MOBILITIES, TECHNOLOGIES AND SUSTAINABLE DEVELOPMENT

Kubatbek Muktarbek uulu, PhD.

Mail: muktarbek_k@auca.kg

A Highly Mobile Planet and Its Challenges

Sustainable transportation

What is sustainable transportation about?

Sustainable Transportation (ST) emerged from three main sources:

1. Concerns about transportation's burdens and the counterproductivity of much conventional highway-oriented planning began to emerge around the planet from the 1970s onward as pollution increased and the often destructive effects of highway expansion upon cities attracted more attention *(Stringer and Wenzel, 1976; Gakenheimer, 1978; Newman and Kenworthy, 1989).*

2. The recognition in some places that reducing traffic in cities through traffic calming (deliberately slowing personal motor vehicles, or PMVs) and pedestrianization (excluding PMVs from certain streets) had many benefits for mobility and the environment, including reductions in vehicular traffic (‘traffic evaporation’) and traffic-related injuries, especially those of pedestrians and bicyclists, and increases in the numbers of people walking, bicycling and using public transportation.

3. The growth of sustainability awareness, especially following the Brundtland Commission's report (WCED, 1987) on sustainable development as 'development which meets the needs of current generations without compromising the ability of future generations to meet their own needs'.

While all efforts to define a field as complex as ST are fraught with difficulty, one of the more useful definitions is that of the University of Winnipeg's Centre for Sustainable Transportation. An ST system is one that:

What does it mean?

- allows the basic access needs of individuals and societies to be met safely and in a manner consistent with human and ecosystem health, and with equity within and between generations;
- is affordable, operates efficiently, offers choice of transport mode and supports a vibrant economy;
- limits emissions and waste within the planet's ability to absorb them, minimizes consumption of non-renewable resources, limits consumption of renewable resources to the sustainable yield level, reuses and recycles its components, and minimizes the use of land and the production of noise.

Common threads in various efforts examining ST emphasize that sustainability with regard to passenger transportation should:

- meet basic access and mobility needs in ways that do not degrade the environment;
- not deplete the resource base upon which it is dependent;
- serve multiple economic and environmental goals;
- maximize efficiency in overall resource utilization;
- improve or maintain access to employment, goods and services while shortening trip lengths and/or reducing the need to travel; and
- enhance the liveability and human qualities of urban regions

Differences between sustainable transportation and business as usual (BAU)

The dominant transportation paradigm until now has emphasized single-mode mobility – whether automobiles, planes or huge cargo ships; ‘hard path’ approaches relying upon facility expansion – whether roads, parking, ports or runways; and financing that often masks the full costs and environmental consequences of its arrangements. The paradigm of conventional transportation planning and policy may be termed BAU. Some of the major points of comparison are presented in Table 1.1.

Table 1.1 Comparison of business as usual and sustainable transportation

Business as usual (BAU)	Sustainable transportation (ST)
Emphasizes mobility and quantity (more, faster)	Emphasizes accessibility and quality (closer, better)
Emphasizes one mode (uni-modality, automobility)	Emphasizes plurality (multi-modality)
Often lacks good connections between modes	Emphasizes interconnections (intermodality)
Accommodates and accepts trends	Seeks to interrupt and reverse harmful trends
Plans and builds based on forecasts of likely demand (predict and provide)	Works backwards from a preferred vision to planning and provision (deliberate and decide)
Expands roads to respond to travel demand	Manages transportation or mobility demand
Ignores many social and environmental costs	Incorporates full costs within planning and provision
Transportation planning often in ‘silos’ disconnected from environmental, social and other planning areas	Emphasizes integrated planning combining transportation with other relevant areas

Unsustainable transportation: The magnitude of the problem

The challenge facing the shift from BAU to ST is great. It touches upon almost every aspect of life: ecosystem health, liveability of communities, access to jobs and services, and the costs of basic goods, including foodstuffs, to identify a few. One way of understanding the world that BAU in transportation has led to is to consider the magnitude of personal and freight mobility and the increasing length and dispersion of trips. The concept of ‘hypermobility’ is very useful in this regard.

Hypermobility

The magnitude of the mobility of persons and freight and the vast trip distances generated by such mobility are presented in Box 1.1 and Table 1.2. BAU in transportation has meant that more roads have been built and expanded, which has not led to less traffic congestion. It has led to more driving, longer trips for people and freight, more sprawl, and more land and energy consumption (Newman and Kenworthy, 1989, pp94–110; Whitelegg, 1997). The magnitude of personal and freight movement has been characterized by John Adams as 'hypermobility'. Building upon the work of Ivan Illich (1973, 1976), Wolfgang Sachs (1992) and others, he has described the serious environmental and social consequences of allowing this phenomenon to continue unchallenged:

- more dispersion of society; more sprawl and destruction of natural areas; longer distances to destinations;
- more societal polarization and inequity between the highly mobile and those denied the benefits of mobility and accessibility; more crime;
- more danger for those not in cars, especially children and other vulnerable persons; more fat, less fitness;
- less social and cultural diversity and variety; less democratic politically; less participation (Adams, 1999, 2000).

An attempt to capture a snapshot of the magnitude of this issue is presented in Box 1.1 and Table 1.2.

Box 1.1 Passenger motorization: A very mobile planet with plenty of roads

Each day Planet Earth's motorists drive their 737 million personal motor vehicles (PMVs) a total of 30 billion kilometres (18 billion miles), creating 60 billion passenger kilometres (pkm) travelled, and by the year's end a total of 10 trillion kilometres (6 trillion miles) and 20 trillion pkm of travel have been recorded on their odometers. In the US, which leads the world in personal motorized mobility, motorists daily record 13 billion vehicle kilometres travelled (vkt), or 8.2 billion vehicle miles travelled (vmt), adding 20.5 billion pkm, or 13 billion passenger miles (pmi), of travel so that by the year's end they have added 5.5 trillion vehicle kilometres (vkm), or 3.5 trillion vehicle miles (vmi), and 7.2 trillion pkm (4.5 trillion pmi) to the odometers of their fleet of 230 million PMVs. While the US constitutes only 4 per cent of the world's population, American motorists own one third of the planet's automobiles, about seven to eight times the rate of vehicle ownership for most of the rest of the world, and account for over half the planet's driving.

Interspersed among the hundreds of millions of personal vehicles clogging the millions of miles/kilometres of the planet's streets and roads, some 100 million trucks and lorries, ranging from small to medium to very large 18-wheelers and double and triple rigs, are busily hauling their loads, accounting for some 8 trillion tonne kilometres (tkm) per year. Churning across the oceans, a fleet of tens of thousands of cargo ships (mostly containerized) and tankers are hauling freight and fuel for a total of 45 trillion tonne kilometres annually. A larger fleet of tugs and merchant vessels transports a somewhat lesser amount of cargo along the inland waterways of the major continents.

In the skies above the roads and waterways, thousands of commercial airplanes account for 24 million flights each year, logging 6 billion pkm (3.3 billion passenger miles travelled, or pmt) travelled each day, accumulating to over 2 trillion pkm annually. The US accounts for 10 million annual flights, almost half the global commercial aviation fleet and half of the world's pkm flown, when its domestic and international flights are combined. A rapidly growing amount of freight, accounting for 200 billion tkm annually, is being carried in the holds of the commercial aviation fleet as well as by fleets of specialized air freight carriers.

Bon voyage! Bonne route!

Huge highways and their interchanges devour and divide the landscape

road junction in Almaty

Chui Avenue

Statistics about the magnitude of personal and freight mobility around our very busy planet.

World roads, paved–unpaved, of kilometres/miles paved–unpaved (millions) 15/9; 25/15
World automobile (PMV) population (millions) 737
World human population (millions) 6784
Automobiles (PMVs) per 1000 persons (world) 100
Automobiles (PMVs) per 1000 persons (US) 750
World passenger kilometres/miles by PMV daily (billions) 60/36
World vehicle kilometres/miles by PMV annually (trillions) 10/6
World passenger kilometres/miles by PMV annually (trillions) 23/12
World truck (lorry, large and medium sized) population (millions) 100
World freight movement by truck (lorry) tonne kilometres (tkm)/tonne miles (tmi) (trillions) 8/5.3
World freight total (water, road, rail, air) tkm/tmi (trillions) 58/38
World freight by water, mostly oceanic, tkm/tmi (trillions) 43/28
World freight movement per person tkm/tmi (thousands) 8700/5750
World commercial aviation flights annually (millions) 24
World commercial aviation passenger kilometres/miles, 2005 (trillions) 3.7/2.2
World commercial aviation passenger kilometres/miles daily (billions) 10/6

Complexity of the issue

Transportation has many impacts; environmental, social equity, economic, cultural, land use and urban form are but a few important ones. Currently, some of these impacts are beneficial, as when people find it easier to get to medical help in an emergency; but many are not beneficial or are even extremely harmful, as when transportation-generated pollution threatens human health and even the survival of life on Planet Earth. Many of transportation's deleterious impacts stem from the lack of integrated planning, flawed policymaking and not including effective public participation.

The variety of issues, the many dimensions of society that are affected, the diversity of actors and interests – all of these make ST an extremely interesting area of endeavour and action. Among the many important factors and dimensions that shape ST, and which vary from one society to another, are:

- culture and social organization;
- economics;
- political and social equity issues;
- environmental concerns;
- policy and planning;
- interest groups.

The problems of automobile dependence

The patterns of transportation and urban land use associated with high levels of automobile dependence present an array of environmental, economic and social problems for the sustainability of cities, as summarized in Table 1.3

Table 1.3 Problems associated with automobile dependence

Environmental problems	Economic problems	Social problems
Oil vulnerability	Congestion costs	Loss of street life
Urban sprawl	High urban infrastructure costs for sewers, water mains, roads, etc.	Loss of community in neighbourhoods
Photochemical smog	Loss of productive rural land	Loss of public safety
Acid rain	Loss of urban land to pavement	Isolation in remote suburbs with few amenities
High greenhouse gases – global warming	Poor transit cost recovery	Access problems for those without cars or access to cars and those with disabilities
Greater storm water runoff problems	Economic and human costs of transportation accident trauma and death	Road rage
Traffic problems: noise, neighbourhood severance, visual intrusion, physical danger	High proportion of city wealth spent on passenger transportation	Anti-social behaviour due to boredom in car-dependent suburbs
Decimated transit systems	Public health costs from air and other pollution	Enforced car ownership for lower-income households
	Health costs from growing obesity due to sedentary auto lifestyles	Physical and mental health problems related to lack of physical activity in isolated suburbs

Bishkek Public Transport

Example of
Decimated transit systems

LAZ-695

Ikarus-280

Environmental problems

Automobile-dependent cities have high levels of private transportation energy use, as shown in Figure 1.3, which compares per capita consumption of energy for private transportation in cities in the US, Canada, Australia and New Zealand, high-income Asia, Eastern Europe, the Middle East, Africa, low income Asia, Latin America and China.

An average American city of 400,000 inhabitants uses as much energy for private passenger transportation as an average Chinese city of 10 million people. Cities in the US, Canada and Australia are therefore highly vulnerable to events in the Middle East associated with oil, as the overthrow of Iraq demonstrates. As a consequence 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.

Figure 1.5 shows automotive smog emissions for the same groups of cities outlined above

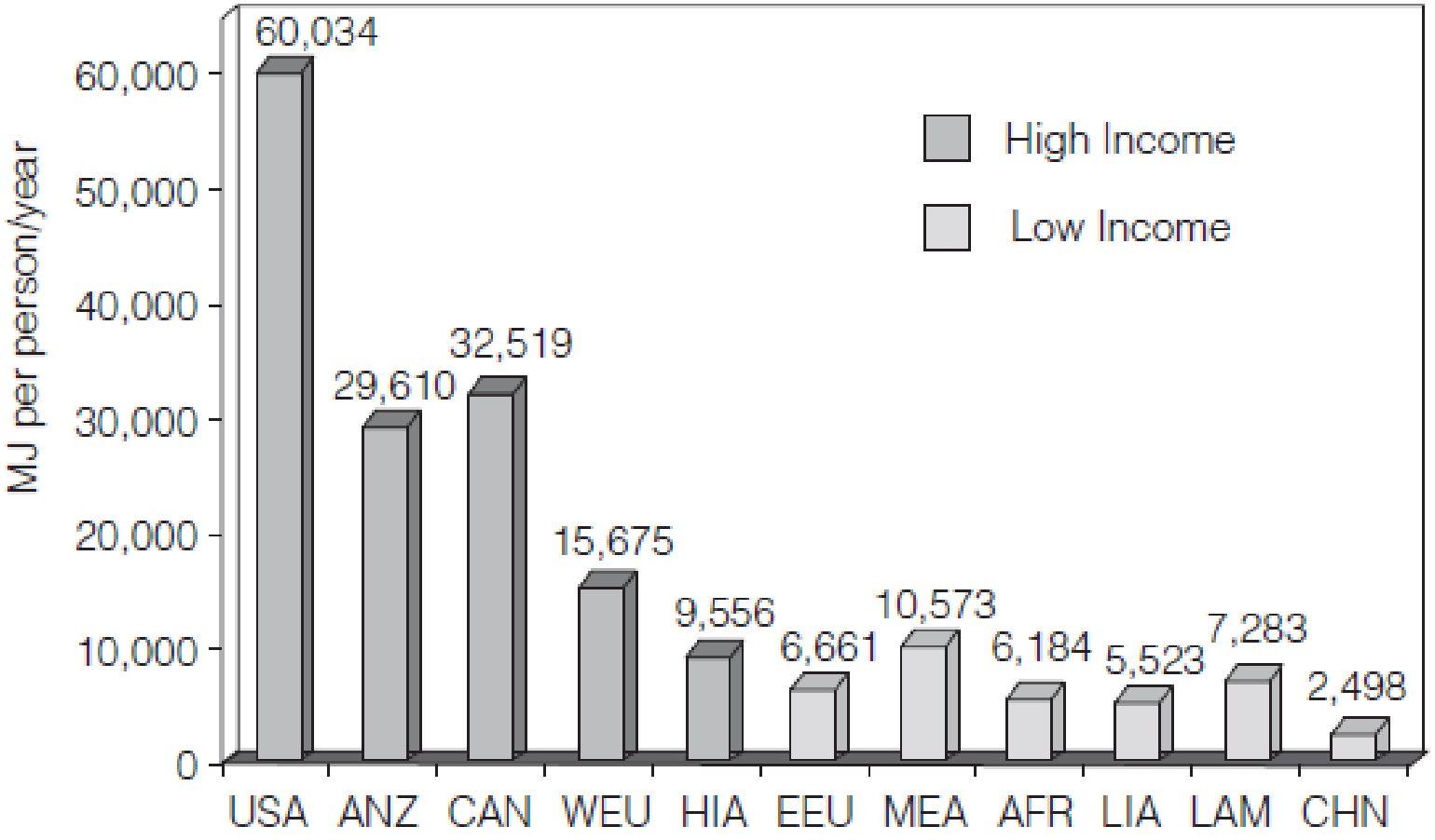


Figure 1.3 Private passenger transport energy use per capita in world cities, 1995

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)

Thank you for your attention!

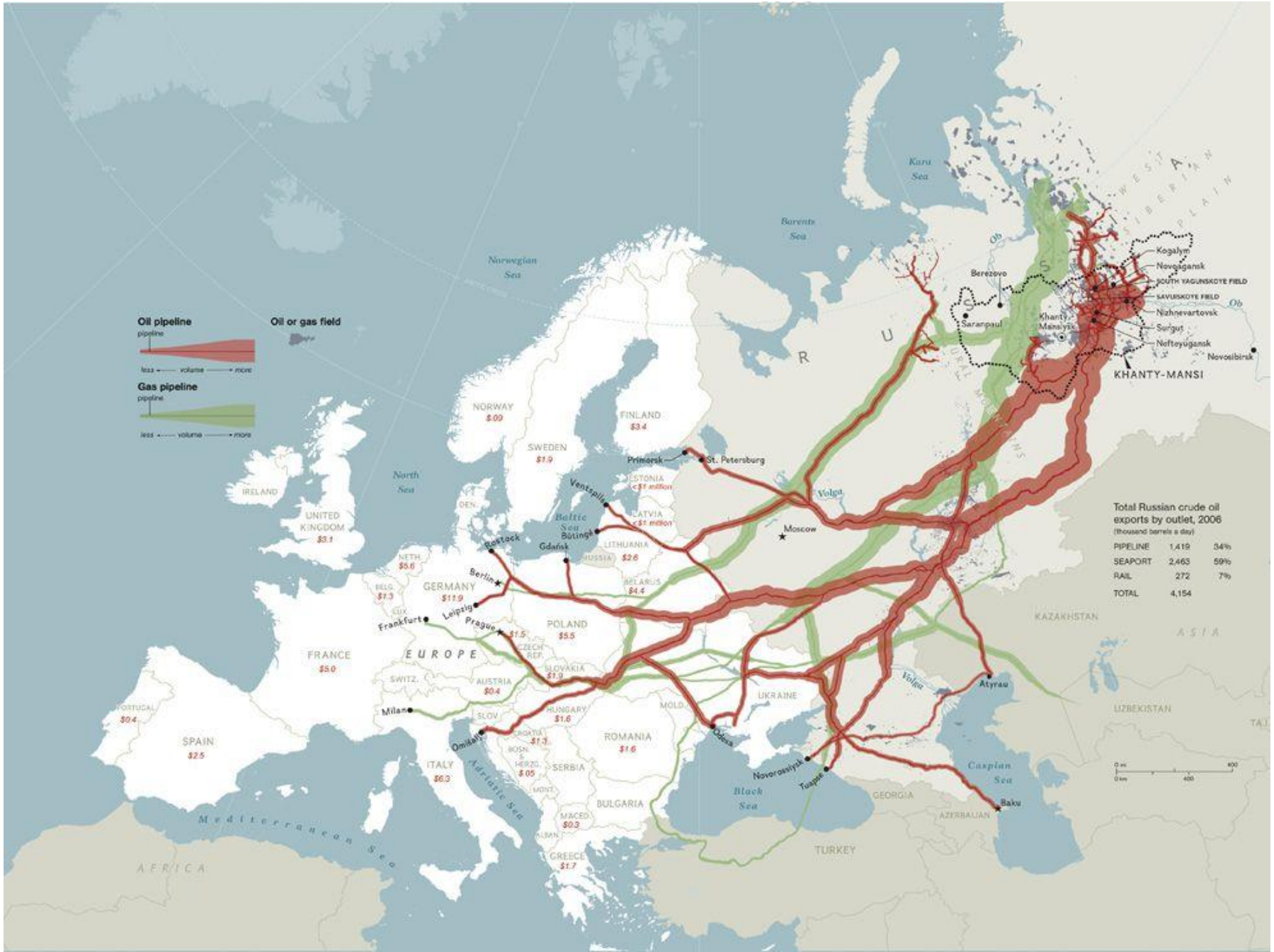
Discussions

- Kyrgyzstan’s experience:
- Parking;
- Public Transport
- Influence of fuel for the life (politics, economy etc.)
- Independence (dependence)
- parliamentary hearings on the “Road Fund”

World tendency

- Gas crisis in Europe
- Ukraine
- History of Gas pipe crisis Soviet Union Time
- Influence of price for energy for the Oil exporting and importing countries.

Oil and gas pipelines from Russia to Europe



What is this?

Boeing-777

Area: 11,581 km2

Population 2020: 2,795,484


AL ZUBARAH
アル ズバーラ
الزبارة

what kind of cars?