MOBILITIES, TECHNOLOGIES AND SUSTAINABLE DEVELOPMENT

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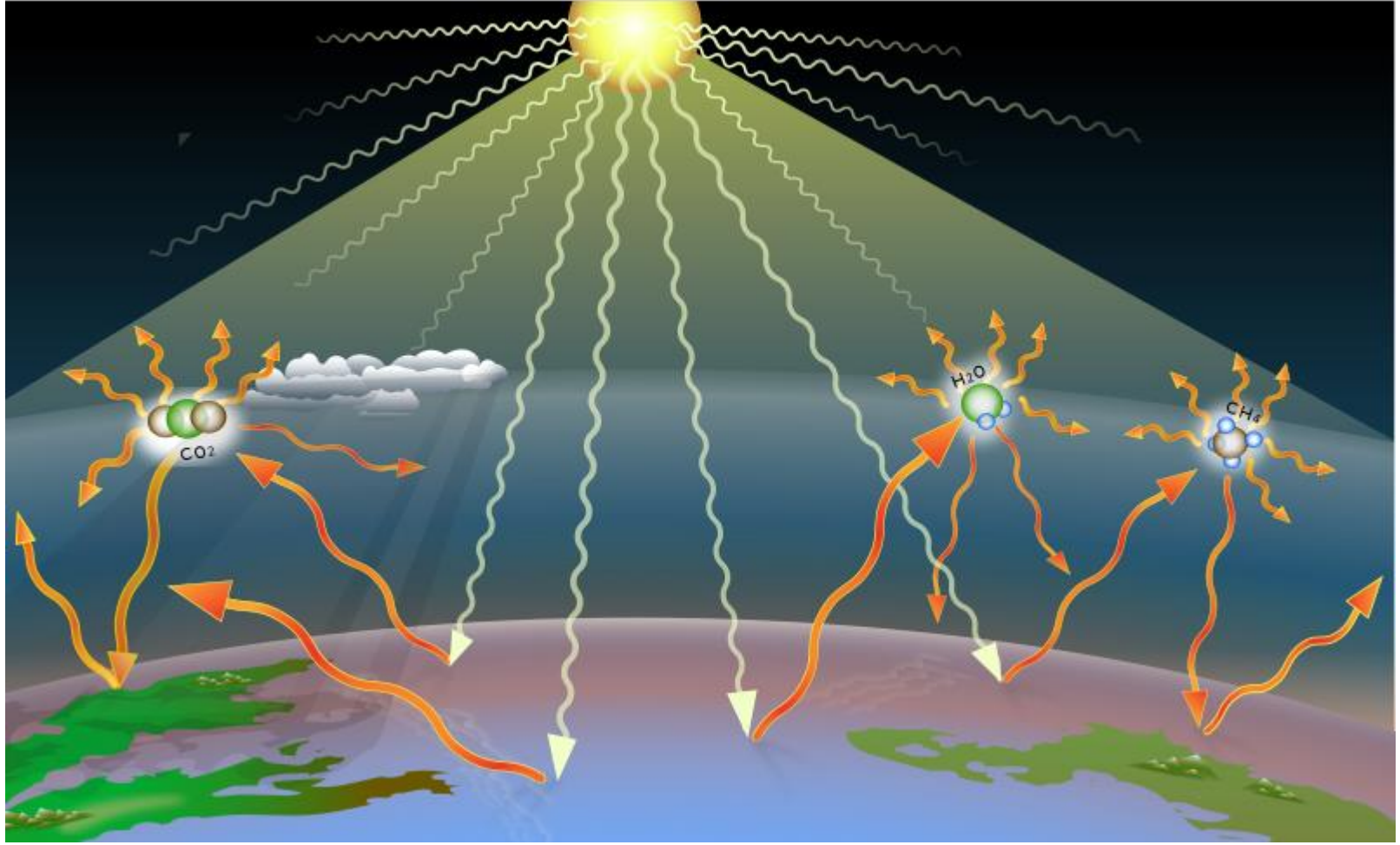
Today’s topics

- **Environmental problems**
- **Economic problems**
- **Social problems**

A Highly Mobile Planet and Its Challenges

Environmental problems



Because of high energy use, ‘automobile cities’ also produce large quantities of greenhouse gases and emissions such as carbon monoxide, volatile hydrocarbons and nitrogen oxides, which contribute to the formation of photochemical smog.

Sulphur dioxide (from transportation and industry), when mixed with precipitation causes acid rain, which results in the acidification of inland waters and kills native forests (e.g. the Black Forest in Germany and Switzerland).

Automobile-dependent cities also lose large quantities of productive land or natural areas to suburban sprawl every year. With the peaking of world oil production, cities increasingly need to retain as much near-city agricultural production as possible to minimize the energy content of food. The recent phenomenon of the ‘100 mile restaurant’ in the US and the ‘100 kilometer restaurant’ in Canada is partly a response to this issue.

The covering of vast areas of urban land with pavement for roads and parking and the construction of extensive low-density housing areas creates huge amounts of water runoff, which can cause flooding as well as polluted water from the oil and brake residues that build up on the pavement. Los Angeles is a prime example of this, where in some areas up to 70 per cent of the land area is covered with roads and parking; the remainder comprises buildings, and its expansive aqueduct system is sealed in concrete to separate it from ground contamination, but is nevertheless badly polluted from pavement runoff.


JVC
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Traffic noise, neighborhood severance and deterioration of the public realm are a major feature of auto-dependent environments. Traffic noise pervades every aspect of life from intrusion into dwellings and workplaces to the inability, in some cases, to converse in public.

Since the automobile began to dominate urban transport systems, neighborhoods have been carved into two by large freeways and roads have been widened, making it impossible for neighbors to maintain contact across their own streets.

Wide highway crossing the city of Los Angeles

The US Federal Highway Program, which saw thousands of miles of freeways carved into the urban fabric, destroyed hundreds of thousands of homes across the country and resulted in the fragmentation of intact wellfunctioning urban neighborhoods, especially working-class ones, built on easy contact among neighbors.

The public realm has suffered immeasurably as streetscapes have become dominated by parking, roads and the other paraphernalia of auto dependence, including high levels of visual intrusion from auto-scale advertising signs, or ‘100 km/hr architecture’ as Jan Gehl, the famous urban designer, calls it (Whitelegg, 1993; Newman and Kenworthy, 1999).

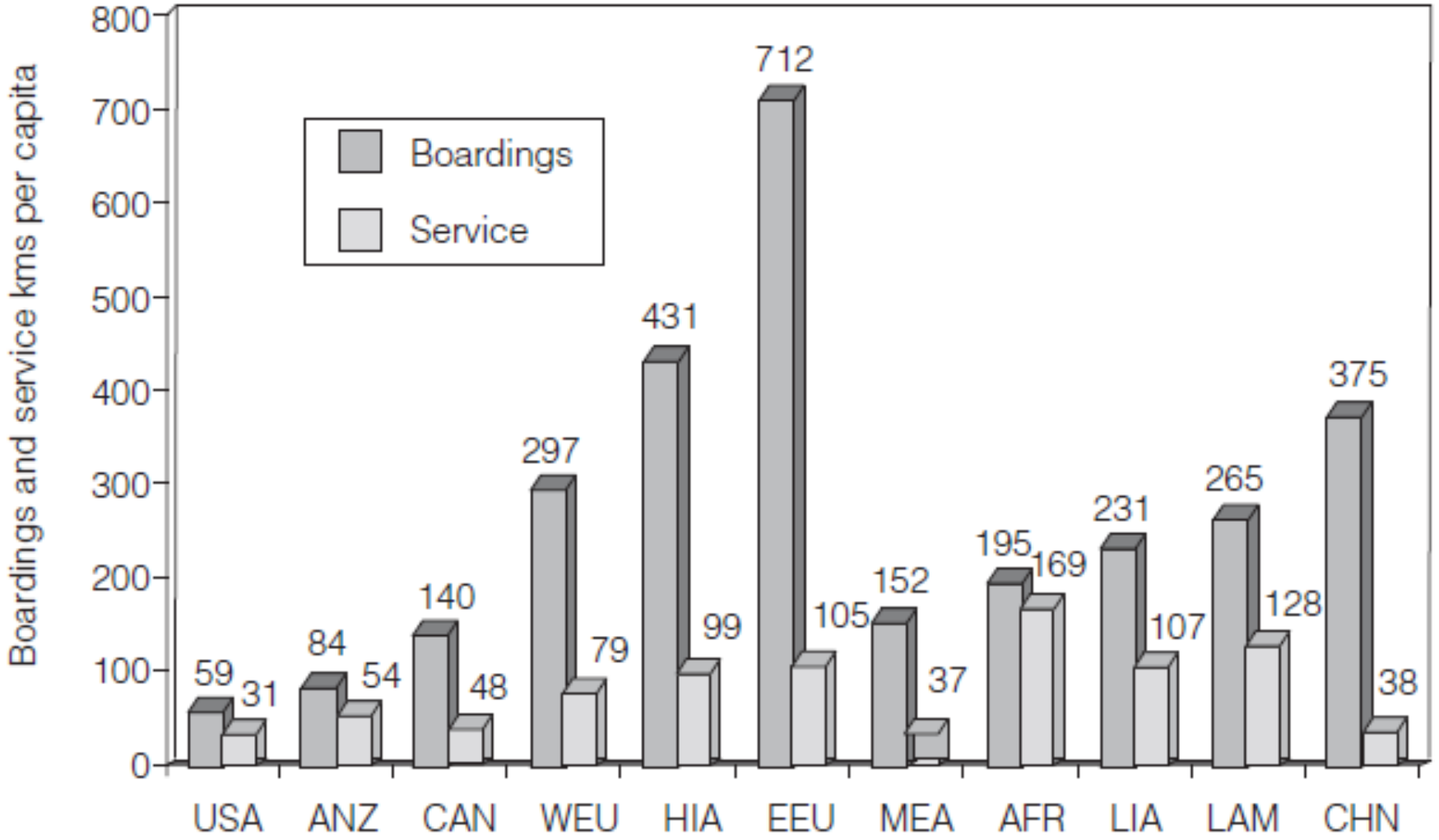
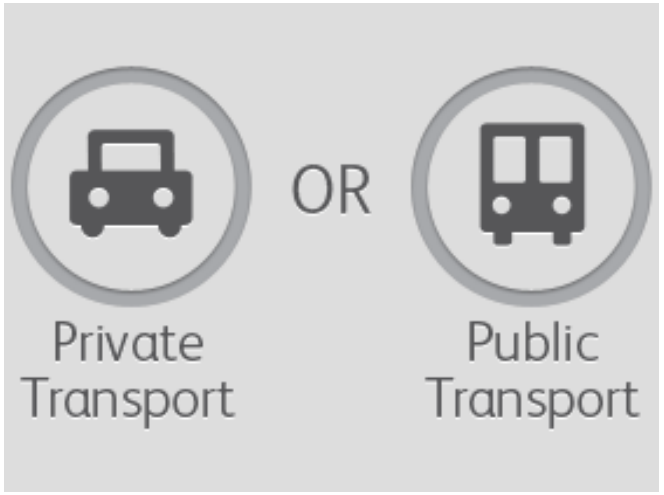


Figure 1.7 Transit system service provision and use per capita in world cities, 1995

Note: Vertical scale is annual boardings and vehicle kilometres per capita. Abbreviations as in Figure 1.9, opposite.

Source: based on Kenworthy and Laube (2001)

Finally, one of the most insidious problems created by auto dependence and its attendant land uses is the spiraling decline of transit systems. Figure 1.7



As can be seen, the US and Australian cities, and, a little less so, the Canadian cities, have low levels of transit use and service. This is not because people in these cities are necessarily less willing to use transit if excellent services are provided, but rather because entire urban systems have been built around the car, resulting in the progressive marginalizing of transit systems that have become less and less able to compete in speed terms with cars, or, indeed, in most of the other factors that influence people's mode of choice, such as level of service and frequency.

Economic problems

Thanksgiving traffic gridlock in L.A.

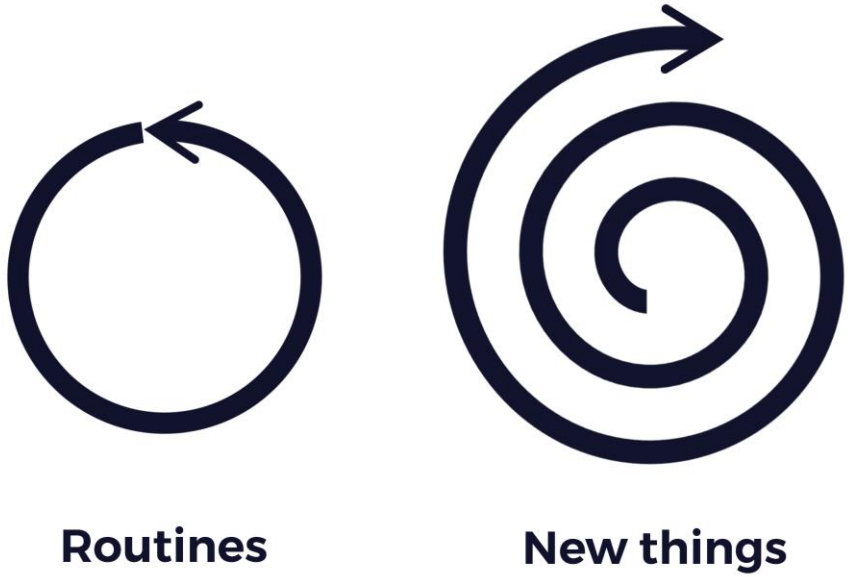
Poor kid…

Automobile cities suffer a number of economic impacts, such as congestion costs in terms of lost time and the high costs of urban infrastructure for the extra distances that must be traversed for water, sewage and drainage systems, roads, and a variety of social infrastructure such as schools, medical centres and community halls that must be duplicated as the city spreads.

Detroit's Bankruptcy Follows Decades Of Decay

Tash-Komur

In the meantime, vast areas of existing urban infrastructure remain underutilized due to demographic changes and are begging for revitalization through better transit and higher densities (Newman and Kenworthy, 1999).



There are also issues such as the loss of productive rural land and urban land to sprawl and pavement. The excessive use of land in cities for the movement of cars to cater for upwards of 80 percent of daily trips, when other less resource-consuming options are vailable, has a significant opportunity cost.

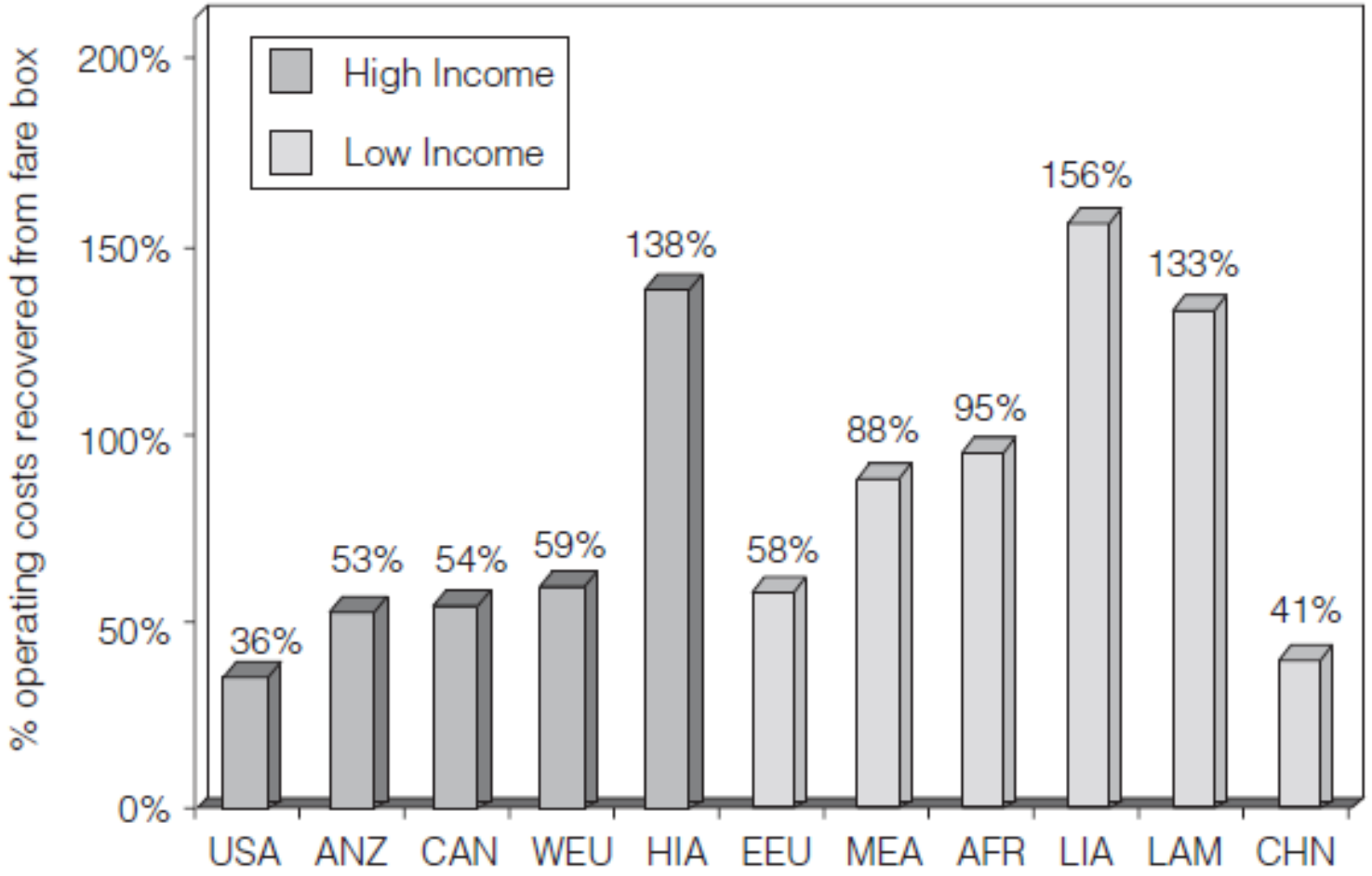
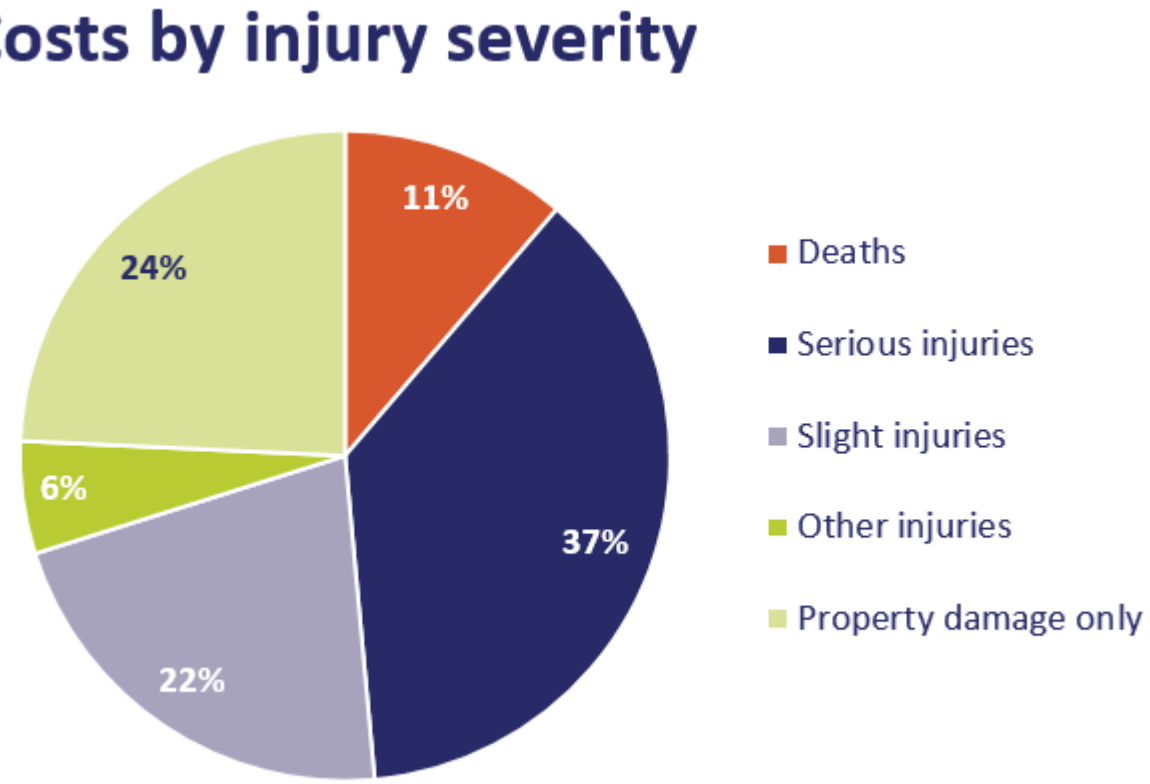


Figure 1.9 Transit operating cost recovery in world cities, 1995

Note: CAN = Canada; ANZ = Australia and New Zealand; WEU = Western Europe; HIA = high-income Asia; EEU = Eastern Europe; MEA = Middle East; AFR = Africa; LIA = low-income Asia; LAM = Latin America; CHN = China.

Source: based on Kenworthy and Laube (2001)

Transit systems in auto-dependent cities also tend to have lower operating cost-recovery ratios – that is, the percentage of operating costs that are recovered from fare box revenues. In 1995, US transit systems had the lowest recovery of all cities, at 36 per cent.



There are large economic costs associated with road accidents and deaths in cities. About 45,000 people die on US roads per year, equivalent to a full-scale war. Road accidents cost developing countries US$100 billion per annum, compared to all incoming aid to developing countries of US$50 billion. Road accident costs worldwide are conservatively estimated to be US$518 billion.

huge parking place and playground

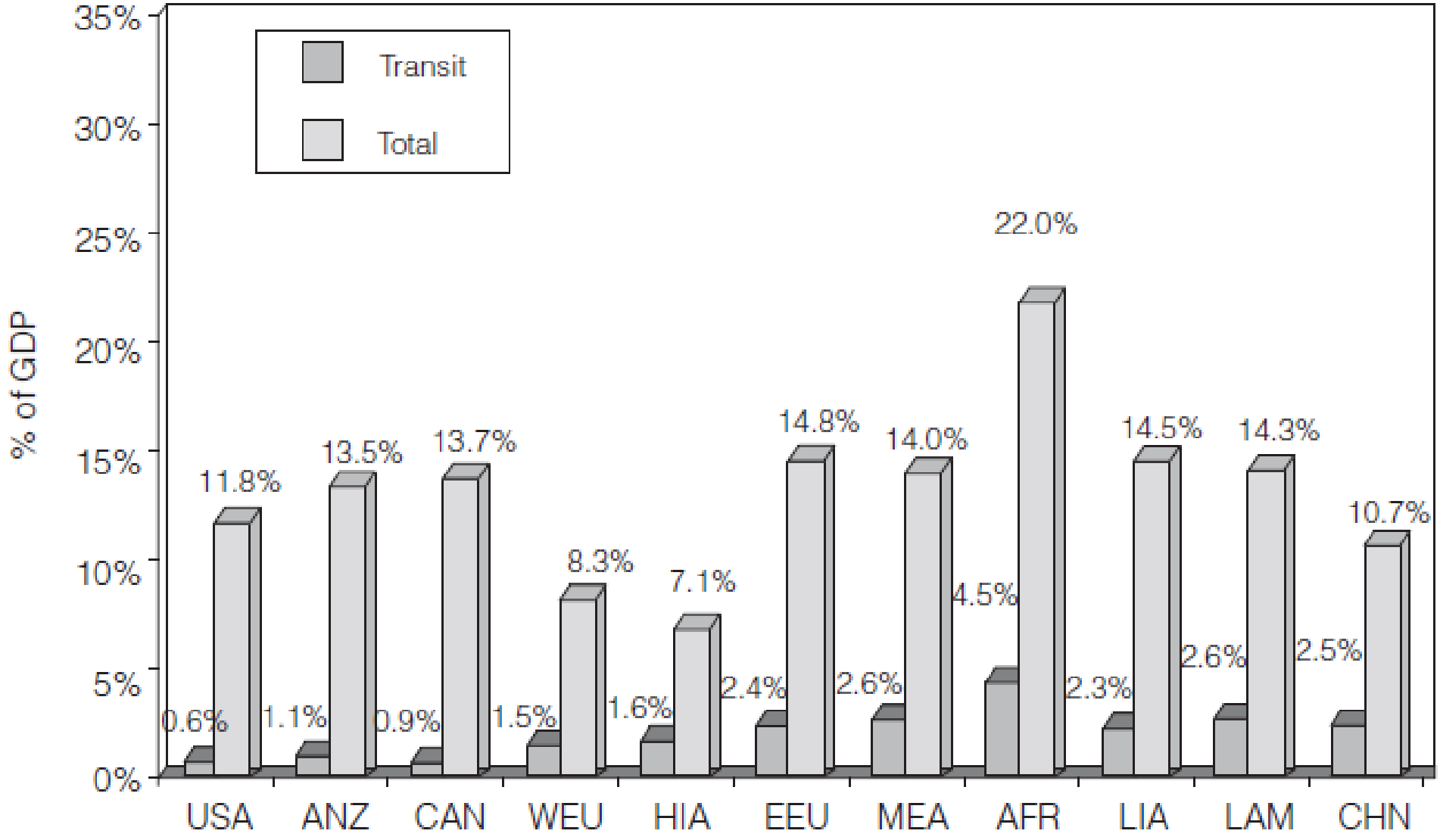
But the biggest cost to cities of dependence on cars comes when one adds up all the operating and infrastructure investment costs for both private and public transportation and normalizes it according to wealth (i.e. as a percentage of gross domestic product – GDP).

These data consider all operating costs of both private passenger transport and transit, as well as a five-year average investment cost for roads and transit all added together. The results are shown in Figure 1.10 and they clearly demonstrate that in the developed or wealthy countries with comparable wealth, it is the auto cities that are paying the biggest price tag to maintain daily access to the needs of everyday life, while the transit-, walking- and bicycling oriented European and wealthy Asian cities spend a lot less. Since transportation is a cost that should be minimized, this lower expenditure gives these cities a competitive advantage. And the data show the relatively small proportion of city wealth that is expended on transit, irrespective of its significance.

Figure 1.10 Proportion of city wealth spent on passenger transportation and the transit component in world cities, 1995

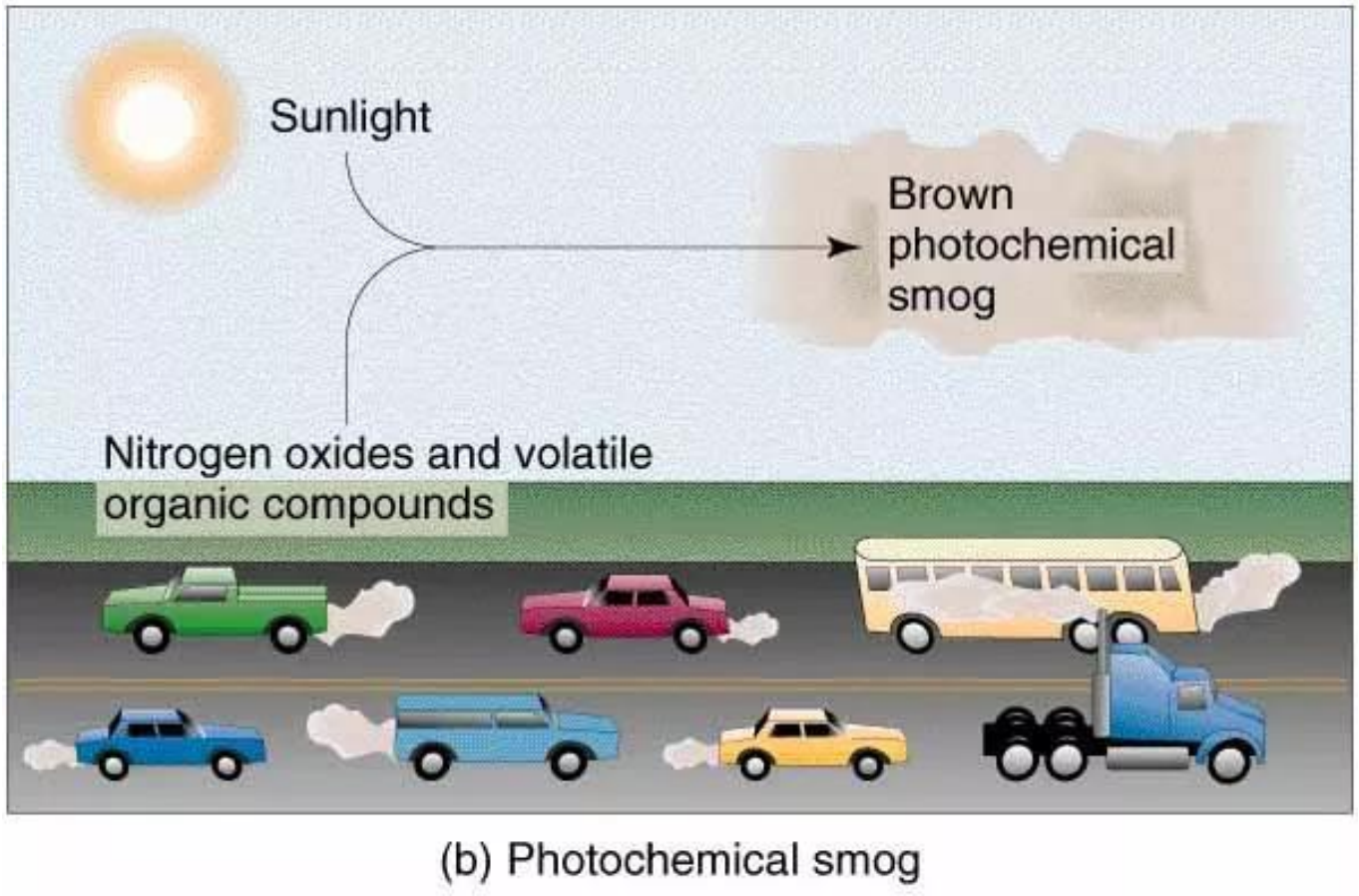
Note: CAN = Canada; ANZ = Australia and New Zealand; WEU = Western Europe; HIA = high-income Asia; EEU = Eastern Europe; MEA = Middle East; AFR = Africa; LIA = low-income Asia; LAM = Latin America; CHN = China.

Source: based on Kenworthy and Laube (2001)



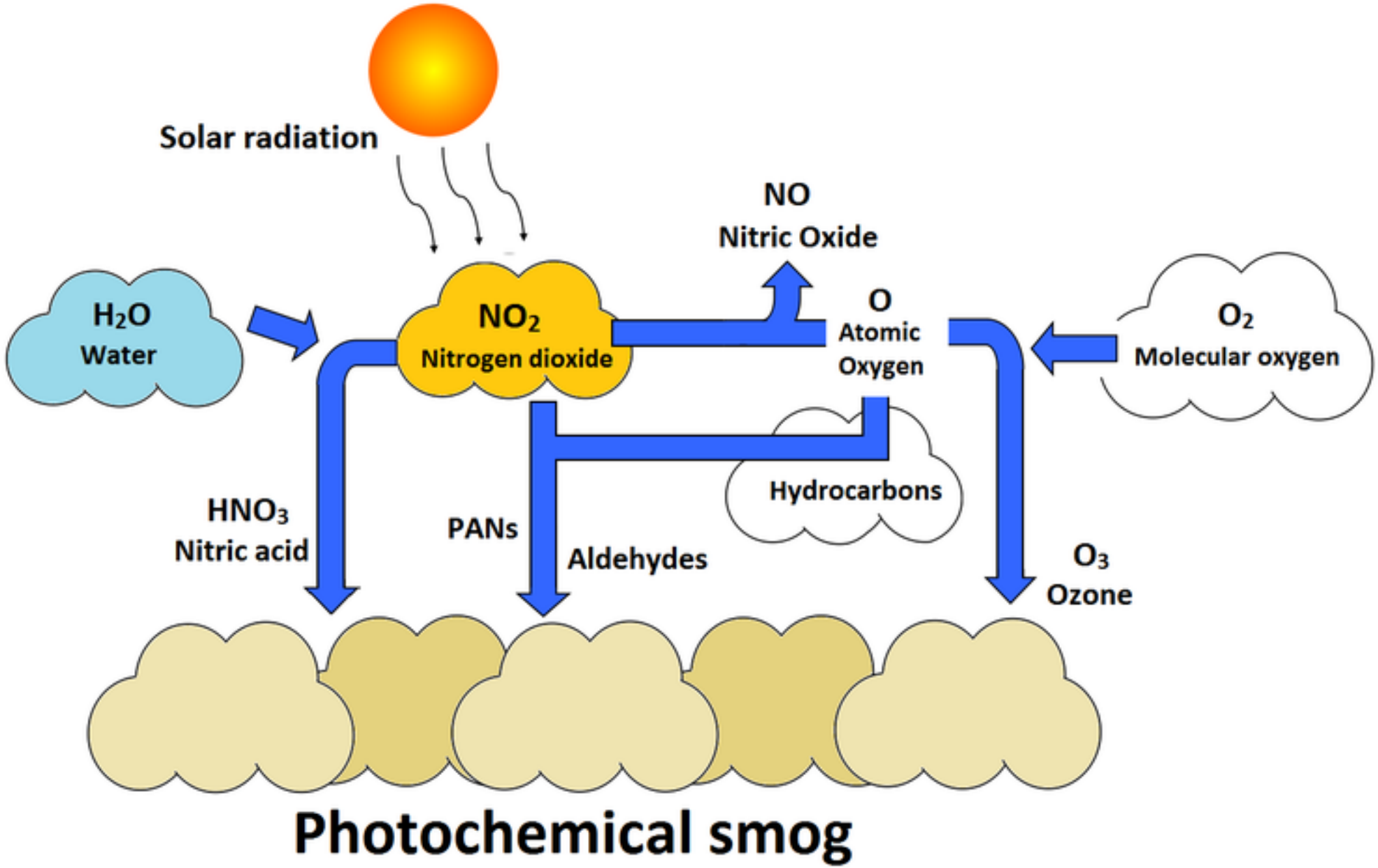
Other, perhaps less obvious, economic impacts of automobile dependence include the effects of obesity on the health system from lack of physical activity, including walking. A Rutgers University study by Reid Ewing entitled Does Sprawl Make You Fat? pursued this question. The US, the world's most autodependent society, has over 30 per cent of its population officially obese, the highest in the world (Frank et al, 2003).

Of course, air pollution from transportation also causes many healthrelated problems and even death in extreme cases, which carry an economic impact. The most obvious examples of this are the well-known ‘smog events’ in Los Angeles when surface ozone levels or photochemical smog reach dangerous levels and people are warned to stay indoors and not to exercise heavily.



(b) Photochemical smog

Photochemical smog also has other well-documented economic impacts, such as deterioration of paint on buildings, negative impacts upon car tyres and the killing of leafy row vegetables and citrus crops.


Solar radiation
NO
Nitric Oxide
H_2O
Water
NO_2
Nitrogen dioxide
O
Atomic
Oxygen
O_2
Molecular oxygen
Hydrocarbons
HNO_3
Nitric acid
PANs
Aldehydes
O_3
Ozone
Photochemical smog

Social problems…

Perhaps less obvious than the environmental and economic issues are a host of social issues for cities linked to excessive dependence upon automobiles. Table 1.3 lists these problems, a majority of which can be traced back to the automobile's deleterious effect on the public realm and the nature of human interactions in auto-based societies.

This is an important dimension, not only for the direct effects which these social problems incur, but also because they relate to human capacity to respond to the demands of ST. If, as is argued below, people lose the capacity to function in a participatory society, lose their sense of being ‘citizens’, then it is more difficult to enact the kind of policies and programs needed to address these problems.

Low-density auto-dependent suburbs where there are few, if any, small local shops and where little walking occurs can suffer from a lack of community feeling and a loss of street life that was common in North American and Australian suburbs only some 40 to 50 years ago.

Numerous authors over many years have pointed to many problems associated with creating urban environments with a poor sense of belonging and a lack of natural surveillance. Jane Jacobs was most articulate in her defence of lively and active city streets, especially in their capacity to help form a community and enhance public safety

Other literature points strongly to the influence that attractive, safe and walkable environments have on the development of children, especially their capacity for independence and unassisted travel. Defensive urban environments such as in gated communities and many low-density suburbs are designed for cars not children, nor do they assist in the formation of friendly, interactive neighbourhoods, referring to Jane Jacobs, reminds us of the important role played by the public realm in cities.

Thank you for your attention!

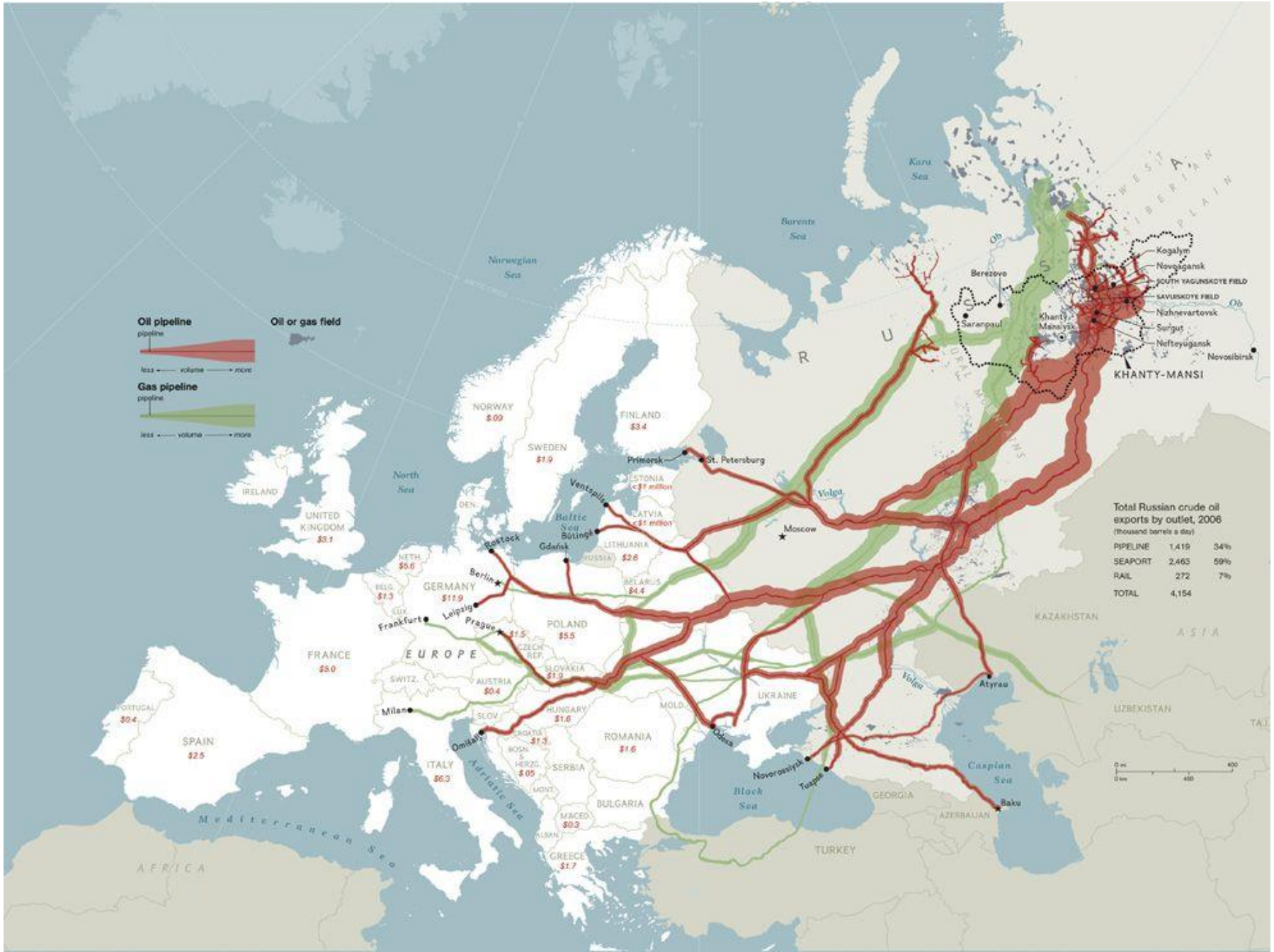
Topics for discussion

- **Environmental problems**
- **Economic problems**
- **Social problems**

Environmental problems

- What Environmental problems do you see?

Oil and gas pipelines from Russia to Europe



What is this?

Boeing-777

Area: 11,581 km2

Population 2020: 2,795,484


Foto: AP

Economic problems

- What economic problems do you see?

what kind of cars?

Social problems

- What Social problems do you see?

living street (Жилая зона)

Young boys playing in a New York City street, 1909

Thank you for your attention!