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This paper is a report about the results and experiences of the 1995 Environmental Fellowship from the German Marshall Fund of the United States (GMF). GMF selects five professionals from Europe and five from the United States every year for a four-week fellowship in the States and in Europe. The GMF's environmental program is referred to as "Building U.S. - European Environmental Partnerships". It focuses on local, regional and national responses to the threat of global warming. The main interests in the fellowship described here were freight transport, food supply and consumption patterns.

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Freight Transport, Food Production and Consumption in the United States and in Europe

or how far can you ship a bunch of onions in the United States?

by Stefanie Böge

Abstract

CO₂-emissions from traffic - increasingly from freight transport - are growing, especially in the highly developed industrialized countries. The answers to this environmentally problematical development are technical ones mainly: Administrators and scientists try to improve engines, transportation modes and logistic strategies. Freight transport is influenced by production, consumption, land-use patterns and life-styles. But these fundamental determinants of increasing traffic are rarely given the same priority as the technical solutions.

The main focus of this paper is on freight transportation and food supply in the United States and in Europe especially in Germany. Organic, resp. healthy and safe food is a growing demand in both countries. People who consume organic food often believe that this contributes to an environmentally sound behaviour. But transportation issues are not or rarely taken into consideration so far, although long distance transport not only needs energy, it as well influences quality, freshness and taste of food.

On both sides of the Atlantic, in freight transportation and food supply can be found a lot of differences as well as similarities. Main differences to the U.S. from the European standpoint are e.g. the bigger land area and larger and much more concentrated economic units. Quite naturally one can find a higher volume of long distance freight transport than in Europe. Similarities can be observed, but very often they present themselves in another extent, e.g. the trend towards privatisation and liberalisation, to more extended suburbanisation or to an unreflected way of consumer behaviour. In addition, this report raises some new questions: is the 'technological solution' of environmental problems the only way? What can be done to include lifestyles and consumer behaviour into a new strategy?

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1. Introduction

Freight transport on roads has increased greatly over the last decades both in Western Europe and the United States. Regardless of technical improvements, energy consumption grows steadily (1). Freight transport is heavily influenced by the nature of countries' economies (i.e., what and how they produce, and where they produce and consume it), as well as their size and physical geography. Because the United States and Western Europe are quite dissimilar in size, geography, production and consumption characteristics, their freight systems have many differences.

In Germany the quantity of freight that is shipped has not increased in the same manner as the distances (2). This means that the spatial spreading and the intensity of exchange in the economy of Germany have grown. A similar assumption should be valid for the economy of the States. In addition, the development of large trading blocks and the removal of barriers to exchange in EU and NAFTA countries has contributed to the increase of distance intensity. In Germany especially in the food sector the development of increasing distances is clear: The amount of food consumption in kg per capita has not grown very much in the last three decades (everyone can imagine our physical limits to what we can eat) but the transport activity in tonne kilometres per capita has almost doubled (3). This means that in consequence we eat increasing distances with our food. But obviously such a development makes no sense if the quality of food is decreasing.

The author has developed a method of product-related transportation analysis. It evaluates freight transportation in a product-related way. This method has been carried out so far in the food sector in several case studies. One main result of these studies is the product related distance (e.g. one strawberry yoghurt accounts for at least 10 m of a 40 tonne truck). This is a way to analyse the enormous spatial consumption of the current production system which is the main reason for the increasing environmental impacts. The product-related transportation analysis is mainly focused on spatial issues of transport. It gives information not only on technical and logistical aspects, but is also closely related with our distant intensive-lifestyles.

Reasons for the distance intensive development in production and consumption can be found in transport policies, the locations and production patterns of the (food) industry, the policy and location of retailers, the principles in agriculture, in the shopping behaviour of consumers and land use patterns. For reducing environmental impacts of freight transportation, it is necessary to extend the

view on the whole food supply (as well the automobile usage for shopping). Freight transport is a result of policies and distance intensive lifestyles, not a reason for itself.

In the United States no similar analysis of the product-related transportation analysis has been undertaken. A related methodology can be found in supply chain management, where costs of transportation are taken into account. But this method does not include a spatial component or a view on current lifestyles which have considerable impacts on freight transport or logistic strategies and with that on our environment. In this paper the general conditions in the United States are discussed and the main differences to Europe which are influencing freight transportation patterns are summarised.

2. Main findings

Obviously in the United States there is a significant difference to Western Europe. The States have more than five times the land area of former West Germany, United Kingdom, France, Italy, Sweden and Norway together (4) and therefore much more long distance freight transport. In general this long distance travel is not seen as a problem in the States. It is common that food is produced on the West Coast and sold on the East coast and therefore shipped over thousands of miles. It is usual that goods are transferred by ship from Hong Kong to Los Angeles, from Los Angeles on a truck (or by train) to New York and from New York by ship to Europe.

The per capita CO₂ -emissions from freight in the U.S. grew by 23 % between 1973-1992 (5). But neither the Clean Air Act nor in the Climate Action Plan include specific suggestions for reducing the environmental problems of freight, excepted some emission standards for truck engines. There are several reasons for this:

- Freight transportation is intimately bound up with other sectors of the economy,
- the emissions of freight transportation can hardly be controlled on a state or regional level by independent organisations,
- the replacement for freight vehicles with specific emission standards is very slow,
- the data about freight is very sparse,
- the environmental community has so far not worked on the freight sector so that there is no serious pressure from society

- the representatives of freight transport do not want to talk about changes in freight transportation because they earn good money in the current system.

At a first glance it seems very complicated to create methods to reduce the impacts of freight transport. Freight transportation is always related with the economy and consumer behaviour. In order to reduce impacts from freight it is necessary to change these distance intensive lifestyles. But maybe there will be a change anyway and with that a certain reorganisation of the economies: The government has less and less money to repair or maintain the infrastructure, therefore the road network is deteriorating although traffic is increasing. This could become a reason that production, distribution and consumption patterns change towards less distance intensive transportation. Planning could support such a development. But as in Europe freight issues in the United States are not very important in planning (on the official side planning is seen as communism or socialism), even though consciousness of the problem is growing.

3. Transportation policies

Transport policy in the States concentrates on efficiency standards, but in spite of the better fuel efficiency in the vehicle fleet, the absolute energy consumption and emissions are growing, especially in freight transportation. New regulations (e.g. a CO₂-tax), so many decision-makers say, are opposed to the free enterprise market economy. Freight transportation is seen as a necessity, no matter how efficient the transportation system is, how long the distances are or which transportation modes are used. These decisions are free (and the best) choices of the companies. Because of the extreme recession in the economy in the last five years, politicians are very careful with political regulations. Therefore policy prefers technical approaches (e.g. technical research on improvements of vehicles or efficiency standards).

Although there are no formal freight transport policies showing how this sector should be handled in a more environmentally sound way, there are some initiatives on the regional level to improve the current freight system. Background for that is the Federal Intermodal Surface Transportation Efficiency Act (ISTEA), which expanded the role played by metropolitan planning organizations in regional transportation decisions affecting freight. For that reason the Metropolitan Transportation Commission in Oakland, CA convened a group of Bay Area freight sector leaders to solicit ideas on how the agency could strengthen its consideration of freight issues in regional transportation planning and project funding decisions (6). This means also that surveys on a micro level are carried out to get more specific data about freight.

On the other hand some regions develop Air Quality Management Plans including mobile emission sources like trucks and trains (7). Basis for these plans are national standards on engines (reduction of railroad emissions about 90-95%, of truck emissions 70-80%). In addition there are efforts to find out how much material is transported within a region and to resolve the lack of knowledge about freight data (8).

The policies of the states can differ a lot (like in Europe between). California in the past had much stricter environmental standards than other states in the U.S. It was claimed that this led to price increases in California which was then unable to compete with other states. For that reason the environmental standards went down and the increase of emissions continued.

Solutions to the problem of increasing road traffic (and emissions) involving raising prices (e.g. with road-pricing or taxes) are not discussed in the current political system. Only congestion pricing is mentioned sometimes because the trucking industry and companies have a certain interest in such a solution: They loose productivity and time in traffic jams what means they loose money (app. 55 cents per minute in a truck).

4. Industry and the use of transportation modes

In some transportation projects like congestion pricing, economics and policy are working together very well. The main incentive for the development of such projects is to save money. In addition, industry tries to save money by supply chain management in logistics and by detailed time analysis. The aim is to make production and delivery more efficient. Within this scope, sophisticated computer models have been developed to improve logistic strategies.

Another strategy is to improve fuel efficiency by the use of better engines. They are getting better and better theoretically, but because fuel prices are so low there is not enough short time demand for such (environmentally more sound) engines. Usually trucks are replaced after 10-15 years. Just as European companies sell old trucks to Eastern Europe, U.S. companies are selling old trucks to China after that period. This behaviour of selling "trash" seems to be an old fashion practice of "highly developed" economies.

Trucks

The use of trucks in the U.S. is not increasing as fast as in European countries but nevertheless constantly (9). One reason is that trucks are the most flexible and cheapest transportation mode for the industry. Another reason is the increasing

proportion of expensive and time-sensitive goods. So trucking is very important for processed goods or perishable goods like food. The growth in road freight has been accompanied in the past by the provision of new infrastructure. As in Europe after the deregulation of the transport market, there is an intensive competition between trucking companies. The result is, that they are economically very efficient which means that prices are decreasing. This has nothing to do with a social or environmental efficiency: more and more goods are delivered by night and on Sundays, the wages for truck drivers are very low and there are more and more unsafe trucks on the roads.

Trains

Over longer distances trains are competitive with trucks. It depends on the kind of goods, but in general trains are used if the distance is more than 750 miles. For any trip less than 500 miles it is more cost efficient to ship by truck. Therefore truck companies make deals with railroad-companies, mostly in the case that distances are too long and therefore trucks are too expensive.

Compared to Europe, where most of the rail system is electrified, the rail system in the States is not very efficient from the environmental point of view: 99% are diesel trains, most of them with high emissions. In order to gain a better environmental performance, in the past there were a lot improvements in the engines (from 3 miles a gallon to 6 miles a gallon). Because electrification is very expensive, U.S. railway-companies test alternative fuel locomotives with natural gas. In addition it is tried to make locomotives more quiet.

Trains carry about 30% of all ton miles in the States (10). This is much more than in Germany, where 20% is carried by train (11). One reason for the 10% higher proportion of carriage is that rail is designed for freight mainly and not for passengers as in Europe. The second reason is that rail companies are all private, they compete with each other and therefore make much better offers to big customers than rail in Europe. In Germany, rail is private since 1994 but there is only one big rail company for freight. The rail companies in the States have reacted to the change in the transport market (this includes that performance windows have become very tight) in a time specific way. Therefore freight trains in the States do not serve on demand any more (like in Germany). They now have schedules that make them more reliable and responsive, not only for just-in-time-delivery. In addition they developed and use double stacking rail cars (which saves a lot of money) and build direct railway connections for raw materials.

However, rail in the States is also loosing market shares because it has to serve unprofitable lines and not least because it is working in a segmented market.

There are different carriers each with their own market areas e.g. for the West Coast and the East Coast. This means that no container can go direct from Boston to Los Angeles and this incurs delays and additional costs.

Intermodal

Although intermodal activity has a small fraction of the market, it is gaining market shares because it is driven by economic factors. In some cases it can be much cheaper to ship intermodal than with one transportation mode. This can be related, as mentioned above, to increasing distances. The profitable distance for intermodal modes is 700 miles. Because travel time gets increasingly relevant for intermodal carriers, more frequent shipments are needed. The railway companies play an important part in intermodal transport because they can use containers. The containerisation is much more developed than in Europe (double stacking and refrigerated containers, which are coming in use more and more). In contrast to Europe, trains in the States are shipping also high value goods, because containers are safe and can be changed easily.

Barges

Barge transportation has only a small market share. It is the cheapest and competes (only with bulk goods) with rail. A lot of grain is shipped, for example, down the Mississippi by barges. In addition, barges are used for dangerous goods. There are only some canals in the States and there is no serious discussion to expand them.

Air cargo

In contrast to that, air cargo is increasing rapidly. It is serving the expanding "global markets" and NAFTA-countries. Air cargo only transports a small tonnage, almost only high value goods and goods with a tight time schedule. A lot of cargo is carried by passenger planes. Air cargo is not seen as an environmental problem ("It doesn't affect us here, this air cargo"), there are even plans to develop many more hubs. The main argument is to produce jobs, therefore any kind of regulation in this field is considered as negative.

5. Subsidies and transportation costs

The constant increase in road freight and the rapid development in air cargo is not without reason. There are some "abnormalities" which can be explained by certain hidden subsidies. Air cargo for example is subsidized by passenger air craft. Trucks still benefit from subsidies on highway transport. Most taxes are paid from passengers and on light cars, but trucks are damaging the roads (and especi-

ally bridges) much more than lighter cars. Roads have to be build thicker, bridges have to be repaired more often for the heavy trucks. Trucks do not pay the full costs they cause, they do not pay to maintain the infrastructure they use (in contrast to that railroads have to pay their full track costs).

In general there is the assumption that costs and prices in freight transport are too low. Getting the prices right should be the most important issue. But this is much more a theoretical debate, because there is no serious sign (there is even a retreat) from politics. And nobody can imagine what will happen with higher prices and whether they will reduce road traffic and support more environmentally sound transportation modes. European gasoline prices are 2.5 times higher than in the States and there is still a similar development, at a lower level, but a constant increase in road freight transport as well. Therefore pessimistic representatives point out that nothing will change with higher prices generally and particularly with higher gasoline prices. The optimistic view is not only to raise fuel costs (only 4-5 % of vehicle operation costs are fuel costs), but to change in addition other factors which have effects on trucking (e.g. fixed costs). It is estimated, if transportation costs for road freight are doubled, there will be more rail and intermodal transport (especially with double stacked containers) and more regional self sufficiency.

But nevertheless, the current situation is different. Because of the fixed costs for running a truck, short distances are much more expensive than long distances, even empty back movements are not a serious cost factor. Beyond that, the freight sector is more elastic than passenger transport, because there is the possibility to pass higher prices onto the consumers.

This shows that the situation in freight has stabilized on a distorted basis and the system can continue in the same (environmentally bad) way, although some progressive and practicable ideas have been advanced from the environmentalists side. For reducing long distance (road) freight transport, much more than raising prices will be necessary.

6. Agriculture, food and freight transport

Compared with other sectors, transportation costs in the food sector are relatively high. The delivery distances of low value agriculture commodities like cattle and Soy beans are dependent on transportation costs. In general, raw materials (low value products) are transported over short and processed products over longer distances. Therefore one important question in agriculture is to minimize transportation costs.

The distance or how far it is profitable to deliver products can be calculated by taking the whole value of a certain cargo minus transportation costs. If Oregon, a typical farmland of the United States, delivers canned beans to the East Coast, the transportation costs (by truck) will be 13 %, for strawberries and plums 10 %, and if people in Manhattan want to eat Oregon hazelnut paste, they have to pay 2% of the final price for transportation. The average transportation costs of agricultural products are 7-15 % (12). If it is much more than this, then a cheaper transportation option will be used (trains for long distances), or it is delivered from not so far away. For Oregon potatoes, for example, customers in Manhattan would pay 95 % transportation costs. Therefore one can assume that nobody has the idea to sell such products so far away.

However, from the production standpoint the main decision is still where the market for the product is. Not only transportation issues influence plant location decisions. The East Coast has very little basic food production. Agriculture can be done much more cheaply on the West Coast. As a result the largest food industry can be found in California, Oregon and Washington State. For reasons of low production costs, food comes from the West Coast mainly and is sold all over the United States. Although theoretically no potatoes are shipped over thousands of miles, one can buy in Washington D.C. bunches of fresh onions from California (for 90 cents). In addition one can see a lot of fruits from Chile and South Africa (the same in Europe).

Some products, like pineapples, are delivered by aircraft. It is profitable, because it is transported together with passenger aircraft and there are no empty back hauls. A similar situation of cheap and far away products can be found with container cargoes. The costs for container cargo to Asia (8,000 miles) are 5 cents per tonne, because one can load a lot on a ship and - again - nothing has to be paid for the back haul.

As in Germany, one can in the U.S. notice an increase in organic agriculture. There are some initiatives like "Fresh for You", a direct delivery initiative, initiated from farmers in Washington State and Oakland, or "Portland Community Gardens" in Portland, Oregon. Such initiatives are seen as a trend, because people get more and more conscious about their food. The share of organic and natural food is not very big, although the consumer demand for organic (or safe) food is higher than the supply. Such facts are not published broadly, therefore neither producers nor consumers know about the real development in supply or demand and have the possibility to adapt to each other. It is not easy for farmers and growers to produce and sell organic food. They cannot be organized like big conventional producers with all their marketing strategies and technical equipment. But cities are supporting organic food initiatives. Some large ones like Philadelphia and Boston are leading this development and started with commu-

nity marketing. Farmer markets are a growing segment. This is a reaction against big supermarkets, where consumers can find everything, but they do not know where the products come from or how they were grown. Farmer markets give the people a choice to know the background about the products.

Unfortunately, transportation issues are not taken into consideration with organic or healthy food, although long distance transport has impacts on the quality. Neither farmers, manufacturers or shops nor consumers pay attention on these issues. A lot of Americans suppose that products from Europe are healthier (or safer). This might be caused by the existence of defined standards and labels for organic food in Europe. Products in Europe are tested from independent associations in which consumers have confidence in. In the States one can find no comparable standards or labels which are valid for the whole country. Certain States and manufacturers try to fix their own standards, but they are more or less without any control and so nobody trusts them. There is no agreement on what standards should look like.

So there is much more confidence in European food and one can see in the American health food shops a lot of products like crisp bread, cheese or juice from Switzerland or Germany. Furthermore, like conventional food, organic fruits and vegetables are also produced mostly on the West Coast, so that a lot of these products are shipped thousands of miles to the East Coast. One can find with organic food a similar structural situation in Germany, but on a smaller geographical level. At the beginning of organic food demand most was produced in South Germany and was shipped over hundreds of kilometres to organic food shops. Now, after some years of supply, one can find much more organic farming and food processing in all parts of Germany, so that the delivery distances of such products are decreasing.

With the growing demand for organic food the situation in the States is changing in the direction of more decentralized production patterns as well. Especially on the East Coast there is a growing interest to get more regional and local products. But the lack of organic production sites and an adequate infrastructure still makes it difficult to serve the market with "low distance organic food". Nevertheless, one can find some initiatives which are going very far in this direction. The Urban Ecology Inc. in Oakland, CA is organizing organic food distribution by bike ("Zero Pollution Delivery Solution"). The special bike construction they use can carry 500 pounds of goods. This bike system has been operating for some time in different regions like Oakland, Berkeley, and New York. It is meanwhile competing with auto cargo, because it works better with regard to time and cost effectiveness.

Compared with Europe (especially with Germany), the food industry and as well retailers in the States are larger and much more concentrated. There exist for example approximately 10 main bakery chains which run their own companies and bakeries. Food processing in the last few decades became a big business. With that development also centralized production patterns and large economic units were encouraged. As mentioned above, such structures make it very difficult for organic producers, which are usually smaller, to exist, although there is a recent increase in health food processing too.

Regional and local food production in the U.S. is supported from diverse initiatives, especially from food co-operatives. In some States like Minnesota, these communities are very strong. They realized that transportation changed the economy towards a global mass production and mass market with the result of loosing more and more regional economic power. Therefore a growing number of local initiatives try to keep small production sites in their region not only in the food sector. A reason for this is not least to create and preserve jobs. But in order to develop or maintain such decentralized supply systems, it is unavoidable to include consumer behaviour that today in the majority is in contrast to the ideas of a sustainable food system with less transportation.

7. Consumer and travel behaviour

The product demands and shopping patterns in Europe are converging with those in the U.S.:

- People buy more and more processed food (one main reason being time saving aspects),
- people buy much more products at one time, i.e. once a week or even once a month (the result is that Americans have much bigger refrigerators than Germans who go shopping more frequently) and
- people more and more use their own car to go shopping (it is estimated that 99% of the Americans go shopping by car).

These trends are directly related to more freight and more passenger transport and furthermore with other land-use-patterns (large centralized production and large retail sales units) which affect consumer behaviour again.

In general, processed food is closely associated with more freight transport. More materials are used for which more production steps and with that more shipments are necessary. In addition, various packaging materials are needed. But not only freight transport is stimulated by the current food system. By buying

more products at one time, it is necessary to carry all that stuff with a special tool: the car. And because of existing land-use-patterns (big supermarkets outside the cities) almost everyone needs a car to go shopping. This initiates the vicious circle of land use and traffic.

Although the problems of big supermarkets outside the cities are well known (the enormous need of space, the dying of commerce in inner cities), there is no serious discussion in the States about the development of their ongoing construction. The argument is that "it is needed", no matter why. Local chambers of commerce pay attention, but in most cases they cannot do enough and the inner cities lose their attraction. Because of the increasing number of food malls outside the cities, shops in downtowns get very specialised and grocery stores for daily needs are few in number. Supported by the described consumer behaviour, there is a change from a nation of small business owners to much fewer but larger operations. Stores are becoming larger and larger and therefore need more and more consumers to remain profitable. On the other hand, big supermarkets can offer better prices and a "better" quality of food, so that consumers see advantages in using such facilities. The result is, that people have to travel longer distances to buy daily things.

An identical situation in consumer behaviour, traffic and land use patterns can be observed between West- and East-Germany, especially before but as well after the reunification - again on a lower level. Prior to re-unification there was a low ownership of private cars in East Germany and therefore East Germany had a much more dense and mixed land-use. People went to the shops on foot and bought much more frequently because they could not carry so much. Even today big department stores from West German companies have problems to work profitably because people do not buy enough. But with the rapidly growing ownership of private cars this phenomenon disappears.

But anyway, in Germany much more profitable small scale structures still exist - as one can see with the pedestrian areas. The destruction of mixed use has not gone so far as in the States (but it is nevertheless on the way!). In Portland (Oregon) an attempt to develop a pedestrian area with various shops has not worked very well, because of the lack of demand. Now the community attempts to integrate supermarkets (e.g. with the light rail system), but it is not very successful because there are not many good examples in the States.

Campaigns to change behaviour in the U.S. (e.g. anti-smoking or anti-drunken driving campaigns) were very successful. But it seems that transport and consumption behaviour is not or almost not changeable because it is related with other issues like land use patterns, prices or comfort. However some people are optimistic: if the public understands what the problem is, there will be a potential

that they will change behaviour, as seen with smoking. People are more and more aware what they eat and safe food has an increasing importance. But this is neither related with the growing problems of freight transport nor with the growing use of the private car. Nevertheless people begin to understand what they can do. In some areas strong communities exist which preserve open space, grow their own products and with that reduce traffic automatically. But this is a question of generations. Older citizens and also people who deal with the protection of smaller areas are very aware of transport problems. But on the whole society and economy follows the current trend. Therefore teaching young people has enormous potential.

8. Land use patterns

As mentioned above, transport is related more or less with land use patterns. In the U.S. there is a lively debate about mixed urban structures, higher urban densities and whether they can reduce motorized trips (and with that motorized shopping trips). It seems that this discussion goes much further than in Germany, where most researchers take the view that mixed and dense urban structures reduce traffic as well. One new result in the U.S. as well as in Europe is that not only land use patterns affect motorized trips, but other issues like incomes, size of households, the possession of a car and certain individual preferences influence traffic. In the States a controversial discussion around these issue takes place. Maybe this is caused by the enormous differences of land-use in the country.

In Los Angeles it is asserted that people living in mixed use areas make more trips. The majority are additional trips made on foot to a nearby cafe or restaurant. The use of a car for going shopping is seen as necessary. Moreover employees do not change their mobility patterns (and less still their place of residence). Some years ago certain States introduced guidelines for companies with more than 100 employees for reducing environmental impacts of their passenger transportation by offering environmentally sound transportation modes. Meanwhile this idea is trivial because certain studies proved that employees did not accept car-pooling, vans or bicycles even if they were offered from their companies free of charge. "Motorized trip reduction by changing transportation modes or land use patterns cannot solve the environmental problems of traffic", is the argument of many researchers. In the U.S. the goal is to reduce emissions and traffic congestion. For these problems more efficient cars, taxes and congestion pricing, they say, would be a better instrument: to reduce motorized trips does not necessarily reduce congestion, because more cars have no effect on congestion (there is the same peak hour with less cars, only longer). Furthermore space is - contrary to Europe and Germany - in the States not seen as a problem (except in

Manhattan) (13). More space for traffic is seen as a benefit, not a cost factor: pavement is cheaper to maintain than open land or plants - and children can play better on pavement. And in addition it is argued: After the earthquake in Los Angeles 1989 it was obvious, that an extended road network is very important. There were enough alternative roads even if some of them were destroyed.

These arguments which are all associated with the impossibility of changing mobility patterns by mixed urban structures can be related with the strange situation in the area of Los Angeles (no historic grown structures, auto oriented planning). Fortunately it is only one point of view in the discussion about mixed use and mobility. Other studies demonstrate that there is a correlation between automobile usage and urban structures (including residential density, transit accessibility, local shopping and pedestrian friendly environments). In such studies it is pointed out that a community with double the density will have 25-30% less driving per family when the impacts of all conditions generally accompanying higher density are included (14). But as mentioned at the beginning of this chapter, mixed use is not the only solution. It can be the basis for another use of motorized vehicles but also demographic characteristics have to be taken into account. In addition it is necessary to clean up cars, to raise prices and make public awareness campaigns to change automobile usage in a more environmentally sound way.

9. Conclusions

One can see a lot of similarities between the United States and Germany but very often they present themselves in different ways: e.g. the privatisation and liberalisation, the size of economic units, the trend towards suburbanisation, longer transport distances and consumer behaviour. On the other hand the economic and social system in some parts has gone so far that one can discover interesting solutions, which can contribute to sustainable development. The reasons for such solutions are often considerations of cost effectiveness rather than environmental protection. One example is the highly developed freight rail system in the U.S. or the co-operation between rail and road.

Compared with the United States one tends to find in Germany more evidence of environmental consciousness and more activities towards a sustainable life-style (especially in food production and consumption, even to some extent in automobile usage). This does not mean that the world looks better in Europe, but it seems that together with the more diverse and smaller structures there are more opportunities to create a sustainable way of life.

On both sides of the Atlantic one can find two groups of environmentalists: on the one hand people who want improvements of the basis of existing systems, on the other hand, people who want to change the underlying value systems. Technical improvements are - compared with values or behaviour - more easy to imagine, therefore most environmentalists believe in such solutions. But the question is whether such "solutions" can be the only response to the threat of global warming. CO₂-emissions (especially in the transport sector) are increasing, although there were enormous technical improvements in the past. Therefore values and behaviour should play in the future a bigger role than nowadays: not only because of CO₂-or other emissions, but also because of the decrease of our quality of life, which is related (more in the U.S.) with unsafe food or (mainly in Europe) with the increasing need of space for motorized traffic. The first step for changing values is the understanding of connections, in this case between transport, quality of food and the quality of our living environment.

Information and education are very important to change values, although it seems that people have too much information about too much (useless) issues. Advertising, for example, could be used for showing people how food is produced and how fresh and healthy food can be if it is consumed in the same region where it is produced. Shorter transport distances are connected with a better quality, a better taste and a higher variety of food. Such information should not complement but replace the current information.

It is said that the United States is the country of the most choices and possibilities in the world. Looking closer, this variety seems a delusion. The amount and the international choice of products has obviously increased. But the system behind food production is based on very homogeneous products (a few kinds, same size, same taste, same colour) which are easy to use for mass production. Moreover, the interregional variety (different kinds, size, taste and colours of fruits, vegetables or animals) has decreased dramatically. As Simone de Beauvoir already described 1947 for the U.S.: "... And soon one finds out, that all chocolates have under the colourful wrapping the same peanut taste and that all best-sellers tell the same story. And why selecting this toothpaste of all toothpaste? This useless overabundance has a taste of mysticism. There are thousands of possibilities - and it remains already the same. You have a thousand-fold choice - and one is worth as much as the other. The American citizen can use his freedom without realizing that such a life is not free." (15) Today it seems that meanwhile some people in the U.S. are more aware of this "useless overabundance" than people in Europe, and that Europe is still believing in this myth much more.

10. Endnotes

- (1) **Stacy C. Davis:** Transportation Energy Data Book, Edition 14. Center for Transportation Analysis, Energy Division, prepared for Office of Transportation Technologies, U.S. Department of Energy, May 1994, p. 2-17.
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- (3) **Statistisches Jahrbuch über Ernährung, Landwirtschaft und Forsten** (Statistical Yearbook for Nutrition, Agriculture and Forestry). Bundesministerium fuer Landwirtschaft (Federal Ministry for Agriculture, Ed.), Landwirtschaftsverlag Muenster-Hiltrup, diverse Jahrgaenge (divers years) and Bundesminister fuer Verkehr (The German Federal Minister of Transport) (Ed.): Verkehr in Zahlen 1991, Verkehrsentwicklung 1950-1990 (Facts and Figures about transportation, 1991. Traffic development 1950-1990). Deutsches Institut fuer Wirtschaftsforschung (DIW), Berlin 1992, p. 382-385.
- (4) **U.S. Congress, Office of Technology Assessment:** Saving Energy in U.S. Transportation. Washington, DC: U.S. Government Printing Office, July 1994, p. 87.
- (5) **Schipper, Lee; Scholl, Lynn:** Keep on Truckin': Energy Use and CO2 Emissions for Freight. International Energy Studies, Lawrence Berkeley National Laboratory, Draft of October 27, p. 10.
- (6) **Metropolitan Transportation Commission (MTC)**, Oakland, CA
- (7) e.g. **The 1994 Air Quality Management Plan** of the South Coast Air Quality Management District and the Southern California Association of Governments.
- (8) e.g. **Truck Operations Survey Results.** South Coast Air Quality Management District, March 1993.
- (9) **Schipper, Lee; Scholl, Lynn:** Keep on Truckin': Energy Use and CO2 Emissions for Freight. International Energy Studies, Lawrence Berkeley National Laboratory, Draft of October 27, p. 7.
- (10) **U.S. Congress, Office of Technology Assessment:** Saving Energy in U.S. Transportation. Washington, DC: U.S. Government Printing Office, July 1994, p. 7.
- (11) **Bundesminister fuer Verkehr** (The German Federal Minister of Transport) (Ed.): Verkehr in Zahlen 1991, Verkehrsentwicklung 1950-1990 (Facts and Figures about transportation, 1991. Traffic development 1950-1990). Deutsches Institut fuer Wirtschaftsforschung (DIW), Berlin 1992, p. 347.
- (12) **Oregon Department of Agriculture**, Portland 1995.
- (13) Obviously these researchers forget that deserts cannot be used like greenland.
- (14) **John Holtzclaw:** Using Residential Patterns and Transit to Decrease Auto Dependence and Costs. Natural Resources Defense Council, June 1994.
- (15) **de Beauvoir, Simone:** Amerika Tag und Nacht. Reisetagebuch 1947. Hamburg 1988, p. 25.

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