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Municipalities as Trendsetters of Innovation

-Urban Mobility and Logistic-

Energy, mobility and internet

In 2014/2015 I supported the city of Berlin as an expert in the Study Commission of the Berlin House of Representatives. Our task was to conceive a strategy for the German capital; the central challenge was defined as “New Energy for Berlin – The Future of Energy-Sector Structures”. The mobility sector has not been included in spite of its important role as a user of fossil energy and as one of the main sources of greenhouse gas pollution. This was a mistake caused by traditional disciplinary thinking.

In the future era we have to interpret cities as subsystems of societies and together as artificial subsystems of the very sensitive biosphere, the supersystem of all life on Earth. We have to take into consideration that all artificial subsystems are part of the global ecological processes/cycles. Their impact is changing (second by second) the ecological status quo of our planet – with local consequences like smog and global consequences like the greenhouse gas phenomenon.

These impacts on the ecology are very different; but the main problem of the next decades is the CO_2-pollution of fossil energy production and -consumption. In the context of the energy turnaround policy we have found a broad consensus to substitute fossil energy trough renewable energy production in the sector of power plants; but we have not pointed out broadly enough that every traditional car is a little power plant itself, using its combustion engine. And every car is a consumer, manipulated by its driver. More or less cars are prosumers. The question is: How can we convert cars as negative prosumers into positive prosumers?

If we consequently change the traditional status and nature of cars, we can eliminate two evils at the same time:

- the huge and contaminating system of extracting, transforming, transporting and allocating fossil oil for mobility;
- the harmful emissions of the traditional car use.

If we understand the mobility system as a multilateral component of the upcoming renewable energy system, we will open the door to large efficiencies due to the perspective of overcoming the old bilateral world of allocation, of separated energy supplies. One supply system will substitute two supply systems; this is the era of electricity and efficiency!

If we speak about the future of mobility, we have to view “mobility” and “energy” as one complex, supported by the “internet of mobility and energy”. The internet has to be the preferred instrument to make structures and processes more efficient, to accelerate and shorten the procedures; to help humans to use the energy and

mobility facilities with less stress, less costs, better inputs and outputs, environmental friendly, sustainably.

Internet and mobility are not natural allies, for an optimal coexistence they need rules, conditions. Also the internet of things has to serve the human comfort, the human society, it has only a serving role. In the sector of mobility, we have to avoid too, that the usage of intelligent technologies becomes a pure subjugation under a technological heteronomy.

Municipalities as trendsetters in the energy turnaround

Together with Dr. Patrick Graichen I drafted the introduction of the final report of the Study Commission “New Energy for Berlin”. We started with “Berlin’s role in the energy transition” because of the importance of cities as avantgarde of societal transformations.

Respecting the new function of mobility as part of the comprehensive prosumer-sector of fossil-free energy systems we can repeat here some of these introductionary findings: “Energy systems in Berlin, in Germany and around the world are facing radical changes. […] We must therefore convert our energy systems to run on climate-friendly energy sources by 2050 at the latest. […] Cities, metropolises in particular have an enormous responsibility in this regard. Over half of the world’s population lives in cities, which already account for almost 80 % of global carbon emissions. […] The task for cities is to set an example by reducing energy consumption and increasing energy efficiency. Cities must also optimally integrate renewable energies into the municipal energy supply. […] Berlin has a special duty to help set the pace in the energy transition that the world so desperately needs.”

This reminds of the famous message by René Dubos: “Think globally, act locally!” Municipalities are the local focal points to overtake global responsibility – with the advantage to harvest the results of green efforts even at home: less smog, reduction of illness, less contamination a. s. o.

Climate protection is a global challenge with the municipality as a local player and the sum of municipalities as a very strong global player. Building up an efficient network of cities and metropolises is an important key to win the race against the climate change; conferences like “Metropolitan Solutions” are valuable links to the necessary city alliances for global sustainability.

The transformation to societies of sustainability requires close scientific and administrational cooperation, inter- and transdisciplinary acting plus the mobilization of the basic forces of our societies as practical partners in change. “Bottom up”, the participation of citizens, has to be combined with global goals and regional transformation-strategies. These strategies should be the result of regional deals in the near context of the global deal to stop global warming. They have to be flexible and stable and binding for generations. No question: City societies are predestinated to unite diversity, to create synergies because of their fractal nature and their culture of solving problems, of optimal surviving in changing and complex situations. Municipalities should be systematically involved as social trendsetters due to their extraordinary responsibility and their developed abilities in life- or lifequality-protecting social processes or techniques.

The new morphology of cities, including the mobility solutions, should try to offer more space for active communities, social interactions, for self-organization and local life styles. The municipalities of future have to facilitate the use of the urban richness of diversity, have to be a generator of the urban richness of ideas, initiatives, concerns.

The plea of the United Nations (see “World Resources”) for “community based approaches” is wise, but has to be flanked by practical efforts to initiate and develop vigorous communities. They have to be in a daily balance with the biosphere, and in a social balance, without implementing ghettos. A city as a synergetic cosmos of small communities is an attractive idea, if these communities are united by common sense, common basic ethics and a common understanding of fair play and peaceful, infrastructurally supported interaction.

Mobility

In this context we have to discuss the role of mobility. Mobility is one of the oldest phenomenons of human behaviour. It is the secret of our global civilization (remember “Out of Africa”) and the turning moment of our current globalization. Without worldwide transportation and logistics no value chains exist, without planes, airports and feeders, there is no global tourism.

Mobility is not only a duty, it is a social and individual need; sometimes stressful, sometimes enjoyable. It seems to be a central component of our genetic code.

The mobility of future has to respect this sensitively. Mobility – as a walker, a driver or traffic user – has to fulfil deeper demands, it often is a method to feel good. Sports and walking are always acceptable alternatives, but there are reasons for using vehicles that are deeper than the wish to win time. Especially in Germany cars are often treated as personal attributes, as lifestyle-icons, as status symbols. It seems to be a rather long way until the end of the own-car-era, until the end of self-organized individual car-driving.
Therefore electric cars with their spectrum of apps are an intelligent way to link the old world of car mobility with the new time of intermodal, less private mobility. E-mobility is also a noble tribute to the old orthogonal city morphology with its street-obsession. People have forgotten about the times when streets were primarily communication places; nowadays streets are mostly noisy traffic lines and it is sometimes a pity to watch the attempt of café- and restaurant-owners to re-establish a street culture in spite of the permanent car dominance. Electric cars will bring more silence and life quality, but never the less they will change the status quo only to a status quo plus.

To receive more quality we have to transform the city morphology and use the internet as a system transformer. A good goal would be to reduce the traffic areas in a city to a maximum of 20-25 %, to implement further natural green areas/grounds for social and cultural communication, for sports and individual recreation. People will like it and forget step by step the limited fascination of rush hours.

Hans-Jörg Bullinger, president of the Fraunhofer-Society, described – together with Brigitte Röthlein – some motivating developments in the international mobility sector; in his book “The City of Tomorrow” (Morgenstadt). He presented the following technical approaches for a future with a more sustainable mobility:

- In Hefei (China) the city government is accomplishing a modern traffic system with German partners (project METRASYS) in order to avoid a total traffic collapse in 2030. The city will double its inhabitants up to 10 million and urgently needs new solutions considering the already extreme traffic jam situation today. The bridging of crossings for arterial roads, bus lanes, a traffic guidance system, better transfers between busses and the metro and more electric motorbikes are planned or are currently being realized. But the central instrument will become a “Floating-Car-Data”-registration, a basis for permanent real-time-simulations to overview the current air and traffic contamination and to show the best traffic alternatives.

- In Stuttgart (Germany) the city government is implementing a citywide IT-supported car2go-system for e-mobiles which allows to use them spontaneously without traditional contracts, basis fees and a time minimum for the usage. The decided building up of a regional homogene loading infrastructure allows this green car sharing to become a practical alternative to the old system: “Using cars in time is better than owning cars!” (Florian Rothfuss, Frauhofer IAO).

- In Dresden the Fraunhofer-Institute has developed an electric “AutoTram” of 30 meters length which has the mobility of a long bus and the capacity of a city tram. This is a very attractive idea for intermodal traffic systems which need more flexibility in the daily changes of the urban progress. The “AutoTram” can be steered by GPS and requires no rails.

- In an European project Dresden could also pioneer in presenting a new app for mobile phones, called SMART WAY. The user has only to start the app and to enter the address of his final destination. Then SMART WAY shows him the fastest way to go there, offering transport alternatives and respecting personal wishes or new traffic situations. SMART WAY is the navigator for the city walker who has the choice between car sharing, busses, AutoTrams, trams, trains, metromovers, metro, sun boats, e-taxis, e-bikes, bicycles, elevators, special people movers or simply walking.

These are only a few examples; you will get more information during this panel. The most important thing is that cities as trendsetters need to have an open mind for permanent innovation. Cities should promote the interdisciplinary cooperation, the international partnership as a core of successful self-organization.

In June, my platform INFRANEU will sign a cooperation contract in Beijing concerning the compatible development of Chinese and German E-mobility systems. We have to cooperate more and more in order to secure a rapid worldwide energy turnaround which will push the necessary mobility system turnaround.

In China they increasingly prefer battery-changing-stations for e-busses, e-lorries and e-cars. These stations are comparable to normal filling stations, delivering a filled

battery instead of a volume of electricity. In 4 minutes you can change your empty battery into a filled one and continue your trip.

These compact battery-changing-stations can be used additionally as solid energy stores for the Smart Grid to deliver energy in phases of energy shortage due to wind- and sun-deficits. Two usages generate more income than one. This will help to offer better prices for drivers and grid operators. This shows the chances if we unite mobility and energy more systematically! As such cars as energy consumers flank the operability of the smart energy net; they become positive prosumers.

In twenty years the battery stations can also be used for the filling of Redox-Flow-Batteries, which work with battery-tanks in cars with polymer-saltwater lotions as fuel. These battery tanks can be refilled almost like petrol tanks – with ecological acceptable impacts.

If we project our future infrastructures we have to overview the longterm processes of innovation. Do we need multi-functionary stations for the long run or do we only need decentral loading points? It depends on the whole conception of future designing.

Cities as locations of complexity are demanded to look forward, to consequently innovate, to optimize, to motivate and integrate, and to be trendsetters of the open society of sustainability. They are obliged to do so and we are invited to be a part of this green progress.

Thank you.