

Towards local zero emission mobility as an evidence

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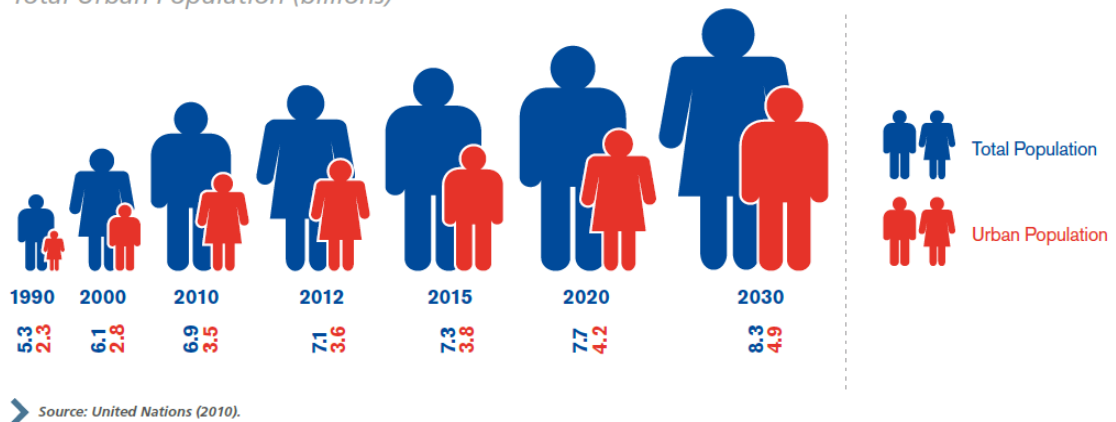
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- **The World Population is growing.** Global population in cities will reach 60% by 2030 and 70% by 2050. The number of cities with more than 1 million inhabitants has exploded to over 450, more than 20 of which are 'megacities', with a population of more than 10 million.

Total Urban Population (billions)



Cities are the Future of Younger Generation. Globally, young people aged 15-24 years represent 18 per cent of the world's population. 85 per cent of the world's young people live in developing countries, where they often comprise a large portion of their communities. An increasing number of young people around the world are growing up in cities – especially in the fast-growing cities of sub-Saharan Africa, Asia and Latin America. In many cities around the continent, more than 50 per cent of inhabitants are under the age of 24.

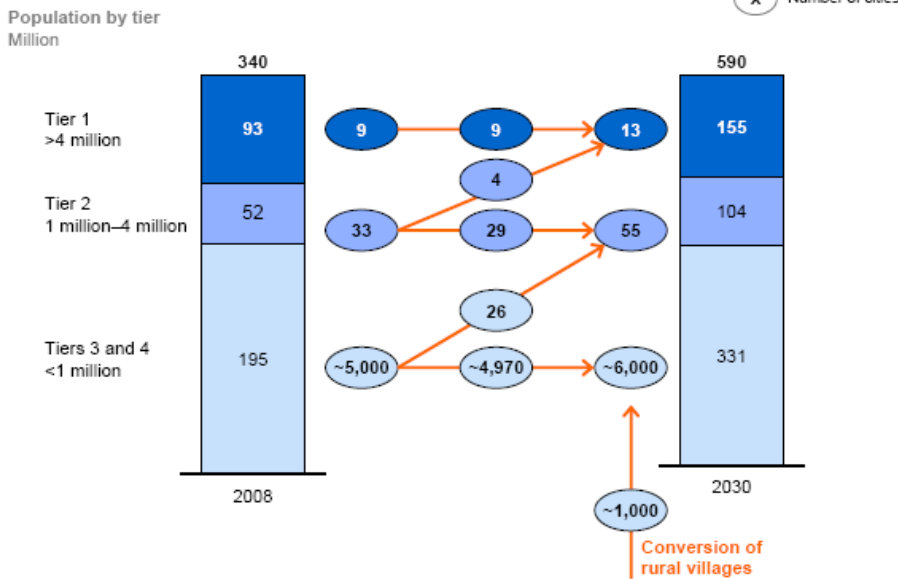
- **Cities are Creative and Productive.** Cities are the engines of wealth creation and innovation, with the 40 largest urban mega-regions accounting for 66% of global economic activity and 85% of all technological and scientific innovation. Cities capitalize on their economies of agglomeration and scale to deliver opportunities for livelihood generation across all strata of the socio-economic pyramid.

- **The urbanization and the city as a matter of fact.**

The world has become more urban with the global share of population living in towns and cities reaching 50,6% in 2010, and projected to be almost 60% in 2030 according to UN Habitat. 23 of 27 megacities over 10 million people are settled in the southern hemisphere even if 40% of the population of less developed regions are urban, respectively 75% of those of developed countries. 95% of the worldwide population growth will be located in emerging countries till 2030.

Cities will accommodate 90% of the next 2,2 million babies to be born by 2030. Everyday 180 000 people leave the countryside to reach urban settlements.

India will have 68 cities with population of more than 1 million by 2030, up from 42 today



SOURCE: India Urbanization Econometric Model; Census 2001; McKinsey Global Institute analysis

The city of today and tomorrow is changing fast and is currently built from the extremes of the society, from the top and from the bottom. Both are based on private and individual venture facing the urgency to accommodate new population within cities.

1 billion poor people live in self-built areas, slums, favelas, kampungs, moving mainly locally and on short distance. 1 billion rich people live in gated communities, private cities, moving from one

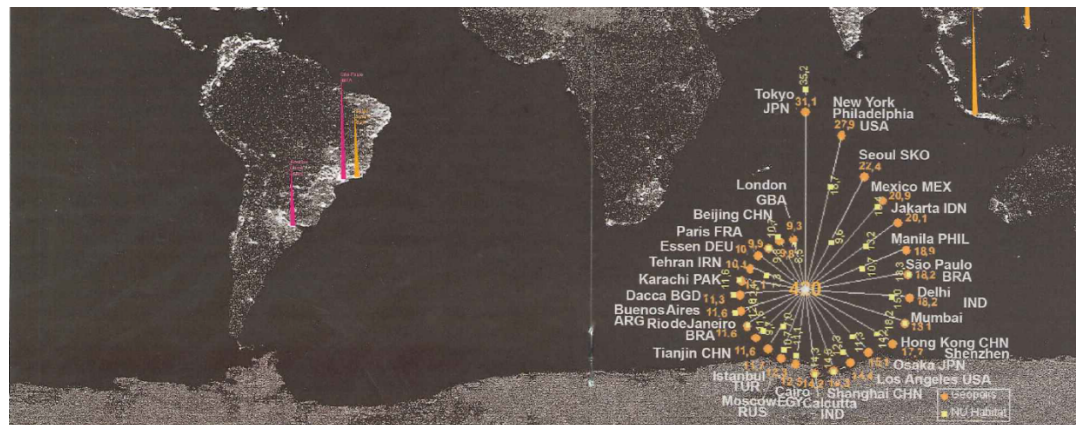
archipelago to another, by car for 400 million of them. In the middle the conventional planned city is highly inert with 25 years of responsiveness.

The megalopolis & megacities first

The number of cities more than 10 million people reached 22 in 2010 (18 in 2000). 8 of the 10 biggest cities in the world are located in emerging countries. “Most of the metrocities have a field of specialization; the city is not only an aggregate of people and premises, it is a mindset “(Pierre Veltz). Polarized large cities contribute highly to the world GDP and they articulate world economy with national one. The largest cities archipelago is a kind of horizontal network.

Megacities as the economy and/or the political capital of a country are the arrival port for new global trends or the export hub of locally redefined fashion. All that within increasingly reduced cycles of time. Nevertheless megacities are over-loaded, congested and have to self-regulate permanently, implementing rules and enforcement.

Worldwide urban settlements situation and the 27 megacities in 2005.

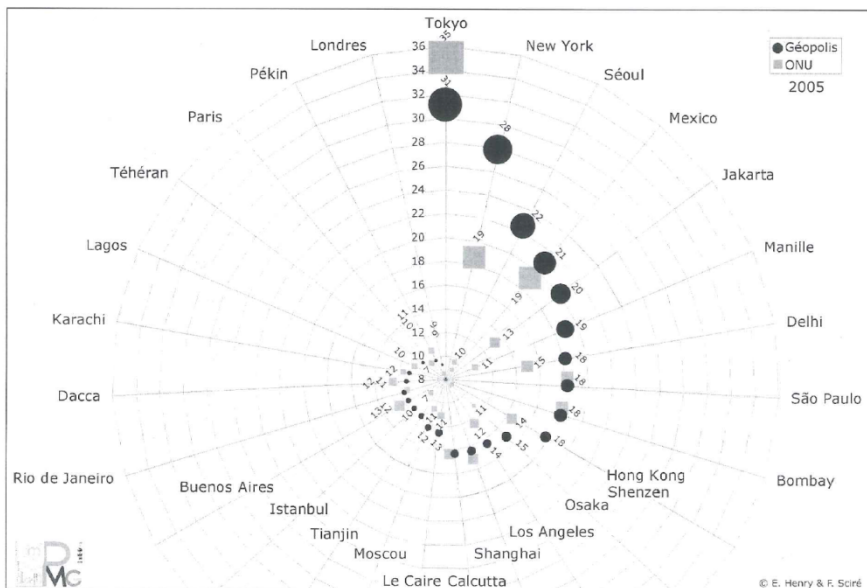


Source: PMG Perspectives métropolitaines Globales, E.Henry, 2008

Today this long dominance by global cities may be ending. Instead of clustering increasingly in “world cities”, economic power is now declustering away from the primary urban centres to a host a smaller cities as well as the sprawling suburban periphery (Joel Kotkin, Forbes Global, July4, 2005). Yet in terms of high-end service jobs as well as headquarters, the hierarchy seems increasingly unsteady. Great cities will remain important as centres of commerce and culture, but corporations have been starting to locate their headquarters in suburban periphery or even small towns. Even when the headquarters remain in or near the traditional core, much of the work has been moved elsewhere. The cost pressure on companies operating on a global basis began to force companies to place operations, including headquarters, in lower-cost, less

densely populated, more family-friendly locales and places where most technical or managerial talent is now concentrated. The rise of telecommunications networks and discount air carriers allowed for even the most global of players to operate from smaller towns, from increasingly distant locations.

The urbanization spiral



Source: PMG Perspectives métropolitaines Globales, E.Henry, 2008

Perhaps most critical to the future of world cities are emerging trends in the developing world. In the past size almost always dictated which cities would become the dominant business capital. But today the very girth of the most populous megacities as Mexico City, Cairo, Lagos, Kolkata, São Paulo, Jakarta, Beijing appear more as a burden than an advantage. In India, for example, much of the technology-related growth has gone to smaller, better-managed and less socially beleaguered settlements, such as Bangalore and Jaipur or Hyderabad, or to the rising suburban developments ringing Mumbai and Delhi.

In east-Asia, relatively small-scale cities like Singapore and, to a lesser extent, Kuala Lumpur, have integrated themselves into the global economy more successfully than far more populous Bangkok, Jakarta, Manila.

In the near East, megacities like Cairo and Tehran have suffered to keep pace with the exploding populations, while smaller, more compact centres such Dubai and Abu Dhabi have flourished. In Latin America megacities burdened by crime, congestion and pollution, their bloated size has robbed the city of its economic logic. (Joel Kotkin, *The City: a Global History*, 2005).

Second rank and medium size cities

The urban centres of less than 5 million inhabitants will have the most important growth within the next 15 years. The number of cities of 1 to 5 million inhabitants will grow by 13%, these of cities of 0,5 to 1 million inhabitants by 25% (source UN Habitat).

Tier 2 and Tier 3 cities offer a lower magnitude of expansion of the automobile system locally but an overall bigger volume. The range of motorization is wider than in megacities often divided between the SUV large car for status and the small car to be nimble within the traffic and easier to park. In second rank cities there are large opportunities for the car-based mobility with multi-shape and multipurpose vehicles even if there are regional features (mountain regions, agriculture provinces,...): family/corporate, individual/collective, goods/personal, product/service, Status/taxi,... The size of households may vary highly within emerging country regions and then impact the variable type of needed car. Moreover these cities do not endure road congestion yet and the public transport offer is not as high as in larger metropolis.

Tier 2 cities from 1 to 4 million inhabitants should have the most important growth (UN habitat, 2011).

Capital cities spread, disseminate, radiate new trends in the country regions as well as settle a socio-technical network due to expanding interactions and reverse migration. For instance cities of the Nile Delta in Egypt such as Port Saïd or Tanta benefited of the technical network of engineers trained in Cairo for their first professional years. In São Paulo in Brazil a lot of migrants of Nordeste come back to their region and bring habits from the megacity. The medium size cities are both competing with each other and with the capital city; and build efficient best practice networks.

As the advertising for HSBC Bank says “in the future there will be no markets left waiting to emerge”, “in the future, new trade routes will reshape the world economy”, new stakes and opportunities are about to emerge in the outback of diverse countries. The closer and the sharper will be the knowledge and the understanding of the needs the more reachable and prosperous will be that market.



- **The growth of middle classes**

This trend of increasing urbanization is related to the global economy growth and the expansion of middle classes worldwide. They are characterized by a floating and diverse range of income

and a behavior showing a wish of education, advancement and emancipation. In Asia middle classes are 500 million people equivalent to the European Union.

The number of middle class households should increase fourfold till 2030 (22 to 91 million) and the urban population of India should grow from 340 million to 590 million (Mac Kinsey 2010). This trend demonstrates a potential large market for car ownership. An Accenture survey shows that 54% of developing countries consuming people have the willingness to buy products expressing their personality traits. The total car fleet of the world should increase of 30% within the next 10 years, 80% due to the emerging economies.

In the fast growing economies, the social classes just below middle classes represent a major future market: they are younger, will consume during a longer period of time than their elder due to life expectancy increase. They are more numerous than the whole superior segments of population, and they expect social climb up towards middle and upper middle classes. For instance in Brazil 71 million people get 3 minimum wages (660 €) and less monthly (Lesteven 2010).

The understanding of consumption habits is as important as the knowledge of the road infrastructure quality, as the climate impacts on mobility behaviour, as the sensitivity to the oil price, as the security issues, to face emerging countries reality. In India about 40% of villages are not connected all weather.

Car motorization rate growth.

Motorization growth trend in fast growing countries is 600 cars / 1000 inhabitants in Europe, 800 in USA, 130 cars/ 1000 people in Brazil, 34 in China, 14 in India. If there were 184 cars/ 1000 inhabitants in China the total chines fleet would equal these of the USA, 250 million cars (46 million of private cars in China and 38 in France).

Average rough figures have no tremendous meaning. In some areas of megacities the motorization rate is much higher than in European cities, in medium size such as Burdwan in West Bengal India only 5% of the traffic are cars.

Is car growth sustainable, desirable, even possible?

Massive population, high density levels, deficit of parking provision, and the lack of space are able to impact the motorization growth rate forecasts or make it an unreliable challenge.

On one hand Public transport may not match the entire mobility demand, even if mass rapid transit corridors remain a priority (metro lines in Shanghai 450 km in 2010, 1000 km in 2020), on the other hand the new dwelling areas do not plan western standards level of parking lots (in the 6th periphery sector of Shanghai one parking place is built for two 125 m³ apartment, 1/3 for smaller one).

Mobility needs and urban sustainability

In metropolitan regions car growth is facing massive population, high density levels, road congestion, shortage of parking provision as an unreliable challenge. Public transport may not match the entire mobility demand, even if mass rapid transit corridors remain a priority. Bicycle share will go down in the world, and motorcycle/e-bike will go up.

Trip behaviours have much discrepancy trough social classes. For instance in Brazil the number of trips per day and per capita may differ from 1,16 for the outcast of society to 2,6 for upper middle class, and even be none (E.Vasconcellos, ANTPE) ;

The diversity of India is great and the question of modal share quite different from a megacity to the other and from megacities to Tier2 or Tier 3 cities. The example of Mumbai is quite interesting because it is a kind of laboratory of new trends. Even if rickshaws are forbidden to enter the city centre of Mumbai and that there are no e-mobility solution, it can give an example of what is an indian city in term of modal share. The specificity of Mumbai are twofold:

There is a high level of use of the railway system which is one of the most efficient worldwide
70% of car-owners have a driver due to congestion.

In the Mumbai metropolitan region the car fleet has been increasing 9% every year from 1996 to 2005. The motorization rate is 33 cars per 1000 inhabitant as 12 is the national level (source MMRDA Mumbai Metropolitan Region Development Authority). It depends on the location within the metropolitan region: 59 in the centre, 21 in the suburb, 27 in the large periphery (source MMRDA).

The main figures about motorization in India are:

89.9 cars for 1 000 households – urban national average

51 cars for 1000 households- Built Up Area national average

342.5 two wheelers 1 000 household – urban Indian average

244 two wheelers for 1000 households- Built Up Area national average

In every indian city the share of motorized two-wheelers is high and has been increasing very fast.

Average rough figures have no tremendous meaning. In some areas of megacities the motorization rate is much higher than in European cities, in medium size such as Burdwan in West Bengal India only 5% of the traffic are cars.

The MMR generates 34,5 million trips daily (for all modes) including 2,9 million trips by car. The all purpose modal share is 60% walking, 3% car, 9% bus, 20% train, 3% motorized two-wheelers. Walking is 40% of commuting trips, car 2%, and train 37%.

For Fewer Emissions. Urban mass concentration entails that cities are consuming most of the worlds' energy and are responsible for about 70 per cent of total emissions of our planet.

As developing cities expand, (road based) public transport will also increase. Of course, personal private vehicle will become a more important mode for the majority of humanity. New mobility services and alternative means able to provide intermediate needed solutions and implement sustainability. Ride-sharing, self-service systems, electro-mobility may have a significant contribution in taking part to an overall more efficient mobility system. German studies show that each vehicle of a car-sharing fleet replace 9 to 13 private vehicles within the traffic (Moses program).

It is important to consider the whole chain. In emerging countries EV bottom-up informal, related to an existing modal chain. For instance in Indonesia the *ojek* mototaxi enables inhabitants to go out the kampung urban village district where they live, then take an *angkot* minibus to reach the railway station or the final destination, then jump in *becak* cycling rickshaw or a Bajaj auto-rickshaw in Jakarta. In emerging countries any mobility mean would be able to support business, should be job provider, goods transportation and personal mobility are often mixed together. Carried people sit with vegetables or animals in trailers.

Need of a hierarchical organization of the different transportation means



*As incremental
feeders of more
massive
corridors*

Surabaya interchange Becak - minibuses



Uptake of Electric Vehicles in cities worldwide and in India:

Local Zero emission mobility is a great challenge expanding very slowly but very promisingly. Diverse paths of dissemination may deliver unprecedented opportunities.

Personal electric car ownership is very low due to a strange business model mixing sale of car and rental of batteries, but moreover due to a weak or a lack of consistent recharging networks within western cities.

Counter-examples such as *Auto'Lib* in Paris, *BlueLy* in Lyon, *BlueCub* in Bordeaux show that alternative ways may develop. Bolloré and the partnership with Renault are eager to venture further towards the USA and some Asian cities. The richness and diversity of the solution from moving e-urban furniture to homestyle electro-apparatus show that a multitude of business models may emerge from top-down solutions close to smart cities and demonstration projects to bottom-up solutions pushed by communities of eco-districts and start-ups.

So these local zero emission mobility solutions are based on a new paradigm of vehicles-energy & communication infrastructure- services.

Outside Europe unpredicted demand is coming from request of Gulf countries for the electric quadricycle of Renault named Twizy and real estate projects search for including this solution. Architects and developers of the Las Vegas downtown renewal urban project got the opportunity of Twizy.

Electric mobility solutions are support to urban design and a basis for reshaping parts of cities.

Emerging countries have been definitely decided not to be targets for electric cars... but bottom-up situations show it could be a mistake.

The case of India and mainly those of Bangalore and Delhi show weak signals for e-mobility dissemination. It is coming from the bottom with e-rickshaws or from opinion leader communities belonging to upper middle-classes with the Mahindra Reva car. These categories are activist regarding sustainable issues of indian cities. Most of them work in the IT sector and they have deliberately chosen to be kind of guinea pig to experiment the solution.

According to a typology we are working on about emerging countries, based on the India case, e-mobility is emerging in specific wealthy areas we qualified as "modernity vanguard" cities such as Bangalore, Delhi, Mumbai, Chennai, the city centre of Kolkata, part of the Kerala State on its coastline, Hyderabad. Kerala is representative of non-saturated urban category of area.

The whole india population share regarding this typology is 12,88% of the total one. Some districts surrounding the metropolitan cities are also included in this profile. The main features of these areas are that more of 17% women are working in the scientific and Technology sector.

In modernity vanguard areas the motorization rate is 12 cars for 100 households and 33 motorized two-wheelers for 100 households.

From the bottom, electric rickshaws are manufactured locally and expand rapidly. In Delhi there are almost 2500 e-rickshaws. SAERA one of the indian e-rickshaw manufacturers, expects to produce 400 vehicles a day for the indian market and therefore the African one. The autonomy is about 70 km. The price of the 4 seat vehicle is 60 000 INR (about 1000 €) without battery + 15 000 INR for an Indian made Lead Battery. A conventional auto-rickshaw costs 150 000 INR.

Delhi government banned sale of battery-powered rickshaws or e-rickshaws, as these vehicles are popularly called, last December. The idea was to allow the ones powered by a battery of less than 250W and keep the ones with a bigger motor power out till they could be regulated.

According to senior transport officials, the ban was put in place for checking the proliferation of e-rickshaws. "Vehicles with motor power of less than 250W and speed less than 25kmph are regarded as non-motorised vehicles under Delhi Motor Vehicle Act. However, it was noticed that vehicles with more motor power, almost as big as autorickshaws, were also plying without any regulation," said a senior official.

A majority of vehicles running now are operating with four batteries of 12V, with a power of 650-850W. Four-seaters, these vehicles usually carry more than that number - by accommodating people in seats beside the drivers - and can be seen speeding through the main roads, ferrying passengers for Rs 10 to Rs 40. The vehicles have no registration number-plates simply because they are not registered with any civic or government body. Drivers need no licence and neither are they required to have a background verification. Incredibly, the transport department is blind to the open sale of these e-rickshaws which clearly flout the 250W rule of the government. A visit to dealers in the city clearly establishes that high-powered e-rickshaws are being sold in Delhi despite the ban. Although informal, the service of e-rickshaws gets on one hand the pointing of fingers for generating congestion near metro stations and on the other hand is a key solution for the last mile highly complementary to the use of public transport.

impact on local economy

In emerging countries the informal sector is prominent. About 75% of the indian cities economy is informal. Any innovative mobility solution should be business support and consider necessary informal link within a global formal chain of activities. For instance battery leasing is disseminating. Some people

invest in photovoltaic panels and batteries in order to lease them to night market merchants four hours a day.

The unsustainable situation of the rickshaw pullers and paddle drivers has becoming to be perceived as a kind of slavery and inefficient. In India the market for shifting from an archaic mean to a modern one is 1 500 000 units; 900 000 in Delhi. Moreover e-rickshaws is better business support accommodating four passengers in the place of 2 in an auto-rickshaw. The daily potential earning may grow from 300 INR to 1000 INR because of additional passengers in a trip.

The most surprising feature of that story is that you have no recharging point in the metrocity... the indian *jugaad* may deliver a solution for everything: most of the e-rickshaw drivers use free energy provided by temples. So that you may see a few vehicles recharging with an amazing stretch of cables and of "do it yourself" connections weaving them together on the pavement.



Staying on the bottom-up level it is flabbergasting to notice that millions of electric vehicles are already moving in a few hundred cities. In the same time electric car manufacturers put in question the challenge of selling this type of cars. In India there are almost no electric two-wheelers while 120 to 140 million of e-bikes and e-scooters are in use and have saturated the domestic market of China (source Transport Planning and Research Institute, Beijing).

" e-bikes will continue to grow worldwide, in western countries and in industrializing countries" declares Alain Bertaud (WB consultant).

As for trend, it seems that subway trips to central core are likely to increase in big cities of Asia. But at the metropolitan level individual car trips are becoming dominant. We desperately need a new urban transport technology with much lighter individual vehicles which are guided on special lanes and autonomous on existing roads. Current transit is much too slow for large megacities. Current cars are far too large and heavy and energy inefficient.

Meanwhile, in countries like India, Vietnam and Indonesia the motorcycle and possibly the electric scooter seem to be the mode likely to dominate in the years to come (source Alain Bertaud, 2012).

The biggest explosion of electric vehicles in India is expected in the two-wheelers segment. Around 130 000 e-two-wheelers were sold in 2007-08, 110 000 in 2009.

- Most of them are low-powered and low-speed mopeds.
 - 96 % of the world's e-bikes are concentrated in China.
 - In India the e-bikes industry expects that high oil prices will boost its sale.

- The e-bike indian market estimated at Rs 450 crores (62 M €) with 40 players is expected to grow 10 times in the next 4 years.
- Hero Electric sold 20 000 units the first year 2009, then 70 000 the year after
- Southern states contributed to 40% of its total sales
- TVS Motor Co, Tube invest., Atlas cycles, Ace Motors, Avon Cycles, jumped in.

REVA NXR a lithium-ion powered e-car: 90 mn fast charging offer a 320 km a day range, a 15 mn one 40 km.

Government supports in: Subsidy of 15% on battery operated vehicles in Chandigarh, Bangaluru gives 4% of VAT during the 5 first years of launch of the car, Delhi announced a 29,5% discount for all e-vehicles.

Delhi government has given rebate to 15 000 e-bikes and 150 e-cars. Lack of charging facilities also discourages people to go for e-vehicles. Wait for e-vehicle users to attain critical mass

Clean mobility options: Small low-weight vehicles are not designed to meet the same safety standards of regular light passenger car.

E-vehicles must be charged with power sourced from renewables, such as solar and wind. An ambitious national smart grid plan is under implementation. Already huge wind farms of 200 MW capacity each are under operation in the southern India, Karnataka and Tamil Nadu.

Start-up companys such as SELCO are providing low income groups with photovoltaic panels for lightning, fan ventilation, and inverter charging. The Jawaharlal Nehru National Solar mission is developing many projects.

Innovations & solutions

New services or solutions are coming both from experiments or funded ambitious and expensive demonstration programs in a top-down way & from start-up or communities oriented bottom-up solutions. The middle wave crossing between these two approaches should be reached for dissemination, scalability, operationality, and effectivity.



Diverse trends of EV Mobility dissemination, source J. Grébert 2013

Innovation may disseminate in an incremental way within dedicated relevant areas: zones, corridors, lanes of cities. Megacities offer opportunities pockets such as bus lanes, bus rapid transit corridors, city centre restricted areas to implement new mobility solutions: self-service EV car-sharing as in project in Singapore, already implemented in Paris, Lyon, Bordeaux, autonomous driving testing areas, etc... Second rank cities often belong to networks of cities able to exchange and disseminate best practices of mobility solution more responsively. This is why medium size cities are balanced scales to experiment and develop sustainable mobility solutions in a less restrictive and exclusive way than megacities city centres.

The new already on going way of building cities: The question of eco-building with integrated zero emission mobility using renewal energy is to be grasped. Many initiatives or ambition are developing worldwide such as in Bangalore and other part of India with BCIL (ZED projects), and other parts of the emerging world. Even if these initiatives remain a significant weak signal the demand for disseminating best practices is high and most of them are or should be indigenous and bottom-up people centric. By the way yuppies and opinion leaders testing new sustainable solutions by themselves as “guinea pig” may deliver a model to be replicated by lower social classes glancing towards “upper classes” example. This is peculiarly the case in India.

Most of the people using an electric car met in Bangalore are in the category of people owning all the assets because there are no statistics in India about incomes. This category has TV sets, internet connection, mobile phone, and much more. The average monthly income of the people belonging to that category is about 5000 € (4 to 5 lakhs a month). The amazing feature of the story is that EV mobility

settled by itself in these areas which provided a positive opportunity context for such implementation of EV use.

In the ZED eco-districts built by BCIL (Biodiversity Conservation India) it was noticeable that the e-car was a second car after a conventional one.

Some families are activists to this idea for environmental concern, for instance we met a Mum and her daughter working at PWC Bangalore, each of them owning a Reva and Reva Mahindra car. The mother had been one of the first ten buyers of the city in 2001.

The question of the small size of the electric car is at stake and related to parking issues in the city. The small size of Reva is very convenient to park easily.

Another important point is the expensive price of petrol in India about 0,95 €/liter as if it was 6 to 7€/liter according to the purchasing power correspondence. Moving through electric solution is declared cheap.

On another hand in India the change may come from the top showing the way and moving as a kind of exemplary model.

ZED in Bangalore
THE OTHER ROAD



Photo JG

« it is as simple to charge as a mobile at home »

What is driving the e-market? High oil prices (Rs 70,57/ 0,97 €), greenhouse gas emission, and ambient air quality concerns. Emissions are elsewhere.

Battery costs nearly 30% of an e-bike's price. For a e-car, a battery costs Rs 60 000 to Rs 70 000 (900 €) Reva (Chetan Maini) declares that the running cost of the electric car is 1/10 of a small petrol car, and the owner would save Rs 200 000 (2 800 €) over 5 years even if battery replaced.

According to Yobyke, the running cost of an e-bike is ½ of these of a petrol bike, about 50 paise/km (1/2 roupie). But the purchase price is the most important criterion while choosing a vehicle.

Frugal Innovation comes from the necessity to fill the gap and to assemble available affordable bricks of knowledge or experimented basic solutions to "tackle" scarcity.

Hybridation: Emerging countries are hybridizing solutions and Africa may play a bigger role than previously expected. The Indian Bajaj is assembling auto-ricshaws in Kano (Nigeria), motorbikes, moto-taxis are proliferating in Douala (Cameroun).

About local zero emission mobility leapfrogging solutions may emerge rapidly due to high level of innovation in India. Obviously these solutions would form hybrids from other species of transportation means mixing car-motorbike-agriculture tractor...



- **Mesh of eco-systems**

TOD, transport oriented development is one of the challenges for the growth of the urban world as well as the creation of local eco-systems for innovation based on short distances, circular economy, frugality. A kind of worldwide standard is appearing in diverse countries based on eco-districts based on high insulated & positive energy dwelling, biogas, composting, organic urban farming, community market of local products, car-sharing solution: ZED, Infosys IT Campus (Bangalore, India), Dongtan project (Shanghai Chongmin Island), Masdar (Abu Dhabi UAE), Gingko (Bordeaux, France). These projects may be a ferment for new eco-systems development and be a lever for the use of local zero emission mobility solution. In many areas it is noticeable that EV settle by itself. « such technologies had to be combined with an enterprise that could push conservation values without compromising on everyday living and lifestyles » C. Hariharan founder and CEO of BCIL says. In 13 years the Indian company has built 1,6 million square feet. The cost of BCIL homes works out to around 1.250 INR/ square foot. Maintenance costs are 30 % less than those for ordinary apartment blocks.

Conclusion

The middle class of India will be these who will spend the most in the world by 2030 (Amitabh Kundu, Jawaharlal Nehru University, 2013) The world car fleet should grow by 30% to 80% till the next ten years due to emerging economies. The growth power seems unlimited if we consider that in India only 18% can afford buying a new car, 30% in Brazil, 50% in Russia. But in western countries, during the building of the automobile systems till the 90ies, every new driving license generated seven new parking spaces within the metropolitan region (for leisure, purchase, work, visit to relative...purposes) (source G. Dupuy). It means clearly that the “natural resources” such as energy, raw material, infrastructure, space, time, are not unlimited or endless. Should this situation lead to a kind of quota policy?

It is prominent to play with different scales of territory, of mobility network in order to know how cities will accommodate the economy and demography growth of fast growing emerging countries.