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# **Ecoscape Eco-industry Eco-culture**

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tendencies also appear in their green consumption activities—their main purpose in practicing green consumption is to avert negative environmental consequences to themselves. And though they may buy environmentally conscious products, their main motivation in saving energy is to reduce expenses. Moreover, there is a strong interest in mass consumption that tends to outweigh environmental considerations.

We thus conclude that in China at present, green consumers have not yet matured to the point of becoming leaders of an environmentally conscious lifestyle that would benefit the global environment.

Data Analysis will be subjected to both quantitative and qualitative analysis and the variables to analyse include; socio-economic, cultural background, willingness as well as cost effective of WTO2002VIP in relation to Traditional Pit-latrline. Statistical Package for Social Sciences (SPSS) will be used, Integrated Microcomputer Processing System (IMPS) for data capturing and Concur for errors and validations. T-test and the chi-square will do test of research hypotheses. The research work is expected to last for four (4) months period from inception to final report.

## **Planning, Design and Management for Sustainable Urban Growth: Aspects Related to Land-Use and Transportation**

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Land use patterns and urban transport

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The motion presented by the organisers of the latest World Road Congress to the participants for a discussion to be followed by a vote was: “Car oriented urban areas are inevitable and we should plan for them”.

Following a lively debate the “no” view advocated by Pierre Laconte won with a very large majority, against the arguments of the road – oil – and automobile industry. The present paper outlines some of the arguments.

Cities are key generators of economic growth, and the proportion of GDP generated by cities often greatly exceeds their share of population.

The sustained success of cities as engines of development depends on a multiplicity of factors, which are of economic, social and environmental nature.

Human contacts, the access to a wide range of employment and of goods and services require the ease of movement within the city.

Ease of movement within the city raises the problem of land consumption by mode of transport.

If we take as a unit the land consumption of a person walking or using public transport we can compare it with the land needed by using individual transport modes. Using a bicycle requires around four times the space of a walking person. One must add the space consumed every time the bicycle is parked. The total space consumption is about seven times the one of a pedestrian. Using a car requires around 18 times the space of a walking person. One also must add the space consumed every time the car is parked.

The total consumption can range from 30 times for short time parking up to 90 times for

workplace parking. One should not forget that a car is used only 6% of its life cycle. The remaining time is used by parking.

This in turn raises the question of who pays for this space consumption. A study by the Washington based Word Resources Institute estimates that the costs of using and parking a car and not paid by the users ("external costs") are totalling 300 billion US \$ per year, i. e. a tax payers burden of 1.000 \$ per person.

In larger cities infrastructure can never be expanded to satisfy potential demand for travel by car. Congestion threatens the internal movement which is the very life of the city. It also generates pollution and forces development outwards into the far suburbs. The resulting sprawl and associated lack of public transport mean that many are virtually excluded from the city's economic and social life. Some of the worst cases are to be found in developing countries.

The way to preserve and stimulate the economic life of the city while avoiding such environmental and social damage is to encourage the use of less space-consuming modes of transport, namely walking, cycling, and public transport.

Cities exist for citizens to meet - not for cars to move.

## 2. Public transport: a key factor in achieving a sustainable city

### 2.1 *Public transport contributes to the quality of urban life and the environment in general.*

For a given number of passenger kilometres travelled, public transport:

Saves valuable urban space. We have seen that the total space x time needed for moving and parking a car at work is about 90 times that needed for moving a pedestrian using public transport. This why in bigger cities the car can never satisfy mobility demand. On the street at peak hours buses may carry more than ten times the number of passengers that could be carried by private cars in the same space

Produces much smaller levels of harmful emissions (e.g. NOx), thus helping tackle the factors which damage people's health and the very fabric of towns and cities, including the ground level ozone, which result from a mixture of pollution and climatic factors.

Produces less noise.

Produces less CO<sub>2</sub>, thus assisting in climate stabilisation (The Kyoto agreement of 1997 requires switching to less polluting transport modes – see ENC.)

### 2.2 *Public transport is employment-friendly and favours social balance in a sustainable way:*

Public transport allows access to jobs and services *for all* and therefore favours local initiatives social balance and fairness.

At a time of growing urban unemployment public transport generates twice as many jobs per passenger kilometre as the car and four times more jobs per barrel of oil used

It creates the kind of jobs which correspond to *actual* urban unemployment, which includes a large percentage of people with low qualifications– and it creates most of those jobs locally.

### 2.3 *Public support.*

The need for alternative policies to those which favor the car are supported by the public:

In Europe, 84% of citizens, interviewed in 13 countries, estimate that priority should be given to public transport over the automobile in congested areas (Eurobarometre/UITP survey by face to face interviews). This support by the public is often underestimated by elected officials according to the same survey (who estimate it at 49%). Moreover one citizen out of three believes that elected officials over-estimate popular support to cars.

In Strasbourg (France) the mayor, who implemented a new tram line in her town coupled with traffic restriction was re-elected in 1995 with an increased majority.

### 3. What is required to achieve a switch to more sustainable modes?

#### 3.1 Linking land use and transport

The city should itself be developed along lines compatible with alternative modes (e.g. through mixed use, linear patterns of development, etc.) and the systematic siting of developments bearing in mind access to public transport, cycle paths and walkways, and environmental quality.

Thus the UK government has announced that 60% of all new urban development between now and 2010 should take place inside existing urban areas ("brown-field sites") instead of in green-field locations (leading to urban sprawl). Its new Planning Policy Guidelines forbid all developments not linked to existing urban development. The UK Government has also decided to review its major road projects following the 1995 SACTRA Report which concluded that "most roads generate additional traffic". Due to this "generated" traffic, new roads rapidly become as congested as the existing ones. An additional SACTRA Report (1998) puts into question the economic benefits deriving from new roads in particular the Trans-European road network program of the EU to be built at the expense of urban transport improvements. In the same line, an UK Government report showed that a reduction of road supply had a "traffic degeneration" effect.

Similarly Portland, Oregon, has successfully implemented a policy of urban containment within the limits of its built-up area.

#### 3.2 Making the public transport system more attractive

This requires:

Discouragement of commuter car use so as to contain congestion. Parking restrictions are the simplest means to this end although direct charging for the use of congested roads is likely to be the most effective in the long term, as done in Singapore since 1975.

Reserved routes protected from congestion. In many cases it is enough to provide low cost reserved bus-ways. For larger flows greater carrying capacity will be required – e.g. guided buses, trams, metros, suburban rail. Even then, the costs are shown to be much smaller than those of new road construction, to provide comparable transport capacity (Curitiba or Kunming busways).

Frequent public transport services, free from delays en route, giving good access to all the centres of population and poles of commercial and social activity (Manchester Light Rail Metrolink).

Good service integration between operators. This is helped by providing convenient intermodal interchanges and through "interoperability", for example by allowing heavy rail and light rail to share the same track and the same stations for passenger convenience (e.g. Karlsruhe and Saarbrücken).

A ticket system which allows users to travel by different modes of public transport, rail, bus, collective taxi, as well as use park and rides, with a single document (travelcard) or smart-card.

Real-time information at stations and stops for passenger reassurance on the state of the service.

#### 3.3 Combining traffic restraint and public transport improvement:

In Zurich, (350.000 inhabitants), the entire city is gradually being covered by "blue zone" areas with a 90 minute parking limit except for residents in their own area, which effectively discourages commuting by car and encourages switching to other modes. Meanwhile urban transport and commuter rail services offer a viable alternative.

In Singapore, (2.200.000 inhabitants), emphasis is put on optimal use of existing roads, public transport coupled with a restraint of automobile growth (only 3 % new "certificates of

entitlement" per year) and automobile use (taxation on parking and road pricing). Meanwhile public transport is made attractive.

In Krakow, (400.000 inhabitants), transportation is integrated in the Master Plan for Urban Planning and conservation. A new tramway and pedestrian areas are planned, as did Tunis earlier. Many smaller historic cities are integrating urban planning, including conservation, and mobility. A recent example of transit-oriented new town is Louvain-la-Neuve in Belgium (see ENC.).

To sum up, urban space can be planned primarily for people, allocating to the motor car only the space which is compatible with a good quality of life in urban areas. The use of valuable space by the car can and should be charged for, because in larger cities the road network cannot be expanded to satisfy the full potential for travel by car without destroying the essential urbanity that is their *raison d'être*.

#### 4. Information technology (IT)

Systems giving buses and trams priority at traffic lights, helping to speed public transport, as in Zurich.

Systems to monitor bus and tram movements, allowing control of services and the provision of real time information.

The use of IT to provide up-to-the minute information on routes, timetables, station facilities and other travel information on a system-wide or even nation-wide basis, whether via call centres or direct through the Internet (the Dutch multimodal call centre receives 14 million telephone calls per year), available both off system and while travelling.

Convenient system-wide ticketing suited to today's electronic cash society (e.g. the OCTOPUS proximity contactless smartcard in Hong Kong).

#### 5. Investments for improving access and quality of life in cities require full analysis of alternative strategies

Investments in urban transport often require large public expenditure. The first requirement therefore is to ensure the most effective use of existing infrastructure. For new projects, it is essential that a realistic assessment be made of the full impact on overall accessibility. For instance, in the UK the official SACTRA6 Reports have estimated the amount of new traffic induced by road investments and shown that such investment is often self-defeating. They also question the additional economic activity supposedly generated by road investment.

It is essential that all the alternatives be examined and that the most cost-effective solution be chosen, while making full allowance for environmental and other non-financial effects. An indispensable tool in allowing for these factors is *Strategic Environmental Impact Assessment* of infrastructure investments, which is now an EU requirement for major projects and recommended by the ECMT7 .

#### 6. How to finance urban projects?

Some of the key outputs of public transport (better air quality, reductions in accidents, and mobility for the needy) are not "traded in the market place" in civilised societies and therefore are not suitable for simple 'commercial' financing, but have to be bought by the community in large. Major transport investment however may make heavy demands on public budgets, at a time when there is strong pressure to reduce public expenditure in many countries. A wide range of alternative financing methods is therefore being adopted:

Private sector finance is high on the political agenda. One of the reasons for increasing the role of the private sector in transport (at least in the UK) is to transfer risks that it can better manage and to engage the efficiencies and enterprise that the private sector can bring. The

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6 Standing Advisory Committee on Trunk Road Assessment

7 European Conference of Ministers of Transport

challenge for authorities is to avoid privatising profits while “socialising” the risks. Ways to achieve this objective include the concession to consortia combining subsidised *investment* and unsubsidised *operations* in ways which achieve effective transfer of *risk*.

UITP has studied best practices in public-private partnerships such as the new Manchester and Stockholm Airport rail systems. The financing of the Hong Kong Octopus multi-modal ticketing system was handled by a specific Common Project Company (Creative Star). The London Transport automatic fare collection system has been outsourced to TranSys, a private consortium paid by a percentage on the fares they collect. The UITP best practice case studies are available through its documentation system.

Increasingly urban transport systems require specific financial arrangements which may be a consortium, or a public project company which may later be transferred to a public/private consortium. Loans by international finance institutions to cities require some form of equity at local level. This would be helped by common efforts by the main lending institutions towards encouraging the setting up of proper urban land registration and appropriate land taxation through local authorities, as well as the introduction of taxes on other beneficiaries such as the French Versement Transport (for employers) or Benefit Assessments on the gains due to new projects to property occupiers and owners.

Imaginative finance should help urban areas to make the best use of existing infrastructure and improve it by taking advantage of the latest progress in project finance techniques for the benefit of all citizens, whether car users or not. One possibility is the use of congestion and parking charges designed to manage car traffic levels to provide funding for infrastructure improvements, including public transport facilities.

## 7. Conclusion

Cities are the motor of modern economic life. The growth in private car use however is leading to a situation where the very mobility on which cities depend is threatened by congestion, and the environment which they provide is becoming increasingly unpleasant and even dangerous to health.

The only way of maintaining easy access to the city's facilities on which its economic success depends while providing a healthier and more attractive environment is by making greater use of alternative, less space-consuming, less environmentally damaging modes – walking, cycling and public transport.

To encourage such a shift it is essential to make public transport more attractive and more easily available, while managing the demand for car use – and to encourage the city itself to develop in ways which tend to encourage the use of more sustainable modes rather than of the private car.

The quality of public transport itself needs to be improved. Much can be achieved through the use of IT. New public transport infrastructure will usually provide the additional capacity at lower overall cost than equivalent new road capacity.

It is crucial in decision-making that all the possible options be appraised, and that the appraisal take account of wider mobility, environmental and employment considerations.

The funding of such schemes is being facilitated by the development of new types of financing instruments designed to mobilise private capital. However, a measure of public funding or guarantees will normally be required. The catalytic effect of such can make this one of the most effective ways in which public finance can be used to stimulate economic development while *improving* the environment.

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## ENCLOSURES

The Kyoto Protocol

Louvain-la Neuve (Belgium) – A rail-oriented New Town in the for the 21<sup>st</sup> Century

## The Kyoto Protocol

The Kyoto Protocol is an extraordinary and unprecedented achievement in international affairs. Its inclusion of binding commitments with varied flexibility is more sophisticated than many political analysts considered possible. The many other elements – spanning global ‘soft’ commitments, related processes on technology transfer and financial mechanisms, policies and measures, minimisation of adverse impacts, sinks, and compliance mechanisms – represent a complex package designed to gain and sustain global participation. The central structure of successive five-year commitment periods provides a natural basis for the evolution of the regime over time.

The transfer mechanisms potentially establish new markets based upon resources (emission credits and assigned amounts) that are purely human constructs – harnessing the greed of nations, and their industries, in the cause of climate protection. The incentives to expand ownership and access to these resources will be immense.

The major OECD importers may seek permissive rules on both the project mechanisms and trading, so as to maximise their access to cheap emission credits and to ease the struggle for ratification that may be long and difficult in some countries.

Almost everything about the governance of these mechanisms remains to be determined. We have yet to develop a clear understanding, let alone consensus, about the international social, ethic and legal foundations upon which such instruments need to rest. Other aspects of the Protocol, including its provisions on policies and measures, minimisation of adverse impacts, technology transfer, and compliance procedures, all require much further development to become effective.

Yet the Protocol has already made two fundamental achievements. First, its adoption has persuaded the private sector that the world will indeed start getting to grips with the problem of climate change, however slowly and ponderously, and indeed that there may be varied benefits accruing to those who move first. Second, it has advanced the debate on international economic instruments from whether to adopt them to how to implement them.

Governments have already made major political investments to establish this nascent regime. It offers a solid basis, and there are no credible alternatives on offer. The world has started down an ambitious and efficient road to tackle its most daunting environmental problem, and there is no turning back.

*Source: Grubb, Michael; Vrolijk, Christiaan; Brack Duncan (1999): The Kyoto Protocol;*

*A Guide and Assessment, The Royal Institute of International Affairs, London, pp: xli–xlii.*

NB: “Sinks” are permanent forests which absorb CO<sub>2</sub> e.g. the Amazonian tropical forest. However a 1999 report by the Hadley Centre (UK) claims that newly planted forests do not retain CO<sub>2</sub> and that therefore only a reduction in emissions resulting from burning fossil fuels can slow down the climate change.

## Louvain-la-Neuve (Belgium) - A Rail-oriented New Town for the 21st Century

In 1968, the academic authorities of the Université Catholique de Louvain (UCL) were asked to move the university out of the Dutch-speaking town of Louvain (Leuven) where it had been founded in 1425 and to find a location in the French-speaking part of the country. Instead of

creating a new campus the UCL, under the leadership of its general administrator Prof. M. Woitrin, chose to develop an integrated new university town and acquired to this effect 1000 hectares of agriculture land at the edge of the municipality of Ottignies (3.800 inhabitants), some 25 km south-east from Brussels. The main idea was to foster town-and-gown interaction by attracting a strong non-university resident population as was the case in the historic town of Louvain.

The land acquisition took place on the open market through different agents, with the help of a low-interest loan from the State. The UCL appointed the Groupe Urbanisme Architecture (R. Lemaire, J.P. Blondel and P. Laconte) to draw the master plan of the new town (called Louvain-la-Neuve i.e. New Louvain) and co-ordinate its architectural design and development.

Considerable flexibility was to be maintained in view of the uncertainty about the future urban growth, as only the university buildings were receiving guaranteed State grants, while housing and shops were to be developed through the private property market. This flexibility was achieved by structuring the entire new town along a linear backbone and implementing it by successive self-contained phases. The master plan was approved in 1970. The first self-contained phase came into use in 1972. Louvain la Neuve received the 1982 Abercrombie Award of the International Union of Architects. It was also presented as a good practice by Belgium in its reports for the UN Conference Habitat I in Vancouver (1976) and for the UN General Assembly Special Session in New York (2001).

The linear backbone is made of a long pedestrian main street and a succession of piazzas with shops, restaurants and cultural facilities and (since 1976) a new central underground railway station, paid for by the National Railways. Automobile access to the buildings is by peripheral roads and underpasses. Parking is peripheral or located under the buildings. The new railway link has put Louvain-La-Neuve at less than 30 min. from the centre of Brussels. This has strongly helped to attract non-university resident population. Non-university population is (since 2001) higher than the one linked to the university.

The residential areas are made of rows of single-family houses, maisonettes and low-rise apartment buildings. This design option also applies to the university buildings. The master plan allows for the parallel growth by phases of the urban services and the population, according to the response of the market. The total day occupancy is about 30,000 people (about 100 per built-up hectare).

The close propinquity (less than 1 km radius) of most of the University buildings, housing and the associated social facilities, shops and restaurants, means that personal contacts are more effectively encouraged than by any organised procedure. Automobile transportation is extremely reduced inside the town. The whole concept actually maximises the use of non-motorised transport. The "high-density low-rise" option also meant dividing the site into small plots (150 to 400 m<sup>2</sup>). All categories of contractors could tender for both the residential and the university buildings, effectively discouraging cartel formation and keeping construction prices down.

Besides its unusual energy saving compactness and the fact that all wooded parts of the site have been listed, Louvain-la-Neuve has several pioneering ecological features. These include a double water collection system by which all rain water is collected separately towards an artificial lake located on the lowest part of the site. This lake has become a key amenity for residential development.

By contrast to the overall design features the master plan provides for a central district made of a large concrete slab (some 3 hectares). It covers the railway station, two layers of underground parking and allows underground access to the shops and services (see illustrations). The land remains as elsewhere in the hands of the University and the air rights are shared between the National Railways (for the railway station), the Bank of municipalities (for the underground parking space), private developers (for the commercial and leisure activities such as theatres and cinemas) and the University itself (university buildings located on the slab). The large university multipurpose hall (Aula Magna) and a complex of 17 cinemas opened in 2001. Further shopping and leisure facilities (Centre Esplanade) are in project.

Illustrations:

View of a pedestrian piazza (the central part of the pedestrian street network is built on a concrete



slab covering rail, road, parking and storage space)

View from the lower part of the railway station (to be partly covered by the shopping and leisure Centre Esplanade)

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## **Financing Green Buildings in China**

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This presentation will begin with an overview of green building economics, arguing that such projects are highly competitive, low-risk investments. This will be followed by a review of some important traditional and innovative financing instruments, and how they can be successfully *combined* to create bankable green building projects in China. Financing and risk management tools to be discussed include export credits, credit enhancements, carbon emissions trading schemes, and non-recourse financing coupled with “wrap around” energy savings performance guarantees. The author will conclude his presentation with a list of policy recommendations that could help attract foreign and domestic capital to green building projects in China.

## **The Planning and Design of Constructed Wetland Eco-System in Residential District**

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This paper focuses on “water”, analyzes the characteristics of biological treatment of wastewater, and discusses the combination of constructed wetland ecological system and landscape design. Taking a residential district in Chongqing as an example, the author explains that constructed wetland ecological system is perfectly conformity with the ecological design principle, suggests a new way in landscape design of ecological residential district.

[Key words] Residential District, Landscape Design, Constructed Wetland Eco-System, Ecological Principle, Planning and Design

## **The Analysis About Ecological Footprints of Macao in 2001**

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