

## Access in Cities and Sustainable Urban Transport: A Challenge for Third World City Planning Practice

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**Abstract:** The way cities are organized constitutes a potential for increasing demand for motor based travels, road infrastructure needs and vehicles. This encourages energy profligacy, pollution, visible declining service levels in spite of increasing transport based investments and needless changes to our microclimate. All these threaten city sustainability. This study, relying on a current study from Akure Nigeria discusses the nature of travel patterns and characteristics from a Third World city. The methodology of study entailed the use of household based questionnaire survey exercise conducted on 360 household heads that were selected using the stratified systematic sampling technique. Descriptive and inferential statistics were used to analyse the intensity of travel characteristics and reported travel problems. The study affirms close relationship between intra urban travels and urban land use arrangements as well as travel characteristics which are dominantly work trips, commercial trips, ecclesiastical trips and recreational trips. Recommended policy thrusts include the need for reducing the number of vehicles in circulation hence an urgent viable mass transit scheme intervention is anticipated. Also, walkways and cycle ways need be provided and landscaped to attract patronage. This will ensure safety and guarantee 'clean city mobility'. Beyond these, long term interventions of compact city development and regional balance around emerging cities of the Third World were proposed.

**Key words:** 'Walking city', intra urban travels patterns, urban traffic demand, compact city, cycle routes

### INTRODUCTION

Among many things, literature presents transport as the means of getting from one place to the other, using different modes of travel. It is also seen as a means to an end and never an end in itself. While Okoko (2006), sees transportation as a process that involves movement of commuters, goods and services from a given point of origin to specific destination, Cullingworth and Nadin (2002) believe that much of transport constitutes an impediment to the enjoyment of some other things, more so that transportation entails mobility and mobility necessitates consumption of energy. It has always played a major role in urban development since the emergence of cities a couple of thousands years ago.

In further arguments, Cullingworth and Nadin (2002), Pacione (2002) and other scholars see transport as a means of providing accessibility, that is to say mobility is not important in itself as much as in its provision of access. This therefore, opens up a genre or new vistas of reasoning-that of managing land uses and land use relationships to enhance accessibility across the urban scape. The greater the accessibility, the lower the need for transport such that transport planning will be more environment friendly if it looks beyond road expansion or elongations; to highly articulate land use mix across cities.

In a sense, this genre of transport analysis embraces the sector-specific sub-set of the post-1988 sustainable movement, hence the need for a study of this sort in our cities. This is more so the case as the way we travel and the continued growth in road traffic damages our towns and harms the countryside. It has to do with energy profligacy, pollution, declining service levels in spite of increasing investments and needless changes to our microclimate (Newman and Kenworthy, 1999). Over most of the century, it was assumed that adequate transportation structures needed to be built since they provide an essential underpinning to growth and economic health. Accordingly the main concern of transport planners and policy makers was in the "supply" of transportation and specifically in ensuring that the supporting infrastructure was going to be adequate to support all projected requirements. The dominant approach was, therefore, to forecast and then build to meet. In public transport planning likewise it was the supply and efficient operation of vehicles that got the build of attention. As a result, it is claimed by many analysts and observers that most places have as a result heavily overbuilt their physical transportation planning which in fact has led to unsustainable levels of traffic and resource use. This in a way, challenges land use planning and regional planning instincts and concepts

as well as transport policy orientations more so that demand for transport in cities for people, goods and services is determined largely by the spatial arrangement of different land uses and the degree of complementarity between them.

**The sustainable urban transport movement:** This is a movement that is gradually gaining force in the last one and half decades (Wikipedia, on-line). It shifts emphasis in public spending and actions away from building and supply to management and demand. In all situations, values for the environment and prudent sustainable use of natural resources are central. The 'sustainable transport' idea thrives more on accessibility than transportation.

'Sustainable transport', came up as an almost accidental follow-up to the earlier term Sustainable Development whose origins were the 1987 Brundtland Report. Peter Wiederkkehr at the Organisation for Economic Cooperation and Development (OECD) in 1994 led a small international working group of transport planners that agreed that a new policy approach was needed to place environmental criteria in transport issues on the front burners along with other policy goals of sustainable development. The Organisation for Economic Cooperation and Development (OECD) thus began to chart a path towards Environmentally Sustainable Transport (EST). This culminated in the International Conference Towards Sustainable Transport in Vancouver, Canada in 1996 and the Vancouver Principles towards Sustainable Transportation (Newman and Kenworthy, 1999).

As a strand of thinking, Sustainable transport refers to the movement of people and goods in a municipal or urban area in a manner that minimizes environmental degradation, systems costs, traffic safety problems and traffic congestion, while ensuring access even of the poor to meet their mobility needs. Casually, sustainable transport does describe all forms of transport that minimize emissions of carbon dioxide and pollutants, it does not endanger public health or ecosystems and meets mobility needs consistent with use of renewable resources at below their rates of regeneration and use of non-renewable resources at below the rates of development of renewable substitutes.

With the growing index of urban population everywhere, growing transport problems associated with rising levels of Low Occupancy Vehicles (LOV) - the passenger car use - is on the increase; necessitating a call for the sustainable transport paradigm. From the land use and regional management perspectives, this entails effective land use management that encourages dense, multi use developments in close proximity to public transportation and low polluting fuels (Nagurney, 2000).

**Traffic problems and equity issues in cities:** Within the last few decades, growth in the number of cars on the global scene has been more rapid than the growth in urban population (Pacione, 2002). The growth pattern of vehicles is such that between 1950 and 1990, number of cars globally increased from about 53 million to over 400 million. Between 1950 and 1960, the number of vehicles on the road in Britain literally doubled from 4-8.5 million. By 1980, the figure rose to 19 million and 28 million by 1999. Much as these statistics come from the developed world, it need be stated that certain third world countries and cities have experienced the most rapid growth in the absolute number of road vehicles and share the trend of these statistics and to a larger extent, the accompanying problems hence the need to achieve a reorganization of travel needs and travel patterns in our cities. Across the large third world cities, rapid growth in traffic, stimulated by increases in incomes for some groups and general expansion in the urban economic activities are common features. The introduction of mechanized transport has aided extensive urbanization and discouraged the 'walking' city structure that was hitherto the dominant preoccupation all over.

Demand for transport in cities is determined largely by the arrangement of the different land uses. A study affirming the relationship between land use and transport as encapsulated in the distinction between the 'walking', 'tracked' and 'rubber' cities has been discussed by UNCHS (1994). Suffice to say however that the 'walking' city has the pre industrial compact urban morphology. Activities are in close proximity and easily accessible to one another on foot or animal drawn carts. Apart from the administrative core, functions are often not distinctly segregated spatially. Walking as the dominant mode of travel may still persist in the core, even after the city might have evolved beyond this form. At the other extreme, the 'rubber' city is the automobile dependent city with densities of 10-20 persons per hectare (25-50 persons per acre). The vehicular means of travel widens choice of residences with a decline in attraction for the traditional core districts. As the typical third world city urbanizes over time, the pace of transition from the walking to rubber city often does not give sufficient time for developmental adjustments across the stages. Virtually every thing goes on at fast rates. As such, the physical spread of many cities today engenders dependence on motorized transport and longer intraurban trips (Dimitriou, 1992). In the same vein, Pacione (2002) opined that nearly all cities are now affected by the advent of motorized road vehicles whereas access desired implies energy utilisation. This need be consumed sustainably. There is thus the need for conservation in the face of development, to be aimed at via sustainable urban transport strategies.

Table 1: Showing number of Passenger cars per thousand population in selected cities

		1975	1980	1985	
Africa	Nigeria	4	4	9 (1991)	
	Cote d' Ivoire	11	14	18	> x2
	Botswana	5	7	13	c. x3
	Tunisia	17	23	40 (1991)	> x2
Central America	Mexico	39	53	83 (1991)	> x2
Asia	Malaysia	39	56	90 (1987)	> x3
	Thailand	6	8	14	
S/America	Ecuador	7	7	15	> x2
	Colombia	16	18	28	> x2
Oceania	New Zealand	369	401	60	Crashed

Source: UNCHS (1996)

The United Nations strongly linked city traffic related problems with the concentration and growth of urban based vehicles in cities (UNCHS, 1996). The passenger cars (low occupancy vehicles) form the reference point because of its poor efficiency in urban transport delivery. Table 1 reveals that the number of passenger cars per thousand inhabitants in Mexico, Colombia and Ecuador more than doubled or thereabout between 1975 and 1985. These same details trebled in Thailand and Malaysia. For Nigeria the index more than doubled for the stated years while in a few cities the parameters dropped for example as in New Zealand.

In major cities, economic costs of traffic congestion are staggering which when coupled with poor public transport systems translate to high travel costs for the urban poor. Besides this, the affluent who use the low occupancy passenger cars often do not pay full social, economic and environmental costs generated while much of traffic related health risks are borne by the non-road users (Armstrong-Wright, 1993). Asides from this, while road accidents remain a leading cause of deaths globally, about three-quarters of these accidents occur in the third world. With the severity indices, the urban poor as pedestrians or cyclists bear the brunt of vehicular collisions while the city poor suffer further from vehicle related environmental pollution. This comes from poorly maintained old engines especially in this era of 'fairly used' imported vehicles in Nigeria. This is more the case when they are held up in city centers.

Few cities have successfully coped with the fallouts of increasing growth of passenger cars on their roads. With lower rates of car ownership when compared with the advanced economies, cities in poor economies suffer more from poorly functioning traffic management schemes that ensure high levels of congestion; urban noise levels, poor road maintenance and much lower provisions for roads. In Nigeria, road transport is the most dominant mode of transport, accounting for over 90% of mode of travel on land (Okoko, 2006) while the dynamics of road development over time reveals an upward trend. Between 1954 and 1964, nationwide road network grew from 29,000

miles (46,667 km) to 46,000 miles (74,000 km); the macadamized surfaces being only 7,000 miles (11,265 kms) by 1964. The road network in the country is now estimated to be about 200,000 km (Okoko, 2006) with a sizeable proportion being macadamised.

In Akure as in many Nigerian cities, the transport problems keep increasing owing to the increase in urban population, increasing number of vehicles and social activities; and among many others, the dynamic and ill-guided land use mix across the city. These normally spawn high proportion of intraurban transport need, infrastructures and motor vehicles, which produce a heavier volume of traffic. Consequently, urban traffic congestion has become one of the dominant transport problems in this city as in most other cities. This paper therefore posits to examine the dynamics of intra urban travel characteristics in Akure, a typical Nigerian city. It goes on to examine the associated problems and there after establish a discussion that enhances sustainable urban transport and urban health.

## MATERIALS AND METHODS

**Akure-The study area:** Akure a medium-sized urban center became the capital of Ondo State of Nigeria on February 3rd 1976. The new state consisted of all that amounted to the old Ondo province as created in 1915. From this point in history (1976), Akure has tripled in importance and destination focus being all-together the traditional headquarters of the Akure kingdom, capital of the Akure South Local Government and lately the seat of Ondo State administration (Onakerhoraye and Omuta, 1994). There has also been a dynamic change in the area extent and land use mix in Akure such that have implications on land use and regional planning, transport network and travel patterns. The city core area now exhibits an extensive 'dumbbell' shape, centering on the Oja Oba/Arakale core area and the Banking districts of Bishop Fagun/Alagbaka areas. According to Ogunbodede (1999), the area extent of Akure grew from 1937 ha in 1976, to 5330 ha in 1986 (36.34%) and 7995 ha in 1996 (66.7%). Similarly, the commuting distances during these periods in Akure increased from 6.4 km in 1976, to 10.5 km in 1986 and 13 km in 1996 for the major road. The increase in commuting distance within the city has great impact on trip generation, attraction, distribution, mode of commuting and fares paid by commuters.

The existing road network in Akure is dominated by the Oba Adesida/Oyemekun roads. This is a primary road of about 5 km length and 20 m wide. It bifurcates the city into two unequal parts. There is also the Arakale road, which is a major secondary road that runs parallel

to the Oba Adesida/Oyemekun roads. It is about ten meters wide and carries a traffic volume far beyond its capacity (Bobadoye and Fadamiro, 2006). All other roads that join these main axials are poorly developed, thus making them more attractive hence vehicular traffic on these routes is usually heavy. The streets in the core areas are unusually narrow and poorly networked hence there is a constant congestion among vehicular traffic and pedestrians particularly at Oja Oba and Oke Aro road junction. This hampers pedestrian travel. The pedestrian routes as distinct from the roads exist in many neighbourhoods of the core areas. They pass through individual properties and foster community relationships and permeability. These are however not prominent or absent in the Government Reservation Areas and the elite areas of the town where urban development have been patterned largely after vehicular access. Pedestrian routes as informal walkways dominate the peripheral development areas especially in between plots and blocks on the layouts. They however lack planning and landscape elements.

The study reported in this study was done using a household based questionnaire survey exercise conducted on 360 respondents drawn from Akure town. Deriving from a detailed reconnaissance survey, the entire study area was first subdivided into two major study zones comprising of the densely built inner core districts and the outer less closely packed residential zones. Respondents were selected using the stratified systematic sampling technique with albeit a random take off to decipher the travel patterns and problems in the city. A copy of the questionnaire was now administered on household heads selected for the study sample.

The Akure Chapter of National Union of Road Transport Workers (NURTW) was interviewed too. This interview schedule was used to gather data to supplement whatever the questionnaire exercise could furnish on Akure the study area.

The study uses the descriptive and inferential statistics to analyse the intensity of travel characteristics and travel problems on the city. There from, it went ahead to propound solutions to perceived problems.

## RESULTS AND DISCUSSION

**Intra city travel characteristics and sustainable transport development-empirical facts in akure:** There is a close relationship between intra urban travels and urban land use arrangements. From the study, a number of trip patterns were seen as dominant in the Akure travel profile. These include work trips, commercial trips, ecclesiastical trips and recreational trips. A detailed examination reveals

Table 2: Showing Trip patterns in a typical week in Akure

Trip type	Mon	Tues	Wed	Thurs	Friday	Sat	Sunday
Journey to work	230	230	225	225	204	9	9
Religious trips	5	7	20	5	32	30	327
Commercial trips	5	4	5	4	5	131	14
Recreation trips	36	36	26	46	35	67	10
Total	360	360	360	360	360	360	360

Source: Fieldwork, 2006

Table 3: Showing the occupational structure of respondents/travelers in Akure

Occupation Status	Frequency	Percentage
Unemployed/students	116	32.3
Self employed	6	23.3
Civil/public servant	149	41.1
Corporate private employment	9	2.5
Total	360	100.0

Source: Fieldwork, 2006

spatial differentiation is quite strong in Akure such that the need to conquer space is palpable in between land use areas. Attraction to work places is a major determinant of travel characteristics across the city as most trips in the city, by whatever mode of travel are work-related. From the Table 2, between 56.7 and 63.9% of trips made on working days of the week are journeys to work places. This travel streams thus constitute sources that management can easily cash in upon to formulate a viable mass transit scheme to achieve sustainable transport aims and traffic calming over the urban space. Other trip types exist but are less significant. While ecclesiastical trips gain prominence on Sundays, commercial trips are significant on weekends.

From Table 3, Akure fits in as a civil/public service town. Besides a few primary schools, the Post office and the old Local Government complex in the core area, other government offices are all located off the core residential areas. The work places, often located off the residential areas imposes strong travel links between the residential areas and the work places in the town. Trips between these land uses are often made on automobiles. Owing to the attractions of these work areas, there is a volume of passenger traffic that engenders the typical peak periods in Akure. A return of over 40% public servants and another 32% students/unemployed category reveals huge potential passenger traffic to be moved every day to work places and schools sited away from the core areas.

Notable travel patterns include the Federal University of Technology stream to the peripheral University site. This is a large land use area that generates huge opportunities for workers, who traverse the city space to get to and from work daily. The off campus status of the school ensures that just less than 20% of the student population is accommodated on campus hence a potential volume of passengers that travel to the school regularly.

The second stream is between the residences to the 2 secretariats viz: the State Secretariat and the Federal Secretariat-beyond the core areas. This zone also houses the State Police Headquarters, Nigerian Customs Headquarters and the Nigerian Population Commissions head office among others. Corporate offices in the city are also not in the core areas hence the build up of potential commuters to work areas in Akure.

Apart from these, there is also the large district for traders and informal services providers in the city central areas. These are employment zones that attract patronages from all over the city and hence commuters. All these influence the travel characteristic and portend potentials for an articulate mass traffic scheme.

The primary aim of urban transport is to enhance mobility across land use areas. The needed efficiency with which this is achieved is however compromised by congestion, arising from the number of vehicles that ply the roads ferrying the volume of passengers. More specifically, this stems from the concentration of travel flows at certain times during the day, with the principal reason for the typical double peak distribution of daily trips between journey to and from work especially in the core areas and other major travel routes of Akure. Congestion of both vehicles and human as seen on Akure roads is a visible manifestation of the failures in urban transportation management and planning. Daily, vehicles and human beings clog together at important roads in Akure township, while people going to work/schools queue at bus stops waiting to be taken to their places of work or schools. As the distances between land use areas-residences, work places, places of worship, etc have become longer owing to lower density settlement patterns, accessibility has come to depend more on mobility and this being more in low efficiency modes-the private cars and taxi cabs, in Akure.

This study however, believes that the inter relationships between land use areas play crucial roles in generating or attracting traffic. This is more so the case as urban land use areas have been identified as intimately interwoven with transportation needs. Blunden (1971) among other proponents affirms that a unique property of land use is its ability to 'generate and attract traffic'. The over dependence of the intra urban transport system on small cars which are less efficient in passenger bulk carriage generate environmental problems of public health importance. Age of the vehicles ensure urban air pollution especially on the main roads. This is essentially true for the heavily built up urban core districts that are serviced by old rickety fuming automobiles. The needs for parking spaces in the city centers and micro climatic changes of the core areas compared with neighbouring suburban districts are all issues of concern to public health and sustainability.

Table 4: Means of public transport in akure township

Mode of transport	Total number
Mini buses	222
Type (A) taxis (on main streets)	1,600
Type (B) taxis (specified routes)	700

Source: Nigerian Union of Road Transport Workers office, Akure. 2006

Table 5: Relationship between vehicle ownership and number of trips made per week

	Assumed std.			100R
	Values	error	R <sup>2</sup>	
Ordinal by Ordinal				
Spearman's correlation	-289	0.050	0.059	5.9
Interval by Interval Pearson's R	0.396**	0.042	0.019	1.9

\*\* Correlation at 0.01 significance level (two tailed test), collated from field data, 2006

The field survey also revealed some of the reasons responsible for congestion on Akure roads to include non-availability of effective mass transit transport services in the town. The implication of this situation is visibly seen by the dominance of the transport system by para transit modes and cars. More importantly the use of cars as taxis is the dominant public transport mode in the town. By implication only a maximum of 5 passengers could be carried at a time, owing to the low passenger car unit of this mode of transport.

From Table 4, it can be seen that there are about 2,300 taxicabs and only 222 mini buses in operation in Akure Township. The taxis contribute to the congestion and pollution at peak hours in Akure transport system.

Reviews of the 'vehicle ownership' structure reveal that most vehicles in Akure are passenger cars. The fieldwork informs that over 70% of the respondents own passenger cars, about 13% respondents own buses and motorcycles while only about 3% own trucks. The dominant passenger car ownership structure accounts for the congestion in the city. This is more so the case as studies has affirmed that personal car ownerships encourage short unnecessary trips.

Further more, a test statistics was done on the data collated to test for the relationship between vehicle ownership and number of trips made per week. The Spearman's Correlation using the Pearson R reveals that there is a significant relationship between ownership of vehicles and total number of trips made per week (Table 5). The correlation co-efficient (R) of -0.396 was found to be significant at 0.01 level of significance thus the null hypothesis was rejected while the alternative hypothesis was upheld that there is a significant relationship between the two variables.

The respondents were also sampled on their perception of environmental problems that they contend with. This is important as it will go a long way in determining acceptability or otherwise of probable amelioration strategies. Identified traffic related problems were ranked as: Poor road width, road congestion, parking

problems, street hawkers and road accidents on Akure roads in that order. Arising from these, the study sought out their opinions about some management strategies. It is empirically evident that the intracity traveler will welcome strategies that will aid throughput on the highways. 53% of the respondents welcome articulate auto car restraint especially for private cars in the central areas as good development. Also, over 90% of the respondents express fears about the new market structure as regards the insufficient parking provision. This is viewed as capable of aggravating an already bad situation if amendments are not made to the parking facility in this high trip attracting land use area. Other issues suggested include a caution on the land use dynamics in the central areas where old units are pulled down to be replaced by new high rise traffic generating uses.

### **POLICY THRUSTS**

The challenge of creating new urban forms that conserve energy and attains equity for all is a primary aim of sustainable urban transport advocates. Given the diversity of cities in terms of size, population growth rates and their economic, social, political, cultural and ecological settings, one need apply the campaign of sustainable development of which the sustainable urban transport is but a subset cautiously.

This study has identified the need for traffic systems management in the short run and land use rearrangement on the long term as two major options for achieving the sustainable urban transport goal in Akure and other cities. The manipulations on the supply-demand relationships of the urban transportation are crucial. This is more so the case since readily perceived problems center on the huge 'journey to work streams' that are generated every day of the week. Apart from this, the inefficient mode of travel such as the private motorcar, taxi cabs and low capacity midi buses; congestions and far-flung complimentary land uses are issues to be addressed.

The study therefore, suggests as short-term policy intervention the following:

**Reduction of urban traffic demand:** Policy provision should aim at reducing urban traffic demand. There is the need for reducing the number of vehicles in circulation and the allied non-sustainable attributes, hence the need for a viable mass transit scheme to meet the urgent needs of travelers in our cities while reducing the number of vehicles on the streets. On the Akure landscape, the proposed mass transit scheme will operate between routes such as the City center to the University gate, City center to the Secretariats (Federal and State secretariats), NEPA to the University gate, among others. This programme will reduce the fallouts of too many vehicles on the streets

such as energy profligacy, congestion on roads, accidents and other environmental costs. It will by so doing help in calming traffic in the city while increasing access and throughput.

Apart from the above, efforts at reducing traffic demand can be achieved through auto car restraints in the central areas, some of the high streets can be pedestrianised while some may be turned 'bus only' streets.

**Pedestrian and cycle routes:** These exist as informal traditional infrastructure on the Akure city scenario that, as a matter of policy recommendation should be provided in the city. More walkways and cycle ways need be provided and sufficiently landscaped to attract patronage, ensure safety and guarantee 'clean mobility'.

In the light of the discussions in this paper and the imperative for crisp pointers to sustainable urban transport, longer-term policy intervention focusing on land use re-engineering is an essential premise to dwell upon. Two major policy thrusts arise and these include:

**The compact city proposal:** This is recommended for a central area redevelopment programme. By this is envisioned a gradual redevelopment option for the core districts base on an on-going development impetus on ground. As at now, old dilapidating low-rise buildings are being bought over and being developed to high rise buildings, for example the Olukayode House, the new Oba's Market, etc. The policy provision opines that such old buildings should be replaced with high-density multi-use land use developments. Anticipated developments will avail and concentrate opportunities and workspaces in the core districts. It is hoped that this will reverse the ecological invasion of the Central Business District (CBD) that is for now encroaching on other land uses adjoining the CBD. Apart from this, since the skyline will now be here, there will be a huge potential of working class passengers and traders alike who will maximize the mass transit scheme as envisaged above. The proposal will also enhance energy efficacy. However, the Development Control machinery will need be positioned to ensure adequate provision of detailed impact assessment report, ancillary facilities such as on-site parking lots, solid and liquid waste management schemes among others.

**The regional city proposal:** This policy option capitalizes on the landmasses around existing peripheral work districts or foci. Such areas should as a matter of policy intervention be zoned for comprehensive layout developments. This will in a way amount to decentralized concentration around chosen foci or nuclei, provide nearby housing units around work areas thus minimizing long travellings across city space.

## CONCLUSION

In conclusion, this study submits that sustainable urban transport amounts to the movement of people and goods in a municipal or urban area in a manner that minimizes environmental degradation, systems costs, traffic safety problems and traffic congestion, while ensuring access of the poor to meet their mobility needs. As cities grow by the day and passenger car use grows, movement becomes intense and more environmentally costly hence mounting problems arising from energy consumption in the traffic sector creep in. Congestion creeps in and safety is compromised as well as the cost of transportation. This study believes that the interspaces between land use areas that need be crossed are the bane of sustainable transport in cities. To achieve sustainability in this sector, the study has proposed among other submissions, the collapse of interstitial spaces via land use reengineering. This envisions a more compact, accessible urban morphology. Strategies to ensure sustainable urban transportation include: clean, efficient public transportation systems; effective land-use management that encourages dense, multi-use development in close proximity to public transportation; and the use of low-polluting fuels. This is hoped will generate less dependence on fossil fuels and its associated problems, more use of energy free mobility such as the cycle or walking.

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