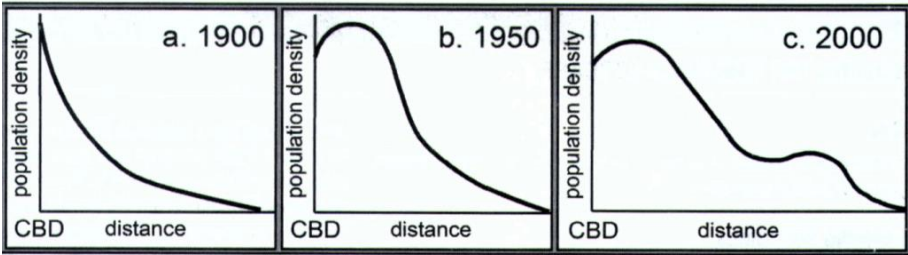
# FROM PUBLIC TO INDIVIDUAL SHARE OF PASSENGER KILOMETRES CARS AND PUBLIC TRANSPORT 1950-2002. SOURCE: SIKA



**THE CAR HIT THE COMPACT CITY AND  
CREATED THE SUBURB**



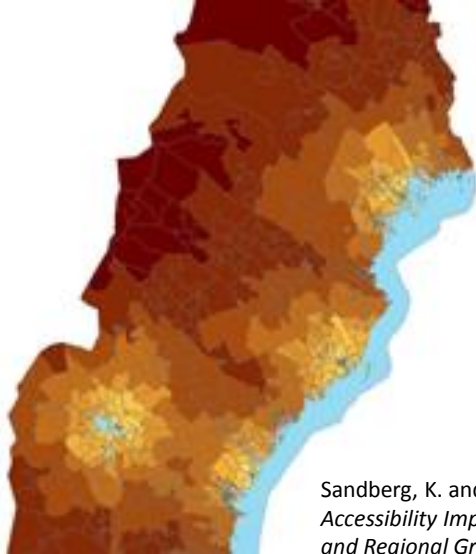
**FROM CITIES TO “URBAN AREAS”**



**Figure 10.14** Generalized trends in population density with increasing distance from the CBD, 1900–2000.

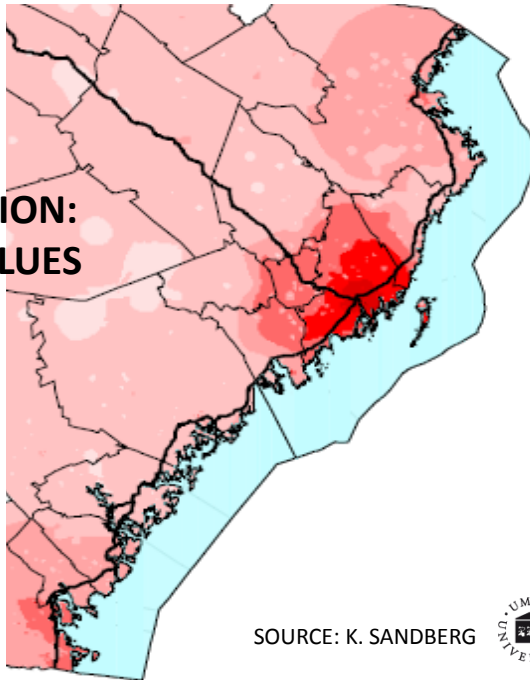


## Generalized travel cost work trips with car 2006



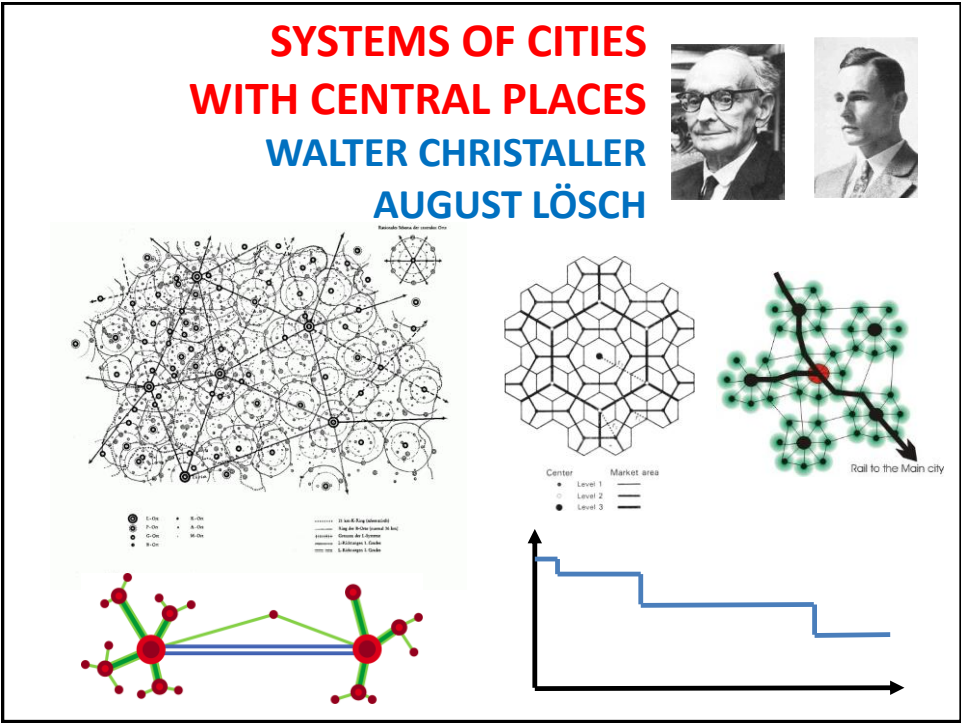
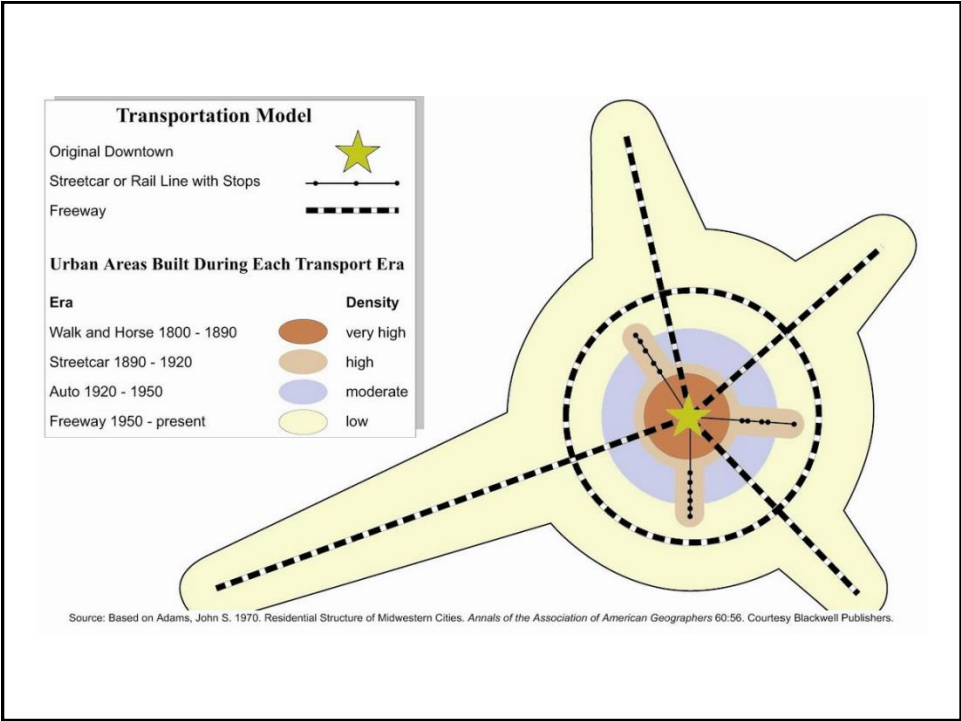
Sandberg, K. and Brandt, B.F. (2011)  
*Accessibility Improvements, Property Values  
and Regional Growth. Trafikanalys*

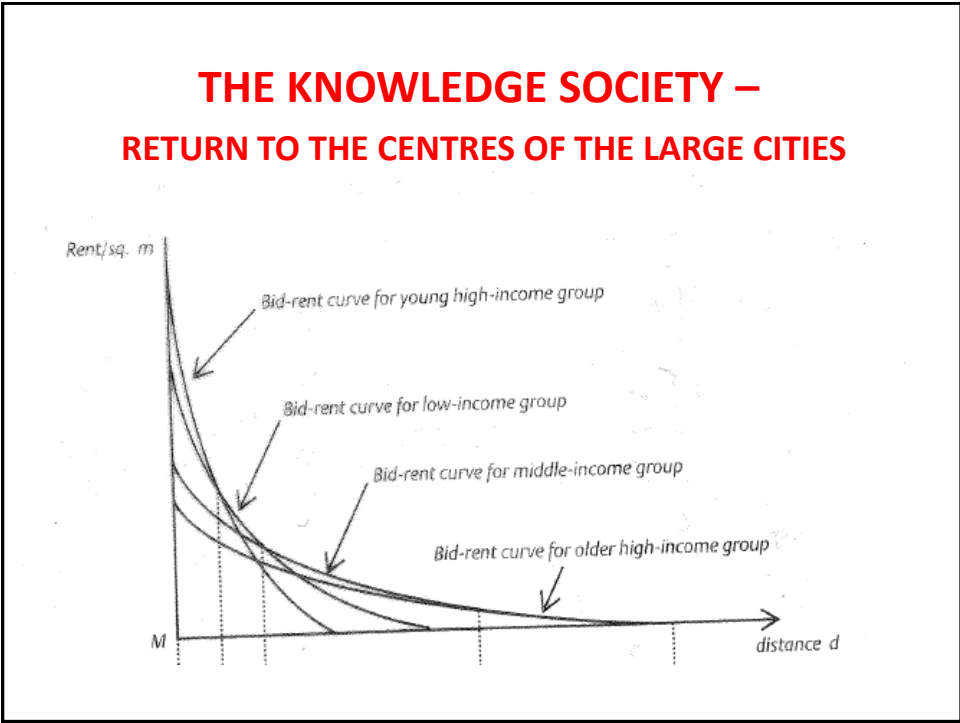
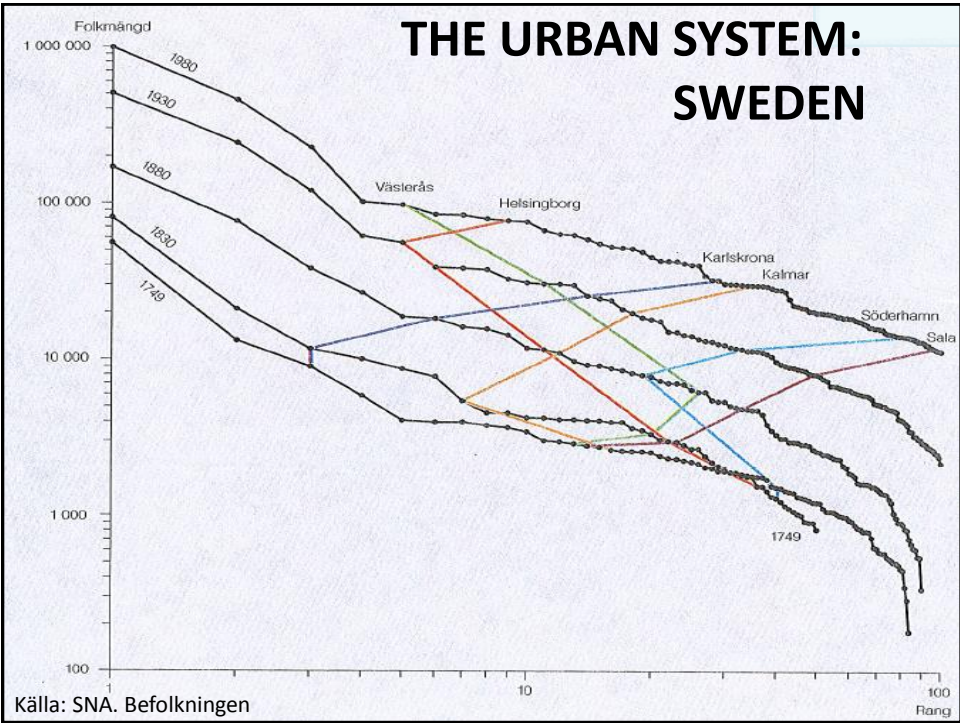
## THE URBAN REGION: PROPERTY VALUES

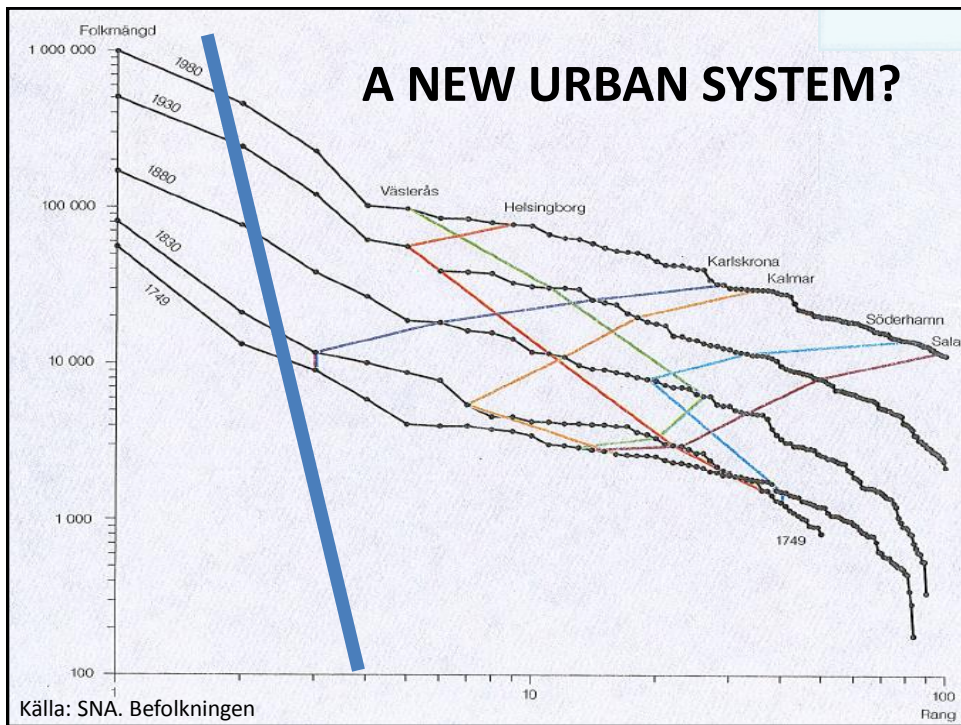


SOURCE: K. SANDBERG





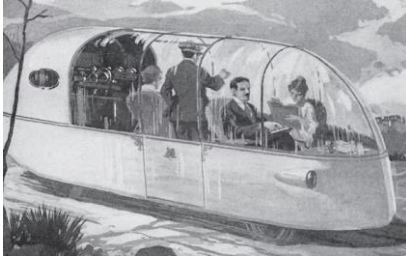




**THE FUTURE  
OF MOBILITY -  
THE FUTURE OF CITIES**



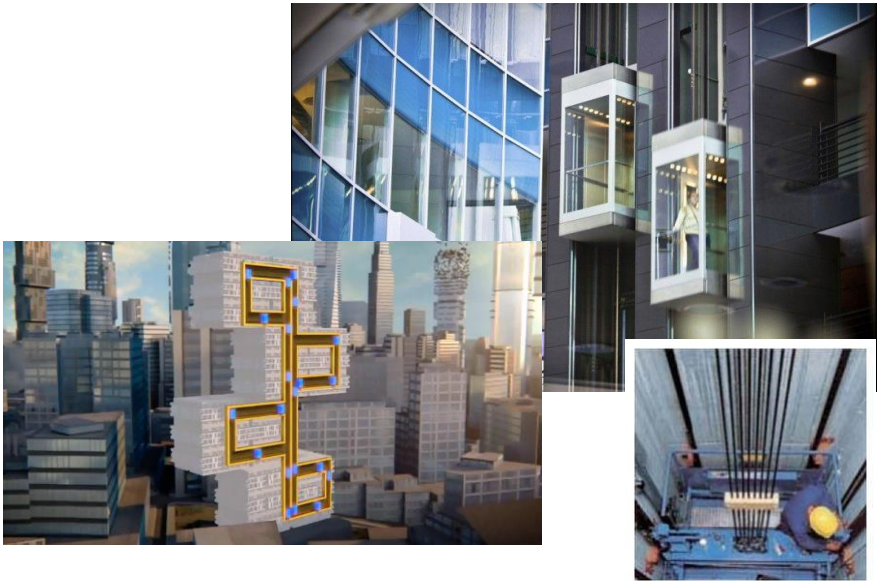
## 1918-2018: AUTONOMOUS AND INDIVIDUAL



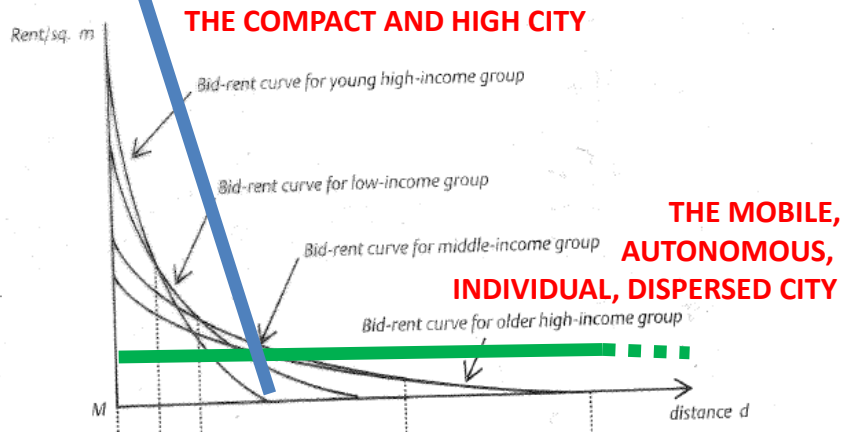
## FASTER AND FOSSIL FREE



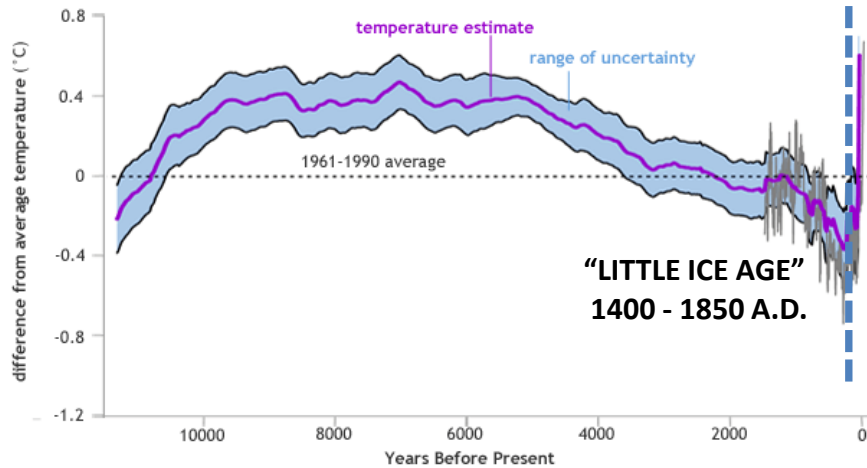
ELEVATORS: HORIZONTAL AND VERTICAL



DUAL PROSPECTS  
URBAN FORM, INTERACTION  
AND TRANSPORTATION



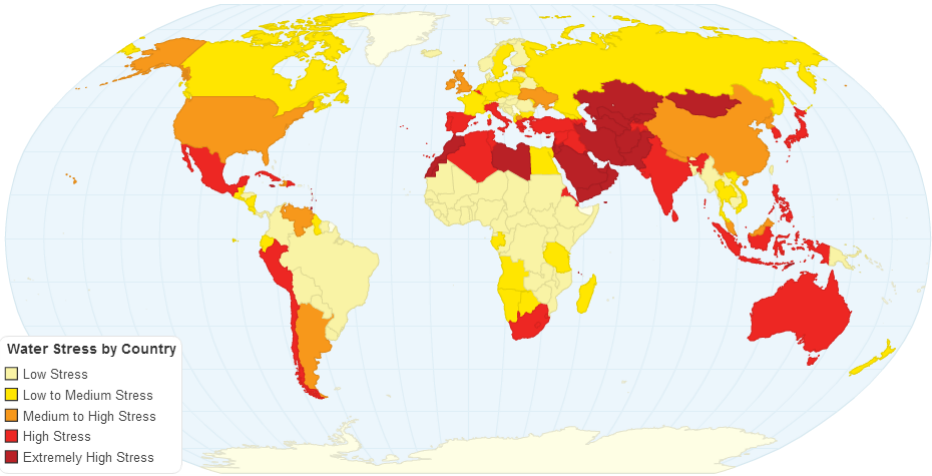
## ***HOLOCENE AND ANTHROPOCENE***



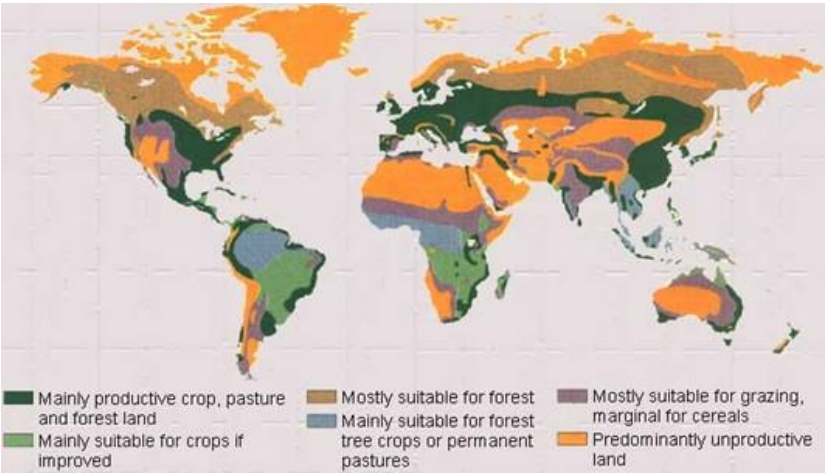
**COOLING DOWN  
BUT  
WHERE ON EARTH...?**



# WATER STRESS AND CONFLICTS



# CONSTRAINED LOCALISATION MINIMIZING GLOBAL FOOTPRINT



## **CITIES ON THE ROCKS?**



## **... AND THE FOREST TO THE WOLFS?**



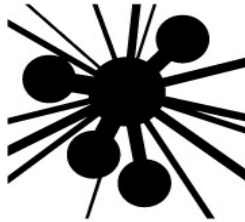
# **THE END OF CITIES?**

## **THE SOLAR POWERED AUTONOMOUS CAR WILL BE YOUR HOME**



## **SHOULD WE STAY OR SHOULD WE GO?**





CERUM  
**CITIES AND CULTURE**

