

Title:**A New Role for Transport in the Development of the Sustainable City of the Future****English version****Sustainability - what does the concept cover?**

The notion of sustainability is used in a number of different relations and often as the headline of a number of rather well-known modes of operations to reduce pollution and to limit energy consumption and the emission of CO₂.

The concept "sustainable" was defined as a political-economical notion in the context of the United Nations report for a Sustainable development often referred to as the "Brundtland report" named after the Norwegian prime minister in charge of the work Gro Harlem Brundtland.

The basic principle of the Brundtland plan is that the lifestyle and organisation of the "Western world" threatens the possibilities of the survival of man as a species on Earth seen in both a medium to longer perspective.

It is not sufficient to do something about the energy consumption, the emission of CO₂ and other air-borne polluting products. We have to consider fundamentally how we can organize our societal lives in order to reduce the strain on basic resources of the Earth considerably. At the same time, it must be organized in such a way that the quality of life and/or survival of coming generations are not threatened in a longer perspective by the fact that our society or socio-economic systems cannot "rest in themselves", and be sustainable.

Fundamental values of society and a sustainable development

The principle of weighting a comprehensive view and considering the life conditions of coming generations have been fundamental for the development of the Nordic societies for centuries.

The principle of maintaining a free choice of consumption as far as possible may seem relatively threatened by the principles behind a "sustainable" development; but this very principle may give us the background for developing forms of transport which may actually give us space for sufficient social dynamics, also on a longer view.

An important element of the set of values in the European countries has been that private as well as public organisations or companies should be able to function "economically efficient". It is not enough to practise the service in question effectively, but the service or the performance must also be carried out efficiently - i.e. by the use of

as cheap or as little resources as possible.

This basic principle is in many ways an important condition in designing and reaching a real "sustainable" development.

The principle that basic societal supply areas are organized by the authorities and made public under some more or less solidary expense model - but often by means of a considerable private, economic production effort - also suits the idea of a long-term development of a "sustainable" society.

The fundamental overall view which e.g. has been the principle of the development in the Nordic countries public sector can be reenlivened and revitalised in connection with the development of a sustainable society. The principle that all organisational units or people in these work together towards a number of superior common goals and to the benefit of that society in general, is a basic condition for the further development and operationalization of the principles behind the Bruntland report.

Besides, a number of psychologists believes that it is extremely important for the psychological well-being of individuals to have the feeling of belonging to a group - to be part of a major community. In the recent development of the European societies one could argue that this basic overall view has been watered down through a continued sectorization with an attention to special interests and outspread rootlessness as a result of this.

Behind a development of a sustainable society lies the basic idea that a lack of overview and general human responsibility will be threatening to the survival of coming generations on a longer view.

The role of the transport sector in the development of a "sustainable society"

The notion of "sustainable mobility" does not give any sense, if defined narrowly in relation to "transport" as an isolated activity in our society.

It is untenable to continue to accept transport as a consequence of societal activity within a number of different sectors. As long as this notion is dominant, the transport sector will be a part of society which uses a lot of energy without much thought of the environment and in a longer perspective a "non-sustainable" part - and thus a threat to the quality of life and basic chances of survival of coming generations.

In urban areas one may immediately think about air pollution with for instance nitric oxides, etc. as being threatening. This is undoubtedly correct in the short run, but it must not lead to investments in solutions which will block a development in a medium-long or long run towards urban transport services which are basically sustainable and which can be carried out without considerable air pollution, CO₂ production, etc. - and

which will be integrated in other performances or societal life and thus be sustainable in the long run.

If actors in the transport sector limit their actions to a mobility of urban areas which uses a little or perhaps even a lot less energy, and which lowers the level of emissions of poisonous gasses, the transport sector will have overlooked the possibility to become a catalyst for the development of a societally sustainable model.

The transport sector has surfaces of contact in relation to practically all other parts or sectors of society. The transport sector may become a catalyst or spearhead of the development of a really sustainable society, if it stops reacting passively towards the other sectors and merely be a problem-solver or perhaps in more harsh terms a dustbin to a number of other sectors' residual problems.

The principle of developing a "sustainable urban mobility" could become the transport sector's contribution in leading the development of an urban life, which in all aspects is far better adjusted to a long-term survival of man as a species.

The most extreme forms of such lacking of a "sustainable urban mobility" can be seen in a number of third world countries where there can hardly be any doubt about the results which the societal organisation has on the "residual product" "transport in the cities" an actual threat to the immediate survival and the fundamental quality of life to large groups of people in these cities - in a very short-term perspective.

The transport sector must stop considering itself as an isolated part of society and instead start examining how the transport sector actively can contribute to a more "efficient" solution of the problems within other sectors.

In other words, the transport sector has to "sell" economical and political "services" to other sectors in order to gain a better societal quality of solution and at the same time build acting-oriented alliances with other sectors of society to gain the fulfilment of basic sustainable objectives in a medium- and long-term perspective.

It follows from this that to claim: "...it solves a transport problem...", is no longer sufficient argumentation to continue a certain activity in the transport area.

The activity in question must be genuinely complementary (i.e. it must solve problems within at least two sectors) and at the same time this activity must be sustainable in a Bruntland report perspective.

The transport sector must take steps a "fusion" of economy and ecology

The principle is a "fusion" of economy and ecology, and the first place this can take place is in the transport sector.

This can only take place in a close cooperation between the transport sector and the other sectors of society. In a number of theoretical and practical areas it is also necessary to develop tools and implements concerning fundamental understanding.

However, it is possible to point to a number of basic elements of such a fusion.

As far as possible traditional "free goods" must be priced. Pollution of e.g. water, air and other basic conditions for the sustenance of life on Earth can no longer be accepted. It is especially important with green taxes in urban areas where these very amenities have a very specific meaning for the fundamental elements of life quality.

Methods to carry out cross-sectional priorities and allocation of resources must be developed in order to avoid societal sub-optimization of single issue solutions. This can for instance take place through a continued development and adjustment of already known principles inside private economies as well as the use of already existing principles of computer technology, and the ability of these to create aggregated sizes and simulation of societal and economical phenomena.

Besides, a development of public administration must take place through a very heavy limitation of the principles of "sector thinking" as well as the carrying through of totally new principles in the selection of personnel as well as the principles of promotion and control.

"Management by objectives" combined with an emphasis of certain moral codes - or perhaps through the use of a special set of quality norms - may contribute substantially to such a development.

Development of a real "sustainable urban mobility"

No-one can claim to have fully developed all elements nor have introduced methods to forward "sustainable urban mobility" at the present time. This would also basically go against the principles of the Brundtland report which in many ways stresses the fact that Man has a chance to adapt to a higher level of life quality with the present development through a special development and refinement of his principles of growth of society.

The principles are to economize with resources and as far as possible adjust the supply to a given demand with reasonable regard to comfort and transport considerations. Besides, the transport sector must try to solve other sector's sociological problems and actively try to point out where other sectors create problems for the transport sector which prevent this in becoming "sustainable". The transport sector must also continually try to forward its ability to change by avoiding capital investment or other forms of bindings which might hinder a different development if or when important technological changes occur.

In a number of ways you can point to different concrete possibilities with the following headlines: diversification, integration, development of vehicles, information and concrete project areas.

Diversification

Diversification has been used by the private sector for many years as a business strategy in connection with a company's wishes to spread a possible risk.

Transport in city areas is traditionally divided into a number of rather separated and narrow fields. You have public transport (mainly carried out by busses, trams or trains), individual personal traffic (self-performed by bicycles, cars or such like), and you have typically a conveyance of goods (by trucks or smaller vans).

All these areas are traditionally operating within certain hours of the day in which a very large extra capacity is available within the individual transport systems, and they are generally on an average basis rather poorly utilized. This is partly a consequence of the principle of more or less fixed working hours, but is also a result of more or less fixed prices, no matter the time of day, or whether the transport buyer has given the supplier the chance to exploit his activity effectively - or in any other way to try to coordinate the individual elements of demand.

For many years it has been quite an acceptable thought with regard to other private economic services, that unless you carry out some sort of price differentiation or give the consumer a choice, (where there is a connection between performance and price) it will result in very heavy problems in the form of "peak hours demand".

It is therefore of decisive importance to the transport sector, especially in urban areas, that a diversification of transport services takes place in order to achieve a more "efficient" use of the transport capacity.

This can be done as follows:

- give transport buyers a real choice of transport comfort levels and prices.
- fade out the borderlines between individual and public transport.
- combine transport - whether it is transport of various forms of goods, persons, etc. - according to the demands of the different types of transport, and not according to questions of younger people, older people, children, small parcels or similar.

Integration

As seen in the above paragraph about diversification, you have a very low degree of integration in the transport sector between various types or arts of transport as well as between transport buyers or agents.

This becomes quite grotesque when you find more than the approx. 28 different publicly supported forms of transport in Denmark, which typically function through very individualized and sectorized orders in the individual municipalities. Besides the ordinary public transport (which is mostly carried out with traditional buses), any municipality will typically engage a large number of vehicles to carry out transport assignments of widely different character, but very seldom with any form of integration or coordination.

It follows from this that in order to fulfill the demands of a "sustainable urban mobility", an integration between different transport forms is necessary, and it must be a "diversification principle" (where demands to the transport is more important than its form of manifestation), which decides how the transport is carried out.

There is hardly any doubt that public authorities are the only agents who can play a real integrating role, as they are supposed to have a fundamental overview as a basis for their actions. Such an overview cannot be expected to be expressed through actions of the present agents in the area.

Roughly spoken, none of the present transport performers will be interested in integration, as it will result in old privileges such as a protected competitive situation being changed. The traditional bus operator will see any form of change as a threat to his/her business, and so will the taxicab owner, the carrier and especially the carrier who works for one or more of the large retail chains in connection with the distribution of everyday goods, etc.

Furthermore, the typical transport buyer usually needs to combine several types of transport from the beginning of the journey to its end. The most primitive form is the combination of bicycle or some other form of individual transport combined with some form of more collective transport. Such combinations are made difficult to a considerable degree, as the change between so-called "traffic modes" is only forwarded to a very limited extent and is connected with considerable loss of comfort.

Development of vehicles

A condition for a real diversification and integration of transport is the development of genuine "multi-purpose" vehicles.

A basic demand to such vehicles must be a cheap production price, based as far as possible on standard components from already existing vehicles. Besides, they must

allow for very quick change, which in practice should be a possibility to change from transporting a large number of seated passengers to e.g. a smaller number of seated passengers and various types of modularized types of goods. In Japan such a development of smaller vehicles has taken place, but the development possibilities are far from having been fully exploited.

These vehicles must also be potentially "zero emission vehicles" or at least fulfill the demands of "ultra low emission vehicles".

It must also be possible to "produce" a wide variety of transport capacities according to similar principles, so that transport supply can be adjusted to transport demand.

Information

The development of new electronic media and the possibilities of telematics playing an important role in e.g. route planning and transport requirements can only be exploited if a total change of the present information and communication strategies of the transport area will take place.

An active communication and marketing strategy should be used as an action modifying element towards the public and also point to possibilities of establishing a connection between fundamental attitudes towards resource consciousness and ecology through actual transport behaviour.

The possibilities of using market research of a more traditional nature to communication purposes as well as product development of public transport forms have far from been exhausted. Furthermore, where diversification and integration of transport forms are prevailing, these possibilities might be further developed.

Concrete project areas

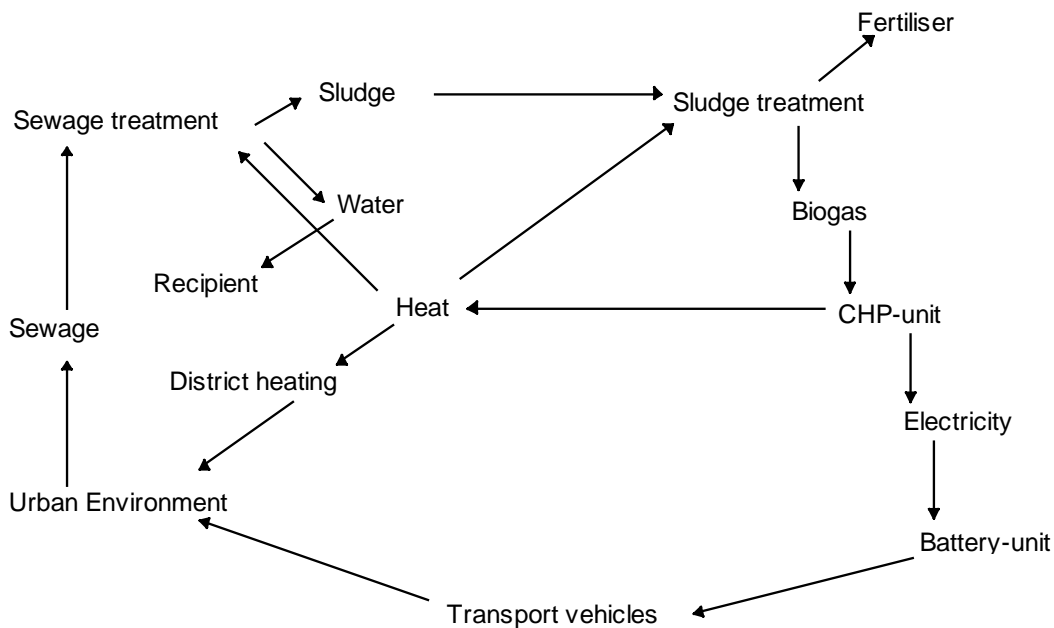
Biogas/CPH and transport.

The use of biogas in public transport appears as an obvious possibility to make a concrete example of integration between different sectors and the transport sector.

The traditional technical solution where biogas is compressed in some form and used directly in a vehicle internal combustion motor is hardly a very suitable solution in connection with "sustainable mobility", as the demands to gas quality and the efficiency of the optimized on-board internal combustion engine are hardly compatible. This is not to say that such solutions are not often better than the traditional diesel-engine based bus systems most commonly used. Indeed from a sustainable point of view they are. A good example of such a project is the way the city of Linköping have organised a combined system of biogas production and city buses.

Instead a solution where biogas from a purifying plant goes directly to a combined heat and power production unit producing electricity for a battery carrying bus and heat for either the biogas producing unit of the purifying plant or to a district heating network (see illustration below) offers a more true complementary situation between needs of the society and the transport sector.

Example of Integrated sustainable mobility



Biodiesel - with stricter environmental orientated specifications

The use of biodiesel products is another example. Here you have to be aware of the specifications of these biodiesels as certain specification elements may have a decisive influence on the increase of e.g. the emission of nitric oxides from diesel motors. Biodiesel should be compared to the usual type of ultra light diesel used by Danish and Swedish urban buses.

Telematics and digital information transfer

The possibility to use various forms of "telematics" has been mentioned above. We are not merely talking about using very advanced forms of communication technology in connection with traditional operations of public or other forms of transport.

The question of demand can also be influenced by help of "telematics". On one hand you can tell the public that a certain demand for transport may be uneconomical or not very environmentally friendly at the moment or on the other hand inform the public when a transport service is offered under conditions which are appropriate for the system as a whole.

Traffic management and surveillance

The use of traditional traffic management methods which are mainly limited to being traffic surveillance is also an obvious and quite effective means to reach short-term environmental improvements and limited energy advantages in connection with urban traffic.

Conclusion

Above a number of development possibilities in the field of "sustainable urban mobility" has been pointed out. Such a development will hardly lead to a successful result or contain any real substance unless the transport sector will leave the present isolation behind and take active part in the development of a new model of society where transport is a link in a chain of actions and services which from a holistic point of view does not threaten the survival of coming generations or their basic quality of life.

As in all other areas it is important to create a connection between some basic values and concrete actions. In the real world we need solutions for a short, medium-long as well as a long-term range. It is therefore quite right to work with solutions which give small improvements in the short range, but which do not basically block possibilities to develop coherent forms of transport or models of solutions. In a short-term view we are talking about the development of ideas which have a relatively brief economic depreciation value and whose technology does not have a life-time which determines the possibility of introducing other solutions in the long run.

Finally it should be stressed that the above mentioned selection of possible actions is certainly not exhaustive - and in many ways of a somewhat summary nature due to the length of this paper.

Comments are welcome, please contact:

Preben Thisgaard, NOVA PRO - Sofievej 1 - DK 4340 Tølløse
Tel.: +4559186999 - Fax.: +4559186573 - Email: novapro@inet.uni2.dk