Parking: Multi-level dilemma
LESSONS FROM MULTI-LEVEL PARKING IN DELHI

RIGHT TO CLEAN AIR CAMPAIGN
2012

CENTRE FOR SCIENCE AND ENVIRONMENT, NEW DELHI
The Centre for Science and Environment (CSE) is a public interest research and advocacy organisation based in New Delhi. The Centre researches into, lobbies for and communicates the urgency of development that is both sustainable and equitable.

The scenario today demands using knowledge to bring about change. In other words, working India's democracy. This is what we aim to do.

The challenge, we see, is two-pronged. On the one hand, millions live within a biomass-based subsistence economy, at the margins of survival. The environment is their only natural asset. But a degraded environment means stress on land, water and forest resources for survival. It means increasing destitution and poverty.

Here, opportunity to bring about change is enormous. But it will need a commitment to reform — structural reform — in the way we do business with local communities.

On the other hand, rapid industrialisation is throwing up new problems: growing toxification and a costly disease burden. The answers will be in reinventing the growth model of the Western world for ourselves, so that we can leapfrog technology choices and find new ways of building wealth that will not cost us the earth. This is the challenge of the balance.

Our aim is to raise these concerns, participate in seeking answers and — more importantly — in pushing for answers and transforming these into policy and practice. We do this through our research and by communicating our understanding through our publications. We call this knowledge-based activism. We hope we will make a difference.
RESEARCH AND DIRECTION
Anumita Roychowdhury

Coordination
Vivek Chattopadhyaya

Research
Shashank Gandhi
Ruchita Bansal

Research inputs
Priyanka Chandola

Photographs
Ruchita Bansal

Layout
Shri Krishan

Production
Rakesh Shrivastava and Gundhar Das

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Right to clean air campaign

Centre for Science and Environment blew the lid on smog and smog makers in 1996 in its book *Slow Murder: The deadly story of vehicular pollution in India*. The study found that the problem of vehicular pollution in India was the result of a combination of outdated engine technology, poor fuel quality, lack of transportation planning and bad maintenance of vehicles on roads. Yet during the early nineties government was indulging in the game of blaming the victims of air pollution by forcing on them a system of pollution under control certificates. The hype over this periodic drive to test tailpipe emissions in the absence of strong action in other areas was cosmetic and diverted public attention from more serious issues of technology, fuel quality and transportation planning.

The connection between poor urban air quality and multiple factors eluded most Indian citizens. To help citizens see through the smokescreen of pollution, to understand the vital connection and protect public health the Right To Clean Air Campaign was launched in November 1996. Since then we are consistently campaigning to:

- improve the decision making processes related to air quality and mobility planning
- build pressure for more transparent policy mechanism
- raise public awareness about poor urban air quality and risks to public health.

This led to an intense phase of learning, action and impacts. The first generation action has helped in arresting the runaway air pollution in some cities. But clean air remains elusive in most cities. It is time for second generation reforms. The future action will have to be more aggressive across the country to cut exposure to killer fumes, reduce energy use and climate impacts of motorisation. The explosive increase in vehicle numbers threatens to undo the small incremental gains. Cities will have to reinvent the idea of mobility, shift towards public transport and non-motorised transport, leapfrog vehicle technology and fuel quality and improve fuel efficiency. Cities will have to find a whole new way out of the choking haze of pollution, congestion and energy guzzling.

If you agree with us, remember to give us your support.
WHY THIS STUDY?

Many Indian cities are in a frenzy to build multi-level structured car parks to meet the insatiable demand for parking. Delhi is no exception. The municipal agencies – New Delhi Municipal Council (NDMC) and the Municipal Corporation of Delhi (MCD), and the Delhi Development Authority (DDA), have drawn up impressive lists of multi-level parking lots to be built in prominent commercial areas of Delhi. The latest tally shows that these agencies together will build nearly 27 multilevel structured parking (NDMC – 3; MCD – 19; DDA – 5). In fact, the manifesto of the principle political parties that contested in the April municipal elections boast of grandiose plans of multitude of multi-level car parks in the city.

Parking deficit is cited as a reason to argue for more multilevel parking structures. All cities like Delhi think that with proliferation of these structures the problem of parking crisis and congestion will go away. Even at the national level the Union Ministry of Urban Development has charted infrastructure development plans under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) and included multi-level car parks in its menu of action. In the conventional planning process, it is accepted that parking demand will continue to grow as vehicles grow in numbers and therefore more parking spaces are needed.

Cities do not ask if these are needed at all, and if yes, how should they be used and managed. Both city level policies as well as the JNNURM parking strategy make the assumption that expansion of off-street multi-level structured parking can suck away on-street parking and decongest roads. There is therefore mad rush in cities to lock up precious urban spaces to build multi-level car parks, when urban land has other competing uses. Devouring land for parking marginalizes the needs of the urban poor as well (See box: Why rethink parking policy?).

Cities are clueless about the ultimate goals of parking policy and how the multi-level car parks fit, if at all, into the overall policy paradigm. Global reviews have shown that it is erroneous to think that plentiful supply of off street parking will automatically reduce and eliminate on-street parking and congestion. Parking strategy will have to be designed differently and conjoined with other demand management measures to make a difference.

Most city governments are finding it difficult to make the multi-level cars parks work and deliver on their intended benefits. There are examples of things going awry across cities. In Delhi the Eros parking in Nehru Place remained grossly underutilised for a long time and till the time enforcement in surface parking improved. Similar fate awaited Nariman Point parking structure in Mumbai. Abundant and cheap parking outside undercut its utilization. In Indore due to poor design of the ramp cars could not even negotiate the parking structure and remained ineffectual. On the whole parking structures stand isolated. Business
The mandate for parking policy reform demands deeper understanding of what parking policy is expected to do.

Parking pricing is an essential element of reforms: The provision of parking for personal motorised vehicles cannot be considered as a matter of public good.
Indian cities are known to have the lowest parking rates in the world. This creates incentive for personal transport. Individual user of personal vehicle should pay for the use of the space for parking and user pay principle should be applied. Parking facilities – underground, surface, and multilevel parking – are provided at an enormous cost. This uses up a lot of public money and cheap/free lands. The full cost of providing parking in public places should be recovered from the user of the parking. Government should not subsidise this cost.

But parking is free in most parts of Indian cities. Priced parking is a very low component. Indian cities are known to have the lowest parking fees in the world. A recent study by Colliers International shows that the major metros in India including Delhi and Mumbai have the least parking charges owing primarily to their non-alignment with the purchasing power parity (see Graph 1: Comparative parking rates in different cities of the world. Delhi is amongst the cheapest). On the contrary, while cities like Beijing and Mexico City have parking charges four to five times that of major Indian metropolitans, others like Tokyo and London City have an astounding sixty times. Such low parking rates create an incentive for the car owners to use private cars over public transport plausibly explaining the horrendous congestion level in cities. These low parking rates, along with illegal parking and dismal enforcement compound the incentive for car use and undercutting non-motorised and public transport.

Lessons from Delhi’s multi-level car park
The emerging trend in India has made it necessary to assess the experience with the most newly built multi level car park in a prominent commercial area, Sarojini Nagar in Delhi. This eight-level “South Square” car park has been developed in public-private partnership mode between the New Delhi Municipal Council and DLF and inaugurated on November 10th, 2011. NDMC entered into an agreement with DLF according to which, DLF is provided land of 3789 square metres on lease and free of cost. They have also been given a license to lease out the ground and the first floor for commercial establishments. This structure has the capacity to park maximum of 824 cars.
The Right To Clean Air Team at the Centre for Science and Environment has therefore carried out a rapid assessment of the structure and the parking challenge in the area to draw some key lessons for the policy and other cities that are embarking on similar projects. It is clear that this Rs 80 crore structure has come up without clear strategy of management to reduce parking chaos, and congestion in the area or any pricing mechanism and improved connectivity plan to reduce car trips to the area.

The assessment has brought out some stark challenges that all cities need to understand.

Concerns over parking management in the area: The rapid assessment has brought out the serious problems with the local area parking management. The multi level parking is not integrated with the surface area parking for common management. Global experience shows that it is not possible to eliminate surface and on-street parking. But well managed legal parking area can reduce chaos and also the need for built facilities and investments. But that will require very carefully designed time variable parking rates for quick turnover of short term parker on the road sides and also area management. This coupled with improved connectivity can also reduce parking demand in the area. But what ails the system now?

- **Multi-crore structure grossly underutilized**: Even during peak hour the occupancy of the parking is less than 20 - 40 per cent. But the surface areas around it are choc-a-block. Congestion has worsened in the area. The new facility therefore has made no difference to the parking situation in the area.

- **Cheaper and free surface parking undermines the usage of the more expensive multi-level car park**: Abundant, illegal and free or cheap parking in the surface has led to uncontrolled parking and chaos. Cheaper parking rates in the surface continue to make the surface parking more attractive.

- **Technology choice and glitches in the fully automated car park discourage parkers**: The private developer has not thought through the appropriateness of the technology in an area with very high vehicle turn over. Also there is no manual ramp back up in the design in the eventuality of any technical snag.

- **Poor and narrow access to the structure and technology snags causes massive delays**: Both parking and retrieval time have increased waiting time for the parkers. It may take 20-25 minutes. Cars have to queue up to get inside. This discourages parkers. It is easier and less time consuming to park on the surface. Congestion builds up on the approach road that has inadequate circulation space. If ever the structure works on full compliance basis it will be difficult to manage the traffic volume on this road.

- **There is no strategic planning for the adjacent surface area parking**: Surface parking has been allowed very close to the shops that impedes walkability of the area. Cars have the full freedom to come right to the door steps. But three-wheelers and para-transit are not allowed to come close to the market. There is massive spill over and free parking available in the vicinity. Design of the parking has encouraged car access to the market.

- **Cars of the local shop keepers use up as much as 60 per cent of the legal parking area and lowers revenue potential**: This has become a serious cause of concern for the parking operators as the shop owners resist payment and take away most of the legal space. Parking contractors therefore rely on illegal
Parking to make money. There is no provision of remote parking for them and feeder connection.

- **A nascent beginning of a new management model**: Recognizing the importance of integrated and common area management model the NDMC has included in its lease agreement with DLF the clause that DLF will also take over the management of the surface area. But DLF is now resisting this responsibility on the ground that close to 10 surface parking locations in parcels will increase their cost of management and enforcement. But this is not acceptable. They will have to take the responsibility and enforce common management plan with the larger objectives of congestion reduction etc in view.

The Supreme Court appointed committee Environment Pollution (Protection and Control) Authority (EPCA) has intervened to direct removing the current distortions in the parking rates in the surface and in the multi-level. It has recommended higher surface area rates. The management plan also needs to curtail some on-street parking and delineate parking area for three-wheelers.

**Parking pricing imbroglio**: It is disturbing that such enormous investments are being locked up to provide multilevel car parks but there is no clear set of responsibilities for the private enterprise to deliver on the core public objectives. Prime commercial areas are being handed over to the private enterprise for free to provide parking without setting the actual delivery targets. It is therefore important to understand the pricing and revenue model and how it is related to meeting the travel demand management objectives of the parking policy.

- **Enormous investments to provide multi level parking**: This one fully automated high tech system in Sarojini Nagar has cost a whopping Rs 80 crore. Given its designed capacity this works out to be Rs 10 lakh per car – close to the cost of affordable housing in Delhi. To keep the system operational it will require additional Rs 3 crore a year. It is most unlikely that the system will be able to recover the full cost from the parkers on the basis of the user pay principle. If it tries to recover the full cost from parking charges parking rate will have to be astounding Rs 120 per hour. As this is not likely to happen this means car users will continue to enjoy enormous subsidy.

- **Parking charges can recover very little**: In this high cost structure parking revenue is a miniscule part of its operational earnings. This explains why developer is unconcerned about the low occupancy of the parking structure. Currently, as it is grossly underutilized and parking fee is fixed at Rs 10 per hour, the structure is able to recover only 1.6 per cent of the operational costs from parking alone. Even in the case of best case utilization the full revenue from the current parking rates can at best be Rs 48 lakhs an annum and even then it will be one fifth of the operational costs.

- **Real estate dominates. Parking secondary**: The developer will earn all its earnings almost entirely from the shops in the ground and first floor of the building – 98 per cent. After the entire commercial components of the building become fully operational, DLF is expecting to earn as much as Rs 12 crore annually from the rent of these shops. This means after taking care of their operational costs DLF will earn more than Rs 8 crore a year. With this they hope to break even in 10 years. It is also estimated that over the life time of the lease of 30 years the developer will make an operational profit of more than Rs 144 crore. The earning from the parking is so miniscule – less than 2 per cent – that developer has little interest in ensuring full utilization or even look at the
integrated management of surface parking. Thus, without a clear parking management framework for the area, the structure can have little relevance in meeting the parking objectives in Sarojini Nagar market.

- **Need pricing reforms:** To address the parking price disparity between multilevel car park and surface area parking EPCA has intervened to direct NDMC to increase the surface area parking rates. The proposed surface parking rates is increased to Rs 15 per hour as opposed to Rs 10 per hour in multi level structure. This is expected to be charged in variable slabs – Rs 60 for first four hours and Rs 120 upto 8 hours and Rs 210 beyond 8 hours. These rates for surface parking are expected to improve utilization of the multilevel car park. Current slabs have been revised. However, a flat slab rate has the risk of disadvantaging the short term parker and incentivising longer duration. A person spending less than an hour in Sarojini Nagar will pay the same as those spending four hours. This will not push people to leave quickly. They will keep crowding the place. If the rates increase hourly it will improve the turn over rates of the parkers. This however, will require well equipped parking lots that can efficiently meter and charge according to hours.

- **Need effective rates to catalyse shift to other modes.** The reality check in Sarojini Nagar has shown that even with full occupancy of the multi-level car parks and proper usage of the surface parking congestion will still remain a problem. There can be some effect if parking outside the legal parking area is strictly prohibited. But pricing signals are important to reduce the parking demand in the area. For example, the CSE survey of the visitors in Sarojini Nagar has shown that most people are willing to consider shift only after the minimum rates for parking crosses Rs 30 per hour. Charges higher than this will have greater effect. Survey of the visitors to the area makes a startling revelation that increasingly people are becoming captive users of cars and resilient to high charges. Therefore, fix the rate at a level that will influence commuters to shift to other modes which is the larger objective of the parking policy. Also improve connectivity to the place to offer more choices to the visitors and shoppers.

- **Getting the parking price right upfront is important:** Given the political difficulty in building support for increasing parking charges small incremental increases will delay the matter of having effective rates. Therefore, judicious decision is needed now to have the effectively designed parking rates. Variable parking rates will require improvement in metering systems and collection systems.

- **Need strategy to ensure that the developer takes active steps to ensure optimum utilization of the structure:** In view of the fact that the developer has not come up with any strategy to ensure that the new structure is utilized to decongest the surrounding, the EPCA and NDMC has given direction to the developer that the commercial occupation of the shops in the quarter of the facility can progress only if the parking requirements are fulfilled. But for a longer term effect it is necessary to come up with system of penalty based on real time monitoring of the facility occupancy and usage.

- **Parking revenue needs larger objective:** Currently, the license fee of the concessionaire is linked only with the parking earnings. It is important to keep in mind that cities are poised for further fiscal reforms and are mandated under JNNURM to create a dedicated urban transport fund. Parking revenue is earmarked as one of the potential sources. It is recommended that in addition to tapping parking earnings it is important to tap earnings from the commercial
component of the parking structure for municipal revenue. Even though developers pay corporate taxes, a mechanism should be in place to tap a part of earnings from the rental from commercial component in these buildings which have been primarily created meet the needs of parking. This enhanced rate can be put to public transport enhancement and local area development.

- **Cities need to move towards full cost market driven parking pricing.** There are strong doubts if the governments will be able to fix parking rates at full cost and market driven rates for demand management. It may be advisable to move toward market driven parking rates eventually with strong enforcement of legal parking. If free and illegal parking do not undercut then market demand and supply can work effectively to keep the rates effectively high while ensuring at least 90 pert cent occupancy of the parking lot at the same time. This is the emerging global trend today. This hinges on the principle that parking provision for personal vehicles is not a public good.

- **Need city-wide parking pricing regime:** Ultimately, pricing reforms are needed on a city-wide basis for commercial as well as residential areas. That blueprint of pricing management must emerge now.

**Management muddle:** The big lesson for us is that parking facilities cannot work without an integrated area management plan that defines the operational parameters for parking, improves connectivity and curtail parking in congested hot spots. The plan requires a clear objective and needs to integrate the surface and structured parking to deliver on these objectives. Much of the problems that have been noticed in terms of ruling chaos, cheap surface parking usage of multi level facility, over crowding, and three-wheelers not having access to the market etc are the manifestation of the lack of local area planning. Review of this aspect has thrown up important lessons:

- **The new area management plan:** Following the inauguration of the structure and at the behest of EPCA, the NDMC has prepared a draft area management plan for the market area to address some of these concerns. The key highlights of this include leveraging the new facility to curtail some amount of on-street parking. The overall parking area has been reduced from 9455 square meter to 7709 square meter. A dedicated parking space has been created for three-wheelers to improve para transit access to the market. These changes should be expedited quickly.

- **Need integrated management of surface parking and multilevel parking:** As mentioned earlier only an integrated management can help to remove distortions between the two levels of parking and also improve the overall management and service level. As part of the lease agreement DLF was asked to manage both multilevel car park as well as surface area parking. DLF was asked to execute a supplementary contract. But DLF has not yet shown any interest and is resisting this to avoid cumbersome management of fragmented parcels of surface area parking for fear of escalation of costs of managing small parcels. But this must be enforced to deliver on the larger objective and as part of corporate social responsibility.

- **The area management plan needs to promote pedestrianisation:** The parking management plan needs to leverage both surface and multi level parking to free up more public and common spaces to create pedestrian precincts in the market and improve walkability. This will improve business in the area. Plan requires design guidelines for the parking area, upgraded metering and collection system.
and improvement in service level in the legal parking area. Design needs to improve people’s access and discourage car parks very close to the shops impeding flow of shoppers and hawkers.

- **Local area parking management needs improved access to public transport:** It should be a joint responsibility of the developer of the parking structure and the municipality to plan access and public transport connectivity through planning and coordination with the concerned agencies. They need to coordinate with the Delhi Transport Corporation/cluster buses to plan reorientation and intensification of bus service; also coordinate with Delhi Metro to plan and improve feeders to the nearest metro stations on Aurobindo Marg and provide remote parking facility for the long term parkers like the shopkeepers at the metro terminals so that they do not have to bring cars to door steps. A good feeder service to metro and bus service if advertised well can bring down car traffic dramatically in the area.

It is clear therefore, that before embarking on massive private investments in parking facilities, cities will have to establish and adopt policy goals for parking. National Urban Transport Policy as well as the Supreme Court of India has made it clear that the parking policy will have to be developed as a travel demand management tool to reduce pollution and dependency on personal vehicles, encourage use of public transport and non-motorised transport and protect urban greens and commons from parking encroachment. Parking policy should aim to reduce vehicle traffic (particularly urban-peak traffic) in order to reduce congestion, accidents, pollution, etc. Parking policy must aim towards eliminating parking subsidies. When combined with priced parking, limit on parking space and

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**WHY RETHINK PARKING POLICY?**

**PARKING DEMAND IS INSATIABLE, ENTAILS ENORMOUS COST AND UNCONTROLLED PARKING SUPPLY ENCOURAGES MORE CAR DEPENDENCY:** Cars are aggressively encroaching upon the scarce and limited urban space that can have other and more important uses. Parking devours close to 10 per cent of the urban land in Delhi; daily addition of cars creates additional demand for land bigger than 300 football fields. Can any city afford this? Is this sustainable? But it is possible to influence and reduce parking demand with parking pricing, stringent enforcement, parking controls etc.

**ROADS AND WALKWAYS UNDER STRESS FROM UNPLANNED ON-STREET PARKING:** Parking spaces are created on road and off road. In the absence of proper parking management both create pressure on the pedestrian space. Unplanned and on-road parking usurps the walkways. In some areas in Delhi 45 per cent of the circulation area is under parking encroachment.

**HIDDEN SUBSIDY TO CAR OWNERS:** Use of valuable urban space is offered for parking either free or for a pittance. This perpetuates hidden subsidy to car owners as the cost of using up scarce and valuable urban space for parking are not recovered through proper pricing and taxes. There are other opportunity costs of parking spaces. The subsidy to the car will work out to be even higher if the rental or the land cost of the parking space is considered. Increased investments in expensive multistoried structured car parks in prime areas will further enhance the subsidy as the parking rates are not expected to recover this cost. If pegged to the recovery of costs multi-level car parks parking charges should at least be Rs 39-40 per hour. But the MCD parking charges in Delhi is only Rs 10 per hour.

**INEQUITOUS USE OF LAND:** The pressure on urban space for parking has also raised concerns regarding equity issues related to urban land-use. More land is allotted for one car slot while building a multilevel parking structure than to a low cost housing scheme for poor people. A car needs about 23 sq m to be comfortably parked. But a very poor family in Delhi gets a plot of just 18-25 sq.m. Is this acceptable? A city can never have enough land for parking and the same land will have other and more important essential uses. Disproportionately high share of urban land is devoted to cater to the parking needs for handful of people.
improved access through other modes of transport, parking strategies can help to switch alternative modes of travel and restrain car usage in targeted areas.

At a broader policy level parking will have to be organized as public, shared and priced parking and not as individual owned private spaces through building based standards. Multi level parking will have some role to play in that. Its role will be further reinvented for multimodal integration to improve usage of buses, cycling and walking. The guidelines for such integration are expected to prioritise the parking needs of different modes within the influence zone of mass transit network and terminals. But in such parking design cars will have the least priority. Cities will have to prepare for this paradigm change as well.

Multilevel parking structures will have to deliver on these objectives.

— Right To Clean Air Team
1. SPOTLIGHT ON MULTI-LEVEL PARKING: THE CASE OF SAROJNI NAGAR IN DELHI

While multi-level car parks are becoming policy obsession in cities, there is lack of policy clarity on how these structures can be integrated with the parking management goals. This clarity needs to emerge very quickly before enormous funds and land are locked up. Therefore, the Right To Clean Air Team at the Centre for Science and Environment decided to carry out a rapid assessment and survey of the recently inaugurated automated car park at the prominent commercial area – Sarojini Nagar market which is in the area administered by the New Delhi Municipal Council (NDMC).

This assessment has looked at the parking management and enforcement strategies as well as pricing and revenue model for both surface level parking as well as multi-level parking in the area. The team has assessed if the multi-level car park has made any difference to congestion in the area or if it has been leveraged to pedestrianise the shopping plaza. The analysis has also considered financial performance of this structure and its delivery on the intended benefits. To support this assessment survey of the visitors to the market was also carried out to assess the user perception and behaviour.

This analysis has brought out important lessons that must be considered in all the future planning and investments.

Sarojni Nagar Market is situated in South Delhi. The market is very close to Chanakyapuri, Safdarjung Enclave and Dilli Haat. The best way to connect would be to either take local buses or hire an auto. The nearest Metro station is INA from where it is a 15 minute drive to this market. Sarojini Nagar is one the best known flea markets in India.

There are more than 300 shops and 100 authorized tehbazaari sites in Sarojini Nagar Market and 90 per cent of the shops in Sarojini Nagar are family owned. The Market is segmented as Babu Market, Central market and vegetable market.

FIGURE 1: Location of Sarojini Market
market has mostly residential landuse around it. There are few schools and a library situated very close to the market. The average size of shops is just about 100 sq. ft.

**Parking Challenge in Sarojini Nagar**

Sarojini Nagar market draws large number of people and vehicles. The designated legal area for surface parking in Sarojini Nagar market is 9455 sq. mt (see Table 1: Parking area in Sarojini Nagar market). As per the Master Plan 2021, a car requires about 23 sq. mt. of area for parking. Thus, the total equivalent car space (ECS) in an area of 9455 sq. mt. works out to be 411 ECS. Only car park occupies 7763 meters that can accommodate 338 cars. (In Equivalent Car Space (ECS) terms. 1 Car = 4 two-wheelers. Also note that 1 ECS = 23 square metres.). Thus, more than 82 per cent of the available surface parking is devoted to cars.

The parking contract of this space has been allotted to Mahinder Kumar Chopra at a monthly license fee of Rs. 15,16,888 for the period of two years from April 2011 to March 2013. The surface parking timings are 14 hours from 8AM to 10 PM every day.

**FIGURE 2:** Sarojini Nagar Market area has enormous scope to be a pedestrian plaza

**FIGURE 3:** On-street parking in Sarojini Nagar Market area during Weekends
The Sarojini Nagar parking area is under NDMC and falls in the category C area according to the grading system based on the commercial importance of the area.

Whatever may be the legal parking area, the actual parking is much beyond the legal capacity. Most of the road along the market area is vulnerable to illegal parking encroachment. Greater spill over happens during tehbazaari days.

The vehicle parking goes upto 1300-1400 cars and around 500 two wheelers on weekends in Sarojini Nagar market area. Even on Monday when the market is closed officially, around 300-400 cars and 100 two wheelers are seen parked. Parking is allowed at a minimal rate. The surface parking fee for a four wheeler is Rs 10 and Rs 5 for two wheelers for first 4 hours, which is very nominal.

Vehicles are parked all along the roads and footpath, leaving no space for people to walk. The situation worsens during weekends as the parking is done in two rows on both sides of the roads.

The vehicles are parked at all the unauthorized places also even after NDMC has put boards of “NO stopping, no parking”. Vehicles spill over to all the roads connecting to Sarojini market.

The location of authorized parking lots is mainly along the market boundary area. Rest of the area has unauthorized parking and it spills over to the adjoining roads.

The map (figure 8) shows the current authorized parking area (in colour red). This has been earmarked mostly along the shopping arcade. Unauthorized parking spills over to all the connecting roads. There is only one bus stop near to the market on the north side, just near the Brig Hoshiar Singh marg. The cars are allowed to come almost right up to the door step of the market.

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**Table 1: Parking area in Sarojini Nagar market**

<table>
<thead>
<tr>
<th>Units</th>
<th>Private vehicles + Autos + Cycle Rickshaws</th>
<th>Cars* only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Square metres</td>
<td>9455</td>
<td>7763</td>
</tr>
<tr>
<td>ECS*</td>
<td>411</td>
<td>338</td>
</tr>
</tbody>
</table>

* (Includes only personal cars and two-wheelers); Source: NDMC (2012)
The local mapping shows that while cars are allowed to park very close to the market area, the autos are restricted at some distance from the market. The police has put up banners that restrict autos and

**Autos have restricted access:** The local mapping shows that while cars are allowed very close to the market area, the autos – the para transit – are restricted at some distance from the market. The police has put up banners that restrict autos and
stop them from entering the market area. Autos are stopped on the outer roads and not allowed near the market. The maximum number of autos and rickshaws that can park is 74 at a time on all sides of the market. This creates discomfort for people who travel by bus or metro and then have to walk towards the market area. Thus cars enjoy a privilege and not the public transport.

In accessing the market, cars enjoy the privilege and not the public transport users.
2. THE LOGIC OF MULTI LEVEL PARKING

With the objective of decongesting the market area the NDMC has set up a multi level parking structure in Sarojini nagar market area. This eight-level “South Square” car park has been developed in public-private partnership mode between the New Delhi Municipal Council and DLF and inaugurated on November 10th, 2011. NDMC entered into an agreement with DLF according to which, DLF is provided has got land of 3789 square metres on lease and free of cost. They have also been given a license to lease out the ground and the first floor for commercial establishments.

Built on a plot of 3789 sq. mt. of area with an estimated cost of Rs.80 crore, the automated parking is expected to ease the parking woes of the busy Sarojini Nagar market as this has created additional parking capacity of 824 cars.

As per the rules permitted in the Delhi Master Plan the developer is allowed to build at least 25 per cent of the built up area as commercial space. Therefore, the ground and first floors of this structure houses retail shops, restaurants and entertainment area. The second to eighth floors are dedicated for parking. Vehicles are charged Rs.10 for the first two hours and then at Rs.10 for each subsequent hour, up to a maximum of Rs.40 for a day. DLF has the land under lease for 30 years and would have to pay Rs 15 lakh annually to NDMC as license fee. The automated mechanical system has been designed by Precision Automation & robotics India Limited (PARI), consultants in Pune.

Technology of the multi-level parking: To park the vehicle in this multi level structure the user is required to buy a car park card, drive into the facility and leave the car at the basement. The mechanical system then takes over and parks the car. The automated parking lots have car lifts, pallets and computerized control systems that would be operational round the clock. This structure has eight lifts to move the cars to upper floors.

Once on the parking floor, the car pallet is positioned by the computerized system for optimal utilization of space. The pallets move forward, backward, left and right
to allow the cars to be moved towards the lift for retrieval. (See box: Technology concept of the automated parking structure)

TECHNOLOGY OF THE MULTI-LEVEL PARKING

The automated mechanical system has been designed by Precision Automation & Robotics India Limited (PARI), in Pune. The cars initially are scanned for any unwanted objects at the entrance of the parking, post which the cars proceed to the bays where the driver leaves the car on a pallet placed on each bay. Immediately after that, the car’s registration number is scanned and the in-time recorded. Next, the pallet is shifted on to a lift which transports the car to the floors above.

The car from the time the driver leaves it on a pallet till the time the driver retrieves it, throughout remains on the same pallet. Such a system evades the circulation radius that a car would otherwise require in case of a manual car parking area and hence, optimises on the parking space. This fact is also evident by the lesser ECS that the MLP uses of 16 square metres as opposed to the norm of 23 square metres thereby saving on 7 square metres of space per car.

The maximum permissible load that a pallet can withstand is 1800 Kilo grams (Kg) for a sedan and 2500 Kg for an SUV [11]. The car is then parked on the floors above. The parking floors do not witness any manual presence thereby ensuring safety of the vehicle. The parking on each floor is managed by means of an algorithm, very much similar to any board game one plays on the computer. So the car keeps moving on each floor on the same pallet on which it was initially parked. To begin with, a ‘retrieval friendly algorithm’ was being used at the Sarojini Nagar MLP which minimised electricity costs and retrieval time, but now to save on both the parking and retrieval time, the algorithm has been shifted to a ‘simultaneous parking’ one. At the time of retrieval, the driver swipes the card and the out time is recorded post which the car retrieval process initiates. Meanwhile, the driver makes the payment. Finally, the car arrives at the bay from where the driver drives out the car. The set of eight lifts provided at the Sarojini Nagar parking area is divided into three subsets, two for sedans comprising three lifts each and one for SUVs comprising of two lifts. Hence, there are six lifts for sedans and two for SUV’s. Because sedans are usually lighter than the SUV’s, they can be parked in the SUV section as well but not vice-versa. The motive of creation of such sub-sets is to optimise on the use of lifts.

The maximum retrieval time for one vehicle for which the project was agreed upon by DLF was 3 minutes. However, in order to minimise the retrieval time, DLF follows several strategies like

a). The order of parking vehicles that DLF follows is one car per floor rather than piling all the cars on the same floor and then moving to the next floor. This also minimises the operational costs on each floor. b). The use of ‘simultaneous parking’ Algorithm which enables simultaneous parking on and retrieval from a given floor. DLF claims that with these strategies it has been able to attain in its first two months of operation a retrieval time of 2 min 11 sec for the month of December and 2 min 7 sec for January. However, it must be noted that there isn’t any waiting lounge for the customers.

As the car reaches the parking window, its registration number is scanned and in-time is recorded. The customer drives into the basement and the ‘parking bay status’ display board indicates the empty parking bay and direction. The customer swipes the card using the instructions on it. The car is transferred to the lift, which moves the car for parking at a slot available on the floors above.

Similarly the car retrieval system is also automated. The customer submits the smart card and pays charges at the car retrieval room and collects receipt from the counter. The customer is able to check through information display unit the status of the request and the lift number retrieving the car. Retrieval on average takes three minutes. The customer moves to the respective lift and drives the car out of parking.
This is certainly all fancy and hi-tech. But the clear question is – has this multi-crore investment been able to deliver on its stated objective – i.e. to decongest the roads and the surface areas around it?
3. CSE SURVEY AND ASSESSMENT

The Right To Clean Air Team at the Centre for Science and Environment has carried out an extensive survey of the Sarojini Nagar market to understand the role and usage of the new multi-level car park and the current barriers to appropriate management, enforcement and congestion reduction strategies. This assessment has exposed serious gaffes and barriers. The illusion that the municipal agencies create that multi-level car parks will solve all ills and suck away the cars from roadside and free-up road space as well as surface areas has turned out to be a myth. CSE team has assessed both legal and illegal parking, nature of usage of the multi-level cars park, parking pricing in the area, the nature of parking contract, access to the area, and the management and enforcement strategies for parking deployed by the parking contractor, police and the private developer.

The review has brought out very clearly that the structure has been created with no clear idea about what it is expected to achieve. Instead of solving the problem it has actually added to the chaos. CSE team made repeated visits to Sarojini Nagar during the months of December-February to assess the ground situation. Understanding the lessons from this experience is critical to guide the new management and enforcement strategies for multi-level parking and also for questioning the wisdom of creating so many structured parking.

Woefully underutilized: It is unacceptable that a 80 crore structure remains grossly underutilised. While the structured parking remains nearly empty, the surrounding surface parking are choc-a-block with cars and two-wheelers. The new parking structure has simply failed to attract people. It has not helped in reducing parking congestion in Sarojini Nagar area.
The Right To Clean Air Team contacted DLF to assess the usage of the system. According to the information shared by them the month of December 2011 has reported a total of 8,500 vehicles at the multilevel parking giving an average of 340 vehicle parking demand per day – just about 41 percent occupancy. One-time maximum has been 465 vehicles out of a total supply of 824. But this further reduced to 4,300 vehicles during January 2012. Such a drastic, almost halving of the parking demand was due to various factors like a number of technical glitches faced by DLF in its first month of operation, also reduction in public excitement about the modern mechanised system of parking. The high demand in December could also be due to the festive season. These statistics clearly point out to the under-utilisation of the MLP.

Poor guidance and signals for people: The developer of the parking structure has not worked out a clear strategy to navigate and bring people into the structure. There signages to navigate the prospective parkers to the structured parking is poorly designed, and inadequate. The actual experience shows that as soon as the vehicles enter the market area the surface parking operators guide the users to the surface parking lots or to on-street parking. Most of the people do not have much idea about the multi-level parking structure.

Approach to the structured parking is very poorly planned: Its site planning is a design failure. The approach road to the multi-level car park is very narrow and has little navigation space. This is also a very congested stretch. During rush hour cars queue up to enter the parking structure. There is a lot of delay in approaching the structure, and in parking time. People feel comfortable parking their vehicle on the outer roads instead. Even on Sundays the team has found only 200 cars parked in the multilevel parking. The structure has resulted in massive traffic jams in the area, especially during peak hours, as cars queue up on the road outside the multilevel parking. As the multi level parking is located very close to the market area, people visiting the market mostly prefer to park their vehicles along the road. The popular perception is that parking inside will be chaotic and they may get stuck finding a parking space. This discourages users from going inside the structure. This is also contributing to its suboptimal use.

Delays due to long retrieval time: During peak hour long queues outside the structure increase the waiting time. South Square has capacity to accommodate 824 cars and has only eight elevators to park and retrieve cars. The DLF informs that their retrieval time is roughly about 2 to 3 minutes on an average. But the real experience of the users is different. Long queues and full operations increase the parking-retrieval time for the commuters. It takes more time to park and retrieve the car from the multilevel car park. People report that inside the structure it takes 10 to 20 minutes to park. Retrieval is another 10 minutes. The users who are still not used to the system get also get impatient about waiting for the retrieval of the cars. While multilevel car parks have other advantage like safety, the operational glitches are still a dampener. Unless supply is heavily curbed on-surface and the on-surface parking rates increased manifold and amalgamated with more efficient handling of retrieval time, the under-utilisation of the multi level car park will continue.

Technical Hurdles and delays: Even though it has just been a few months since the structure was inaugurated, at least 4 times technical snags have obstructed its operations.

The system had just stopped functioning Due to the technical snag, people were unable to retrieve their vehicles and many had to wait throughout the night. When everything failed, they started retrieving the vehicles manually with the help of cranes.
The multi-level car parking structure is completely electronic, but there are no ramps or staircases as fallback in case of power failure or an emergency. Such projects would perhaps work near commercial and office centres where people would park their cars once and retrieve it only in the evening. In markets, people keep coming and going and there is high turn over rate. Some drop in only to buy an ice cream and it will take more time for them to park and retrieve their car, than for the business they came for.

Other vehicles -- two-wheelers and bicycles are not allowed inside. This is treated only as a privilege for cars.

The car bias: This multi-crore structure has been created only to facilitate car parking. Other vehicles including two-wheelers and bicycles are not allowed inside. This is grossly against the principles of the National Urban Transport Policy. Thus,
approach to parking remains car centric which will only promote car usage.

**The rebound effect of parking demand from the commercial space in the structure:** After the commercial spaces inside the multilevel parking becomes fully operational, the demand for parking from the new batch of shop keepers will also increase. Thus, the parking availability will further reduce as it will have to accommodate the vehicles of these shop owners as well. This has not been accounted for in the management plan.

3.2, **Problems with surface parking**

Multilevel car park in any location cannot be seen in isolation. It needs to be integrated with the surface area parking planning as well. But there are serious issues with the surface parking as well in the area. But these problems are not unique to this location but common to most sites.

**Poor design of surface parking:** The parking map of the area shows that the legal parking area has been earmarked very close to the shops which ideally should have been a pedestrian shopping arcade. This has compromised the walkability and quality of the area making it highly impeded. People and shopkeepers are allowed to bring cars very close to the shops.

**Poor enforcement:** There is no enforcement either by the operators or local police to stop people from parking in illegal sites. Rampant illegal parking is allowed – much beyond the legal parking area. Roads close to the market have three rows of car park.

**Shopkeepers use up bulk of the legal parking area and do not pay:** According to the contractor, Mahendran Kumar, shop owners in the market use up great part of the available parking area and barely pay any parking fee. It is estimated that they use up nearly 60 percent of the legal parking area. They keep their vehicles parked the whole day and not pay even the monthly charges meant for them. This means the bulk of the legal parking area is a loss making area and does not generate any revenue. The contractors have been writing to the NDMC officials to take action, but
there is no clear response from the NDMC. The contractor who has been assigned authorized parking lots is concerned that the parking area is always full by 11 AM everyday as the shopkeepers park their vehicles. This barely leaves any room to accommodate visitors’ vehicles. This has led to enormous spillover of vehicles to the outer fringe area. The contractors also resent that this makes their parking venture unprofitable as the bulk users that include the shop keepers do not pay.

Para transit is not integrated in the parking plan: The local planning has given very poor access to public transport and para-transit like autos. While private vehicles are allowed to come very close to the market, three wheelers are not allowed to enter near the market premises. This puts people using autos at disadvantage. This is against sustainable practices. Moreover, only one bus stop serves the market place. There has not been any attempt to consider augmenting bus access to the area.

Illegality and mismanagement is rampant: The parking operators allow people to park in non-designated places. There is lot of adhocism in issuance of parking tickets and amount collected. As noted by the team people can negotiate and pay a reduced amount and not pay at all. On one occasion the team noted that the parking operator who was navigating a vehicle to park rammed it to another car and that led to a fight with the vehicle owner. When police intervened it was discovered that the parking operators did not possess a valid driving license. The police also ignored illegal parking and allowed it to happen.

3.3. Fuzzy logic of parking economics

Parking pricing is the most crucial element in parking policy and getting this right is important to influence the parking and commuting behaviour and car usage. Globally, it is recognized that low and free parking creates incentive for car ownership and high usage and accelerates automobile dependence. The ground reality as evident in Delhi shows that there is no objective principle to guide the pricing of parking.

Dismally low surface parking charges: The prevailing parking rates are too low to influence commuter choices or the magnitude of the revenue that the NDMC earns. (See Table 2: Surface Parking Charges for Sarojini Nagar Market). This virtually works out to be a mere Rs 2.7 per hour. Even these charges are not enforced and collected properly. Spot check shows that the rates can be easily negotiated. While the parking operators issues a ticket with Rs 30 written on it the users can bargain and get away by paying a mere Rs 10. Also rampant illegal parking beyond the designated area is available for free. This further undermines the current pricing regime.

<table>
<thead>
<tr>
<th>Mode of travel</th>
<th>Parking rates</th>
<th>Time duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rs. 10/-</td>
<td>For first 4 hours</td>
</tr>
<tr>
<td></td>
<td>Rs. 30/-</td>
<td>Beyond 4 hours</td>
</tr>
<tr>
<td></td>
<td>Rs. 500/-</td>
<td>Per Month</td>
</tr>
<tr>
<td>Scooter</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rs. 5/-</td>
<td>For first 4 hours</td>
</tr>
<tr>
<td></td>
<td>Rs. 10/-</td>
<td>Beyond 4 hours</td>
</tr>
<tr>
<td></td>
<td>Rs. 300/-</td>
<td>Per Month</td>
</tr>
</tbody>
</table>

Source: NDMC (2012)
Looking at malls to cross subsidise parking: The entire multilevel structure has cost a whopping Rs 80 crore. At the current level of monthly operational expenses the annual operational costs is expected to be about Rs 3 crore. From the parking component it is expected to earn a mere Rs 1.6 lakh and from the commercial component a mere Rs 12 lakh a year. Parking revenue is a less than 2 per cent of its total earnings. This shows the management of the parking structure is not even looking at parking earning to stay afloat and break even.

Rajeev Bajaj, senior vice president, DLF says, “We are relying totally on the real-estate component for recouping our investment expenditure as the parking charges are almost negligible and run us into operational losses. According to our estimates, we might break-even ten years down the line.” Thus, their own estimate shows that they are anticipating a total earning close to Rs 144 crore over the period of 30 years lease. The commercial component of the buildings will bring more than 98 per cent of their total earnings. (See Table 3: Detailed Cost and Revenue break-up of MLP at Sarojini Nagar)

### Table 3: Detailed Cost and Revenue break-up of multilevel car park at Sarojini Nagar

<table>
<thead>
<tr>
<th>Costs (in Rs.)</th>
<th>revenues (in Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed (one-time) capital cost</strong></td>
<td><strong>Operational cost (per month)</strong></td>
</tr>
<tr>
<td>Construction, Technology, Overhead charges, Agency Costs = 80,00,00,000</td>
<td>Mechanical Costs(^2) = 60,000</td>
</tr>
<tr>
<td></td>
<td>Agency Costs(^3) = 4,50,000</td>
</tr>
<tr>
<td></td>
<td>Security, horticulture = 3,50,000</td>
</tr>
<tr>
<td></td>
<td>Repair and Emergency(^4) = 1,00,000</td>
</tr>
<tr>
<td></td>
<td>Electricity Costs(^5) = 2,00,000</td>
</tr>
<tr>
<td></td>
<td>Insurance, Depreciation and Sinking Fund(^6) = 1,50,000</td>
</tr>
<tr>
<td></td>
<td>License fees(^7) = 2,50,000</td>
</tr>
<tr>
<td></td>
<td>Concession fee(^8) = 1,50,000</td>
</tr>
<tr>
<td></td>
<td>DIMTS fee(^9) = 25,000</td>
</tr>
<tr>
<td></td>
<td>FUTURE AMC Costs(^{10}) = 1,71,666</td>
</tr>
<tr>
<td>80,00,00,000 one time</td>
<td>19,06,666 p.m.</td>
</tr>
</tbody>
</table>

Fixed Losses: Rs. 77,55,38,216; Operational profits (once real estate is fully functional): Rs. 80,38,048 p.m.

**Source:** Computed based on the data available from DLF (2012)

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2 Includes costs of lifting and parking, shuffling and retrieval as per Rs. 8.5-10 per car
3 Includes salaries of working staff at DLF
4 Includes fire extinguishers, fire alarms, and sprinklers
5 Costs of general electrical appliances, not including the mechanical costs
6 A fund created to cater to the future operation costs
7 Fees DLF pays to NDMC as per the contract
8 Another fee paid to NDMC
9 DIMTS is the consultants of DLF pertaining to the project’s feasibility and traffic management
10 As of now, PARI pays for the AMC as part of its liabilities/warranty period of two years post which this cost would get added to DLF’s balance sheet
11 This is the opportunity cost of the foregone land on part of the government and hence forms a part of DLF’s revenue in that sense i.e. the costs that DLF would have to incur had the land been not given free of cost forms a component of saved costs or in other terms, revenue.
12 Considering an average revenue of Rs. 20 per car per day
13 This figure has been arrived at by considering two floors of real-estate and 30% construction area with DLF’s projections of an average estimated revenue of Rs. 400/square feet. The actual real estate rental value at present in Sarojini Nagar is Rs. 600-650/square feet/month.
Thus, this multi-crore parking structure which can now fill even less than 40 per cent of its available parking area and earns less than 2 percent of the operational revenue is only an instrument to get precious land in prime areas to have more commercial spaces than meet the objectives of parking and reducing demand for parking. The DLF is relying heavily on the revenue from the real-estate component of the structure. The spot check showed that commercial spaces are still mostly vacant. DLF is currently incurring huge operational losses of the magnitude of Rs. 15 lakhs per month.

Cheaper surface parking rates undercut multi-level car park usage: The parking rate in the multi-level parking structure is Rs 10 per hour for first two hours and thereafter every hour. This is the price DLF is charging to encourage car owners to use this facility. But the surface parking rates are even lower. The parking charges of surface parking are merely Rs 10 for four hours as opposed to close to Rs 10 per hour in multilevel car park. Motorists therefore prefer to park in surface areas.

DLF and PARI certainly consider the current rates to be low and say that Rs. 50 an hour is a more realistic price.

Rationalize surface parking rates: In any given location both surface level and multi level require integrated management and pricing system to minimize such distortions. To improve usage of the multi-level car park and to address the current distortions between surface and multilevel parking charges the Supreme Court appointed Environment Pollution (Prevention and Control) Authority (EPCA) has intervened to direct the NDMC to increase the surface area parking charges. This is one way of improving usage of multi-level car park. EPCA has considered the current time slab for graded parking charges that already exists and has proposed to increase the rates by 4 to 6 times. Therefore, it has proposed to increase the charges for the first four hours from Rs 10 to Rs 60 which is six times jump; for upto 8 hours the rates have increased from Rs 30 to Rs 120; and beyond 8 hours the rates are proposed to be increased from Rs 50 to Rs 210. (See Table 4: Current and proposed parking charges for surface parking in Sarojini Nagar)

Table 4: Current and proposed parking charges for surface parking in Sarojini Nagar

<table>
<thead>
<tr>
<th>Charges as per Existing tariff</th>
<th>Proposed Tariff</th>
<th>Hike in Parking charges</th>
</tr>
</thead>
<tbody>
<tr>
<td>For 1st four hours Rs 10/-</td>
<td>Rs 60/-</td>
<td>6 time enhancement</td>
</tr>
<tr>
<td>Upto 8 hours Rs 30/-</td>
<td>Rs 120/-</td>
<td>4 time enhancement</td>
</tr>
<tr>
<td>Beyond 8 hours Rs 50/-</td>
<td>Rs 210/- for 14 hours</td>
<td>Approx. 4 time enhancement</td>
</tr>
</tbody>
</table>

These two slab rates work out to be Rs 15 per hour. The municipal councilors of NDMC are now deliberating on this proposal and are expected to take a decision soon. The NDMC officials hope that these proposed rates will help to rationalize the current discrepancy between the multi-level parking rates and surface area parking rates and encourage people to use the multi-level car park.

While higher rates for the surface parking will encourage greater usage of the multilevel parking, principally, this two slab approach has disadvantages. The short term parker who may come a for a short errand and small purchases and quickly move will pay a minimum amount of Rs 60 per hour as opposed to a longer term parker who will do higher purchases, and spend four hours and pay Rs 15 per hour. No one will have the incentive to move out quickly. It is therefore better to charge...
higher and ratchet it up on an hourly basis to influence commuting choices.

3.4. Parking pricing to reduce parking demand and congestion

It is important for NDMC to roll out a pricing plan for both surface and multi-level parking lots that will reduce car usage in the area and also augment parking revenue for the municipality. Important commercial areas like Sarojini Nagar and central business districts in the city need effective parking pricing policy. The bigger policy question is how parking management and pricing framework can enable parking to work as a travel demand management tool and mop up additional revenue for municipal agencies. How parking rates can influence the behaviour and commuting choices of the visitors.

To address this the Right To Clean Air Team at the CSE has carried out a rapid assessment of the parking rates and survey of visitors in Sarojini Market. This assessment is designed to understand the visitor profile and their willingness to pay for parking, and commuting choices based on parking availability and pricing. A random sample of 240 commuters was collected over a period of 15 days at Sarojini Nagar. Majority of them were car users. The sample had about 10 per cent public transport users to understand their behavioural changes. Only those respondents were asked to fill the questionnaire that travelled to Sarojini Nagar frequently. Each and every respondent was interviewed individually and the questionnaire was filled by each one of them in isolation so that no respondent could influence the other. It was made sure that all the cohorts of people – shop keepers, shoppers, temple visitors, long term and short term vehicle parkers, those who park their vehicles on surface and in the multi-level car park – were included. It is expected that the respondents indicated their ‘true’ preferences regarding their Willingness to pay for parking.

Questions were grouped in three sections. Screener questions on current parking behaviour; and questions based on hypothetical parking rates close to the market, in the multi-level parking and along the boundary of Sarojini Nagar. The range of parking prices was different according to the area of parking and was so designed as to ensure that the multi-level parking rates were cheaper than the surface area rates ultimately to minimise surface land use for parking (see appendix I for the exact rates). They were also asked about their preferences for parking (i) close to the market, (ii) in the multi-level parking, (iii) along the market boundary, (iv) beyond the market boundary, (v) switch to public transport, or (vi) not travel to the market at all. The acceptance of a particular hypothetical parking fee for the use of parking space provided the threshold amount that would begin to influence the commuter choices and behaviour significantly.

One of the primary objectives of this survey was to understand at what level the visitors will consider changing commuting practices and switching modes.

Highlights of the survey

The conversation with the visitors, mostly car users, has brought out important dimension of the parking behavior. It has also given a good insight into the profile of the parkers and visitors (See Figure 17a-17e Highlights of the survey results). The survey results show that the majority of the visitors come from within 10 km radius. About 91 per cent of the respondents are car users. A large number of them have begun to spend close to 10 minutes looking for a parking slot in the congested area. If this trend worsens it will lead to more fuel burning and emissions. Short term parkers who park for less than 4 hours – majority for 2 hours – dominate the parking users. Most shoppers are short term parkers.
The response to the parking rates is an important pointer for the parking pricing policy. Close to majority (45 per cent) are willing to pay the nominal rate of Rs 10-20 per hour. But a good number of people are also willing to pay higher amount. As many as 18 per cent are willing to pay more than Rs 30 per hour showing that the a section of the car users are becoming captive users and their demand for car usage and parking remains quite inelastic even at a higher rate. They are willing to pay three times more than the current parking rate in multi-level car park and continue to use the car without considering other option. This is a cause of worry. This also brings out that the lack of efficient public transport options for many people and resilience stemming from rising income levels.

**FIGURE 16A: Majority of the respondents considered are private vehicle users**

**FIGURE 16B: As much as 59 per cent come from within 10 km distance and about 21 per cent from within 5 km**
Car owners show willingness to shift to other modes only at a higher parking rate.

FIGURE 16C: Already close to a quarter spend 5-10 minutes looking for a parking space. With congestion, this time will increase and add to fuel loss and more pollution.

GRAPH 16D: Short term parkers dominate – About 62 per cent of them leave within 4 hours.
3.5. **Stunning revelation of commuter behaviour**

The results of the survey were modeled by using the Multinomial Logit model to predict the probabilities with which distinct possible outcomes of a categorically distributed dependent variable can occur. It considered parking choices (where would they choose to park – multilevel parking, close to the market etc); will they chose to public transport if parking rates increase, or not travel to Sarojini Nagar at all.

The analysis brings out important elements of parking behaviour

- There is a mixed reaction. A section of the users are taking more time in parking/retrieving their vehicles even on surface parking and have preferred parking in multi-level car park. But the reverse has also happened. Due to high parking/retrieving time, people are more likely to park along the fringes (less congested) than in the multi-level car park or close to the market.

- Long duration parkers prefer parking in multi-level car park than on surface maybe due to security reasons. Another set of long term parkers would prefer parking even outside the market premises than in the multilevel parking or close to the market or along the fringes of the market.

- Cars vis-à-vis two-wheelers are more likely to park in multi-level car park than on surface. In practice, two-wheelers are not allowed inside the multi-level car park.

- People coming in a carpool prefer parking in multi-level car park, or in other words, people commuting alone in vehicles prefer parking close to the market, maybe due to security/fear issues.

- Statistically, no one is willing to switch to public transport or choose not to travel to the market at the current parking rates and this inference is very strong as it is highly statistically significant.

*FIGURE 16E: As many as 18 per cent are willing to pay more than Rs 30 per hour showing their resistance to shift to other modes*

<table>
<thead>
<tr>
<th>Amount Range</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than Rs 10</td>
<td>26%</td>
</tr>
<tr>
<td>Between Rs 10 and Rs 20</td>
<td>45%</td>
</tr>
<tr>
<td>Between Rs 20 and Rs 30</td>
<td>11%</td>
</tr>
<tr>
<td>More than Rs 30</td>
<td>18%</td>
</tr>
</tbody>
</table>
It therefore became necessary to understand at what level of parking charge we will begin to see a significant change in commuter behaviour. The team therefore needed to find that optimal parking fee at which the commuters would start shifting their current preferences. Currently, in Sarojini Nagar, the graded parking rates work out to an average of Rs. 9.04 per hour is paid per vehicle. At such a meagre fee, no modal shifts will occur in commuter preferences and the number of private vehicles will continue to pour into the market.

Therefore the next step has been to use an econometric model with the response to park or not to park at Sarojini Nagar ‘park yes/no’ variable as the dependent variable and the various factors affecting it as the explanatory or the independent variables.

As expected, a higher fee reduced the probability of saying ‘yes’ to parking. Moreover, higher parking/retrieval time translated into a decrease in probability of saying ‘yes’ to parking. Both these variables were found to be weakly statistically significant. This brought out significant responses that have policy relevance:

- With one rupee increase in parking fee, the probability of saying yes to parking in Sarojini Nagar decreases by 0.02.
- With one minute increase in parking/retrieving time, the probability of saying yes to parking in Sarojini Nagar decrease by 0.05.
- People with annual income greater than six lakhs are more likely (0.7 higher probability) to park their vehicles as compared to the middle income groups and people with annual income lower than two lakhs are less likely (0.7 lower probability) to park their vehicle as compared to the middle income groups. This suggests that demand for parking increases with increase in income.
- People with age more than 50 years have a 0.58 higher probability to use parking facilities (commute by private modes to Sarojini Nagar) than lower age groups maybe due to the old age that might be forcing them to use private, easier to commute modes and hence generating the demand for parking space.

### 3.6, At what level of parking rate commuters will shift preferences?

Clearly parking rates, parking availability, location of parking and time taken to park etc are very important factors that influence the parking behaviour of people. Therefore, any set of parking rates that are placed on table for policy discussions will have to assess its effectiveness from that perspective.

Therefore, the next step for us has been to assess the effectiveness of three sets of rates in changing commuting choices – the current rates, the proposed official rates and the preferred rates emerging from the CSE survey and assessment. The current parking rate in surface parking area works out to be Rs 9.27 per hour. EPCA has proposed an upward revision of rates as mentioned earlier. The proposed EPCA rates work out to be Rs 15 per hour.

The key policy question is – at what level of parking rate commuter behaviour will change and get the commensurate benefit of reducing pollution, congestion, and fuel loss. Personal vehicles cause congestion, pollution, and fuel loss. Parking also leads to time loss. These add up to enormous social costs. The current parking rates that the commuters pay are low and ineffective in bringing forth solutions to the problems of congestion, fuel and time wastage, pollution associated with vehicles.
The personal vehicle users must pay for these costs. In fact the Supreme Court has already taken on board the principle of user pay principle for fixing parking charges. The challenge is to find the appropriate parking charge that will not only include the personal price of using the parking space but also the price of problems caused to the others as parking space is not a private space but shared by the others as well.

This method for finding the minimum suitable price also involves knowing from a survey the ‘willingness to pay’ of the people, i.e. the price beyond which the people would start considering a shift from personal cars. This further helps us to calculate the personal benefits of each vehicle (as if there were no other vehicles using the parking space). But this is not true as there are other vehicles also. Therefore, the logic of calculating the costs of problems caused to the other vehicles. Together, these are used to find out that suitable price which a substantial number of vehicles pay necessary to bring about the social change in behaviour of most vehicles in favour of modes of transport other than their private vehicles.

Therefore, it has been found that at the parking rate of Rs. 30 an hour the social benefits matter are sharper over the personal benefits. At this level a substantial number of parking users perceive that it may be more beneficial for them to reduce car usage and shift to alternatives. This gives the appropriate value of the costs of congestion, fuel and time wastage, pollution etcetera which essentially help in finding the problems which a single vehicle poses. (See Figure 17. Optimal parking fee: Market clearing optimal congestion fee is given by the intersection of the demand and marginal external cost schedules).

Therefore, the parking fee has to be at least Rs. 30/hour to reduce peak hour parking traffic. As the two-wheelers the minimal optimal parking fee for two-wheelers works out to be about Rs. 17/hour\(^1\). Thus, for cars the shift in commuter preferences is seen from Rs. 30 per hour onwards.

Such a high rate of parking has been the result of the high resilience that the Delhi commuters portray. About 90 per cent of the respondents have stated a preference of paying “elite” rates of parking and not shifting to other modes of transport. Only 1 per

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**FIGURE 17: Optimal parking fee: Market clearing optimal congestion fee is given by the intersection of the demand and marginal external cost schedules**

![Diagram showing optimal parking fee]

**Note:** Scenario 1: Model results of this paper; Scenario 2: Current parking rates; Scenario 3: Proposed 50% increments in current parking rates by NDMC

**Source:** CSE computation

\(^1\) Separate rough marginal external costs were calculated for two-wheelers
percent of the respondents are willing to change their mode of travel to public transport given the hike in parking charges as proposed in the survey. It is a result of such a high willingness to pay (WTP) of respondents that yields the high parking rates.

It is therefore important to take note of the fact that only when the parking rates are at least Rs 30 per hour, the commuters will show a shift in their travel preferences. This must guide the parking pricing policy. This is aptly justified on the basis of ‘polluter pays principle’ and ‘egalitarian society principles’. The former implies that those who pollute (or congest and add costs to the society) more should pay more, while the latter points out to the fact that those who do not pollute more (pedestrians and cyclists) should not be made to bear these costs imposed on the society (air pollution and illness etcetera).

It is therefore recommended that NDMC comes up with a parking pricing roadmap that will fix parking rates for Sarojini Nagar and other commercial places in Delhi based on effective demand management strategy.

3.7. Parking revenue potential for the municipalities

Parking pricing reforms have important implications for revenue generation for the municipality. If revenue can be enhanced based on user pay principle it will help the municipality to fund their community services.

At the current level of parking rates NDMC generates Rs 65,78,472 a year of parking revenue from the license from the concessionaire of the surface parking. This revenue is expected to reduce if the parking area on the surface is curtailed – as is proposed to leverage the multi level parking – to decongest the area. With the proposed curtailment of surface parking area the license fee paid by the concessionaires to NDMC will reduce to Rs 53,63,664 a year. Out of this revenue only from cars will be Rs 49,76,000 per year – 92 per cent.

However, NDMC stands to gain if the revised rates proposed by EPCA at Rs 15 per hour for surface parking is implemented. The license fee revenue can increase to Rs 1,99,04,000 a year or close to Rs 2 crore a year. The increase therefore clearly, makes the curtailment of the surface parking revenue neutral.

It is important for NDMC and its councilors to realize that if the parking rates are fixed at the minimum level that begins to catalyse shift in commuting choices – which in this case is Rs 30 per hour, then the estimated revenue can be twice i.e. Rs. 4 crore. If similar reforms are possible in key commercial areas across the city, municipal revenue can be greatly augmented.

Parking revenue needs larger objective: Currently, the license fee of the concessionaire is linked only with the parking earnings. It is important to keep in mind that cities are poised for further fiscal reforms and are mandated under JNNURM to create a dedicated urban transport fund. Parking revenue has been identified as one of the potential sources. In addition to tapping parking earnings it is important to tap the earnings from the commercial component of the parking structure. This should go as municipal revenue. Even though developers pay corporate taxes, a mechanism is needed to tap a part of the earnings from the rental from commercial component in these buildings which have been primarily created meet the needs of parking. This can be put to public transport and local area development.
4. NDMC MANAGEMENT PLAN FOR THE AREA AFTER MULTILEVEL PARKING

After the inauguration of the multi-level car park the EPCA intervened to get NDMC along with the Delhi traffic police to come up with a new area management plan to leverage the new structure and decongest the area.

To decongest and attract people to use the multilevel parking, the EPCA along with the Director (Project), ACP (Traffic) and other officials of NDMC and DLF, the executive engineer has proposed an area management plan. This includes designation and demarcation of legal parking areas with the estimates of parking capacity and traffic circulation plan to improve access to the multi-level car park (see Table 5: Proposed parking area management plan in Sarojini Nagar). This also includes plan to curtail some amount of on-street parking.

This management plan has been proposed by EPCA committee along with NDMC. Accordingly, 10 parking surface locations have been identified around the market with precise capacity. Parking area for three-wheelers has been demarcated. Three locations – 2, 4 and 8, with an area of 564 sq meters are now designated as three-wheelers parking.

The area of the existing surface area parking is 9455 sq meters that can accommodate 411 cars or accommodate 258 cars, 464 two wheelers and 44 auto rickshaws. But under the new plan the area will be reduced to 7709 square meters. Out of this 564 sq meters are now reserved for three-wheelers. Therefore about 7145 sq meters will be available for cars that can accommodate 311 cars. This means surface and multi-level car park together can hold maximum 1135 cars at a time.

A mechanism is needed to tap the part of the commercial revenue of the developers from the commercial component. This should be used for public transport and local area development.
### Table 5: Proposed parking area management plan in Sarojini Nagar

<table>
<thead>
<tr>
<th>Existing parking lots of Sarojini Nagar market</th>
<th>Allotted area in sq meters</th>
<th>Proposed area of surface parking</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newly developed area at Sarojini Nagar around Keshav Park (Location 1)</td>
<td>3008</td>
<td>3008</td>
<td>Entire area proposed for surface parking</td>
</tr>
<tr>
<td>In front of Babu market 1st cross road (Location 10)</td>
<td>278</td>
<td>278</td>
<td>Entire area proposed for surface parking</td>
</tr>
<tr>
<td>G-Avenue boundary wall (in b/w 1st and 3rd cross roads. Now parking not allowed.)</td>
<td>380</td>
<td>Nil</td>
<td>Being roadside parking not allowed in the entire stretch.</td>
</tr>
<tr>
<td>1st cross Road b/w G &amp; D Avenue (Location 8 and 9)</td>
<td>1589</td>
<td>1589</td>
<td>Entire area proposed for surface parking</td>
</tr>
<tr>
<td>D Avenue Sarojini Nagar behind 1st and 3rd cross roads (location 5,6,7)</td>
<td>2270</td>
<td>2270</td>
<td>Entire area proposed for surface parking</td>
</tr>
<tr>
<td>Behind vegetable market at 3rd cross road and parking lot at G and D avenue in b/w 3rd and 5th cross roads. (Location 2,3,4)</td>
<td>1930</td>
<td>564</td>
<td>Being road side parking area being reduced by 1366 sq m</td>
</tr>
<tr>
<td>Total area</td>
<td>9455</td>
<td>7709</td>
<td>(-) 1746 sq m.</td>
</tr>
</tbody>
</table>

**Source:** NDMC

![DECONGESTING Lanes](image)

**FIGURE 18: New circulation plan**
The new management plan also includes measures to improve the access to the multi-level car park and ensure smooth flow of traffic on all four sides of the main Sarojini Nagar Market. It is proposed to make the roads one-way, and clear the access to the multi-level parking. The one way road will move in clockwise direction.

FIGURE 19: Proposed management plan of NDMC for Sarojini Nagar
Developer of the multilevel car park to take up common management of surface and multilevel car park: It is essential that the new management plan should enforce common management for both multi-level and surface parking. In fact it is well understood in the official circle that both the MLP and the surrounding surface parking will require common management model. According to the terms of the agreement the DLF may be asked to execute supplement contract agreement for allotment of surface parking. When the new tariff plan would be implemented, the allotment of surface parking would be given to M/s DLF. But so far DLF has resisted and opposed this idea. The plan of surface parking monitoring advanced to DLF by NDMC implied huge agency costs for DLF as the parking lots were divided into sections which were supposed to be managed distinctly. About 10 fragments of parking is difficult to manage and operate. Operational plan, security, equipment etc for so many segment escalate costs. DLF is thus reluctant to take on the management of surface parking. But this should not be excuse for impeding integrated management. This should be expedited urgently.

5. NEED FOR FURTHER IMPROVEMENT IN PARKING MANAGEMENT PLAN

Multi-level parking and local area management also requires a larger planning perspective to achieve decongestion, pollution, and freeing up of common areas for improved walkability and access. With combined strategy of appropriately priced parking charges, and an area management plan it is possible to reduce parking demand in the area. Multi-level parking should be leveraged to meet the local need for car park. Limited car park should be allowed in the surface. That will be an opportunity to curtail surface parking further around the two parks in the market and convert them into green pedestrian precincts for high volume pedestrian traffic and hawking zones. The on street car parking can be limited to accommodate 56 cars which can be used for immediate and emergency cases. Rest of the on street parking can be dedicated to two wheelers and auto rickshaws.

New management plan should aim for leveraging parking to pedestrianise the shopping area: The new parking management plan has not considered earmarking precincts around the park and the area close to the shops, and pavements as pedestrian zone. Pedestrian plaza helps to improve the environment and the overall shopping experience for the visitors and improves business for the market. It is therefore proposed that car parking be removed from location 1 &6, and direct cars to park their vehicles in multi level parking zone. The two wheelers and auto parking space can be retained as per the current NDMC/EPCA proposal. The parks can be turned into sitting plazas for people to relax and spend good time while shopping. A management strategy of this kind will help to

Improve connectivity: Yet another missing link in the management plan for the area is lack of planning for improvement of the public transport connectivity of the area by design. DTC will have to rationalize, reorient and reinforce bus routes connecting areas where parking management plans will come into force with setting up of multi-level car parks. The feeder system of the DMRC needs to connect the market with high frequency services with the nearest metro stations on Aurobindo Marg. This will also encourage many of the shopkeepers who crowd their vehicles close to the shops to consider remote parking and park and ride on metro. Such
traffic mitigation strategies are followed in other countries as well.

The assessment of the Sarojini Nagar thus makes it clear that the multi-level car park is totally incapable of making an impact without parking price rationalization and objective based management plan.

Yet another missing link in the management plan for the area is lack of planning for improvement of public transport connectivity of the area by design.

FIGURE 20: Further improvement in management plan needed
6. LESSONS FOR THE FUTURE

Establish goals of the parking policy: The biggest lesson from Sarojini Nagar experience is that multi-level parking cannot be constructed in policy vacuum. At one level there is need to restrict their construction to free up land for other competing uses. But wherever they are necessary a clear pricing and management strategy must be in place before they are constructed.

It is clear that cities are now expected to develop parking policy as a travel demand management tool to reduce pollution and dependency on personal vehicles. Parking policy should aim to reduce vehicle traffic (particularly urban-peak traffic) in order to reduce congestion, accidents, and pollution. Parking policy must aim towards eliminating parking subsidies. When combined with priced parking, limit on parking space and improved access through other modes of transport, parking strategies can help to switch alternative modes of travel and restrain car usage in targeted areas.

In Delhi this is expected to take an ugly turn as the rich car clientele will continue to clamour for fee and cheap parking. If the recently concluded municipal elections are any indication then all political parties are also clamouring to give more parking sops to the car owners. Some regressive trends have also set in as evident in the recent case of Khan Market, a posh commercial area in Central Delhi where the traders have fought to assure free parking to the rich clientele. This has also shown how the societal and environmental benefits of paid and restricted parking is not well understood and also ignored in our cities.

It is therefore important to outline the immediate steps to improve parking strategy in Sarojini Nagar and also keep that in view for the management strategy for other locations in Delhi.

I. Lessons for parking management and enforcement

Sarojini Nagar and other prominent commercial areas across cities need to enforce a local area management plan: The available legal parking spaces will have to be utilized to highest efficiency and financial viability. Parking facilities should be multi-use shared amenity to increase efficiency in use of space, time and finances. A management strategy that hinges on charging for parking, stopping parking on walkways, and adding on-street roadway parking can also generate parking surplus. Efficient management strategies for existing parking – both on-street and off street, will be needed to improve efficiency. This is needed as on-street parking can be controlled not eliminated. In India Chennai, Pune, Delhi are among others who are trying to introduce measure for disciplining street parking.

- Designate and demarcate legal parking areas, and improve operations of the existing parking lots – valet parking, upgradation of metering, IT application for improved user information, parking management for spill over etc. Each parking area will also require design guidelines and the IRC guidelines with requisite improvements.

- Enforce strict penalty for violation of parking regulations and walkway encroachment. The current penalty for parking violation under Central Motor Vehicles Rules is ineffective. Tokyo and other Japanese cities have very successfully implemented stringent penalty for parking violation which it is said...
has pushed up the marginal cost for the car owners.

- Parking for non-motorised transport – cycles and cycle rickshaws and para transit will have to be built into the parking design. Cities like Delhi are developing Rent-a-cycle systems near metro and BRT stations. Their parking will have to be integrated with the system design. Sarojini Nagar has earmarked area for autos.

- The future parking structures in other places will certainly need to reconsider the technology especially if they are located in heavy traffic areas. Automated systems may sound or even look attractive but are prone to glitches, time delays etc that eventually affect the usability and attractiveness. Needs very stringent management and operational measures to ensure at least 90 per cent occupancy during peak hours.

- Siting of the structure is important. It should not be too close to the commercial and market complex. It should have adequate circulation space around it.

- There should be integrated management of both the multi-level structures as well as the surface area parking in the same location. The management should be common. Bifurcation of the management must not be allowed. Only this will enable rationalization of operational and pricing practices.

- Leverage the multi level parking structure to curtail surface area – especially strategic and congested on-street parking, enforce legal parking and completely ban illegal and free parking in the vicinity.

- Surface parking area will also require design improvement in which cars should not be allowed to come close to the shops and crowd around the pedestrian access.

### II. Lessons for parking pricing

- NUTP has stated that parking rates should reflect the true value of the land. Government led parking involves a subsidy if the parking charges do not cover the full costs. All parking areas have an opportunity cost that is not considered for parking pricing. Neither private developers nor government should ensure plentiful parking if motorists are not paying all or most of the cost through parking fees.

- The parking rates for structured parking and surface parking should be rationalized in a way that the rates are higher in surface. This will encourage higher occupancy of the structured parking and ensure utilization. Currently, the lower and free parking in the surface parking is undermining the utilization of the multi-level parking. Charge convenient parking spaces on the surface higher than the inconvenient places to reduce congestion and influence commuting choices.

- The EPCA/NDMC proposal to increase the parking rates in the surface parking area should be implemented. However, the rates should increase cumulatively every hour to be able to penalize the longer term parker. Limiting parking duration for short term users can ensure higher customer turnover rates for local businesses and also reduce local congestion.

- Parking charges need to be fixed at a level that catalyses shift to other modes. In
case of Sarojini Nagar it is evident that commuters will begin to shift to other modes when the minimum charges are fixed at Rs 30 per hour and more. Appropriately priced parking can help to reduce demand for parking and car usage. Global experience shows that appropriately priced parking can reduce automobile commuting by 10-30 per cent especially if linked with transportation choices.

- Introduce time variable rates to discourage long term parkers. Eliminate free parking. Free parking should be allowed only to cycles and cycle rickshaws and battery operated vehicles and public transport vehicles. Parking rates should be higher for big cars and SUVs etc.

- Cities need to move towards full cost pricing. But there are strong doubts if the government will be able to fix parking rates at full cost and market driven rates for demand management. It may be advisable to move toward market driven parking rates eventually with strong enforcement of legal parking. If free and illegal parking do not undercut then market demand and supply can work effectively to keep the rates effectively high while ensuring at least 90 pert cent occupancy of the parking lot at the same time. This is the emerging global trend today. This hinges on the principle that parking provision for personal vehicles is not a public good.

### Lessons for parking revenue

- The big gain from parking can be revenue for the local government. Globally the trend is moving towards privately managed public parking in which the government plays the role of setting the terms of issuing parking lease to augment revenue from parking. Periodic license renewal pegged to the parking earnings can help to enhance revenue. The NUTP has also stated that revenue from parking should be used for public transport betterment.

- Global review also indicates that the tax policy for parking should be designed in a way that the parking spaces are taxed at the same rate as it would if the land was used for other development. Land cost of the off-site parking is subsidized by the government. Well managed parking and increased/free pricing can help to augment the returns of the concessionaire. Accordingly, the agreement for the concession period can be designed. Appropriate methods of estimating parking revenue may be worked out. Maximize the revenue gains to be ploughed back for other sustainable practices.

- Increasing parking charges is an opportunity to enhance the revenue for the unicity as well. Currently, NDMC is expected to earn less than Rs 2 crore from the multi level car park based on the lease agreement and the current rates. But substantial increase is possible if the multi-level rates are further rationalised. Similar increase in possible in surface parking as well.

- Currently, the revenue estimates in the lease agreement for the multi level parking are based only on the parking earnings. And parking earnings are expected to be a mere 2 per cent of the operational costs. More than 98 per cent of the earnings for the developers are expected to come from the commercial component. But there is nothing in lease agreement to tap the rental earnings for the NDMC. Keeping in view the larger objective of tapping earnings from parking for mobility/accessibility enhancement the rental earning of the developer should also be tapped.
Lessons: Improve connectivity of the area to induce shift to other modes

- The local area planning should include good public transport connectivity to influence commuting behaviour. As of now there is no plan to augment public transport supply to the area. Delhi Transport Corporation needs to reorient and intensify bus service to improve connectivity. DMRC should design feeder connection with the nearest metro stations on Aurobindo road and also provide remote parking facilities. This can substantially help to cut captive use of surface parking by the local shopkeepers as well as visitors.

- Parking can be creatively deployed within the framework of multimodal integration to improve usage of alternatives – buses, cycling and walking. Cities like Delhi are already developing guidelines integration of interchange points and make neighbourhoods more public transport oriented. These guidelines are expected to prioritise the parking needs of different modes within the influence zone of mass transit network and terminals. These are being designed to enhance walking, cycling and public transport access within the influence zone. In the parking design spaces for buses, inter-mediate transport vehicles and cycles are given priority followed by car. Park and ride concept is customized according to this principle.

- MOUD parking guidelines have made a provision for parking legislation. But its prerequisites should be assessed and detailed along the travel demand management principles.
A GOOD PARKING STRATEGY BENEFITS ALL

Public response to parking policy as a demand management tool is still very lukewarm because its benefits for both car owners and non-car users as well as for city environment are not well understood. Parking if managed well can also dampen the demand for parking and restrain car usage. These benefits are now being explicitly identified in the ongoing policy making in cities as in Delhi by UTTIPEC. Public support for this strategy can get stronger if people understand the benefits.

- Benefits to the vehicle user -- reduces traffic chaos: Car users can have more reliable and predictable advance information about availability of parking spaces that can reduce cruising time. Efficient billing makes payment more transparent and accurate. If short term parking is managed well then the chances of finding a space for quick errands improves and reduces waiting and cruising time as well as fuel spent on cruising. This decreases traffic chaos due to indiscriminate on-street parking. Smoother parking also reduces social tension, road rage and law and order incidences. Many people have been injured over parking scuffle in Delhi.

- Benefits to non-car user: Well managed parking will help to protect footpaths and allow barrier free walking, frees up public spaces for cycle tracks, rickshaw parking, autorickshaw-parking, play grounds and also improves access to bus-stops. Improve safety of children, women and elderly people. Well managed common parking can make it easier for emergency vehicles like ambulances, fire trucks, police, etc. to reach all homes/ offices/ buildings. Removal of cars from the shopping frontage improves visibility and access to shops for more customers, improves shopping experience, and increases throughput of customers. Walkable neighbourhood fosters mixed use, improves overall environment, green areas and public recreational spaces.

- Environmental Benefits: Paid and restricted but well managed parking can reduce car use/ dependency which can reduce air pollution and congestion in the city. Air pollution is already taking heavy toll due to respiratory diseases like asthma, cardiac problems. Long term exposure to high air pollution levels can lead to increased occurrence of cancers. Noise level lead to stress and disease. Global experience shows that when parking policy is designed as a travel demand management it reduces car usage and therefore congestion, air emissions as well as fuel use. Boston froze the parking requirements in the city at a level that is only 10 per cent higher than the parking requirement level that existed in 1973. This helped Boston to control car usage and meet the federal clean air standards. In New York very high parking fees and limited parking supply have lowered car ownership far below the average rates in other US cities and reduced air pollution. Portland, Oregon has set an overall cap of parking spaces downtown. This has increased public transport usage from 20-25 per cent in the 1970s to 48 per cent in mid 1990s.
Parking imbroglio in Khan Market is the most recent instance in Delhi where battle lines have been drawn to protect the rich from paying for parking in one of upmarket areas of Central Delhi. Khan Market draws elite clientele but they have been assured free parking for the last 60 years. Khan Market Traders Association (KMTA) states that the system of free parking in Khan Market has worked well. KMTA has 25 attendants managing the parking lot. The entire fund of the attendants is being collected by them by way of contributions from the shopkeepers. While offering free parking to its customers the KMTA has offered to pay a fixed amount every month to the New Delhi Municipal Council (NDMC).

Proposals for paid parking at Khan Market were mooted by the NDMC in 2001, 2004 and 2006 but were dropped after the KMTA protested. The Environment Pollution Control Authority (EPCA) directed paid parking in Khan Market area on March 5.
2011 as a solution to the parking woes and congestion in the area. In fact, in 2006, SC had given the direction to NDMC to inter alia submit a proposal to the EPCA before 31st October 2006 for “rationalised parking rates for all types of parking based on the user pay principle in which the user will pay the full cost of parking and the element of subsidy is eliminated.” The Supreme Court also required the officials of NDMC, the MCD and the GNCTD to cooperate with the EPCA “so that final parking policy can be placed by the EPCA before this Court expeditiously.”

According to the NDMC since KMTA was not paying any licence fees to the NDMC till date, it was suffering loss of considerable revenue. All other major markets in the NDMC jurisdiction have paid-parking.

But KMTA approached NDMC and EPCA on March 22, 2011 against the proposal and conveyed that if paid parking was permitted, it would lead to spillover of cars to the surrounding roads where free parking is available leading to inconvenience and nuisance in the neighbourhood colonies. They also alleged that in contractor managed parking “there is rampant encroachment by hawkers, vendors and beggars.” Further, the contractors tended to maximise their profits by overcrowding parking lots. On this basis they tried to justify free parking.

The matter moves to court. High Court Hearing– June 3, 2011

The KMTA commented during the hearing that it is prepared to compensate the NDMC for any revenue loss but that should be on reasonable terms. There was a proposal to fix the charge according to the “Tariff Group A” of NDMC and equate it with the rates of Connaught Place. But that was not acceptable to KMTA as that raises the license fee amount. The rates were then fixed at lower rates for NDMC area that worked out to be a monthly license fee of Rs. 5,34,207/-. This was supposed to be linked to the competitive rates offered by the contractor in the tender process for parking lots of NDMC area for the period from 1st April 2011 to 31st March 2030.”. But the KMTA representatives were not willing to pay even this as this translated to a sum of Rs. 1500/- per month per shop. However, eventually this rate has prevailed.

The court advised both the traders and the corporation to explore the possibilities of implementing a Bhagidari system on similar lines to that in Bengali Market. The system there has ensured that there is no dispute between the council and local traders in terms of parking. The High Court during its judgment noted that “given the profile of those visiting Khan Market, which is doubtless a much sought after destination in the heart of the city, the payment of a modest parking fee at rates comparable to the parking rates in other commercial centres in the area including Connaught Place cannot cause inconvenience to either the general public or the KMTA.”

However, it is important to note that the High Court has taken on board the principles of travel demand management proposed by EPCA. The Judgment states - “private vehicle owners must pay the cost of the use of public spaces required for parking” and further that “parking policy cannot be based on the increase of parking supply, but on restricting the availability of parking in the city and strict enforcement to ensure against misuse”. NDMC should ensure strict enforcement of higher parking charges for on-street parking in neighboring areas or ban the practice completely with the help of other enforcement agencies such as the Traffic Police. The judgment advised NDMC to keep a tighter vigil to prevent misuse and other violations.
The High Court also stated that although introduction of paid parking by itself may not reduce air pollution tangibly, a beginning had to be made. The Court recognized that it was a policy decision that the NDMC had to take keeping in view the increased traffic congestion in the area and the corresponding increase in the demand for parking space. Further, no exception could be made only for Khan Market when every other major market in the NDMC area had paid parking.

It was finally agreed that KMTA will pay a monthly license fee to NDMC.

This development has constrained the application of user pay principle and the strategy of variable pricing to influence commuter behaviour. Hidden subsidy will continue and this weakens the case for paid parking in the area.

Now the license fee to be paid by the KMTA works out to be Rs. 93 per sq. m. of the parking area per month which is much lower than Category A parking lots of Connaught Place which fetch Rs. 186 per sq. m. per month that is used in the tender process. Otherwise, the rental in area runs several thousand per sq mt.

Also, the shopkeepers who do not use cars to commute will also be brought under the loop of paying the monthly license fee unnecessarily. In fact according to Tariff A zone the cost of parking a car for one month is Rs. 1000 as opposed to Rs. 1500+ which every trader in Khan Market will have to shelve out to NDMC. There is no economic rationale for the traders’ decision at Khan Market. The fear of loss of clientele seems unnecessary as people visiting other affluent shopping areas like malls etc. also shelve out a lot of money as parking fee. Since Khan Market is a much sought after destination for the affluent in the city, the parking charges at current tariffs are not a restraint.

KMTA could have earned substantially if the rates were rationalized and car users were made to pay for parking. Now that KMTA is the licensee, it can manage the parking free or paid. In case, they continue with the free parking, a sum of Rs. 1500/- per month to NDMC will be paid per shop. This is in addition to the contribution they already make towards the maintenance of the lot and salaries given to the parking attendees. Why do the shop keepers want to subsidise the rich clientele of Delhi?

The moot question remains – why the rich be allowed free use of land especially when their cars entail enormous social, environmental and real estate costs?

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