

Cluster 5/Module 1 (C5/M1): Parking Planning and Management.

This presentation is one of the support materials prepared for the capacity building program *Building Leaders in Urban Transport Planning (LUTP)*.

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Objectives

After this presentation, you will understand:

- **Overview of the importance of parking as it impacts:**
 - **Travel behavior**
 - **“Livability” of cities**
 - **Traffic flow on roads**
- **Off-street parking issues and appropriate policies**
- **On-street parking issues and appropriate policies**

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Parking is cited as a major problem in most cities, including those in both developed and developing countries. Roadways and public transport are commonly addressed in the development and implementation of a strategic transportation plan, but parking is not generally addressed explicitly. Nonetheless, parking is an important part of a multi-modal transport system.

This presentation addresses the importance of parking in the shaping of a strategic transportation plan. It covers the following topics:

- The traditional and strategic views of the parking problem
- The importance of parking to:
 - Travel behavior
 - “Livability” of cities
 - Traffic flow on roads.
- Off-street issues and policies
- On-street issues and policies



Opening Exercise Urban Parking Issues



- The following two slides show how parking is provided in China and Vietnam.
- As you look at the pictures, ask yourself:
 - What are the problems?
 - How does the parking approach affect pedestrians?
 - How does the parking approach affect bus users
 - What are potential solutions?
 - What would you recommend if these problems were in your city?

Parking plays an important role in a city's roadway and public transport system. It significantly impacts the city's quality of life. The following two slides show how parking is provided in China and Vietnam. As you look at the pictures, ask yourself:

- What are the problems?
 - How does the parking approach affect pedestrians?
 - How does the parking approach affect bus users
- What are potential solutions?
- If this was your city, what would you recommend?

Please spend about 5 to 10 minutes on this exercise.

What's Wrong with this Picture?



Bus Stop in Weihai, China

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This is an extremely busy bus stop in Weihai, China. Parking is provided between the buildings and the road.

- What safety and other problems are illustrated here?
- How does the parking as currently provided impact the public transport system as well as roadway congestion?



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What's Wrong with this Picture?



Sidewalk in Danang, Vietnam

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This sidewalk is in an older, commercial area and is used for parking.

- What are other ways to provide parking in older commercial areas where off-street parking facilities were not constructed at the time when the buildings were constructed?



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Approaches to Parking Policy

- **Traditional view**
 - Motorization growing rapidly
 - Parking needs growing
 - More parking should be provided
- **More strategic view**
 - Parking policies help shape how cities develop and function
 - Land use
 - Transportation system performance
 - Parking policies should be a key element of master plans/strategic transport plans and detailed plans that implement them



Parking is a major problem in most cities. Many have taken a traditional or supply-oriented approach. As motorization grows rapidly, so does the increased need for parking, at an almost 2:1 relationship. This is true because parking spaces must be provided at home for overnight storage and at work, shopping, recreational, and entertainment locations during the day.

The traditional response is that more parking is needed. The government should provide adequate public parking and impose parking requirements for new developments.

The strategic view recognizes that parking policies shape how cities develop and function. They impact how land-use development occurs and how people travel. Parking policies should be a key element of master plans and strategic transportation plans and should support the desired vision for a city.

Importance of Parking

- **Parking policies impact travel behavior**
 - **Availability and price are key factors people consider when making trip (destination) and mode choices**
- **Significant land, money devoted to off-street and on-street parking**
- **On-street parking uses limited roadway and sidewalk space**
 - **Affects traffic flow and pedestrian/bicycle safety**



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The importance of parking can be felt in three ways.

First, parking policies impact the choices that travelers make, in terms of both destination and mode (e.g., auto, bus). The key variables are the availability of parking and the prices that are charged.

If parking is not available or is priced very high, travelers will:

1. Choose to ride public transport instead traveling by car
2. Travel to another, potentially more distant destination to meet their needs, or
3. Not make the trip at all.

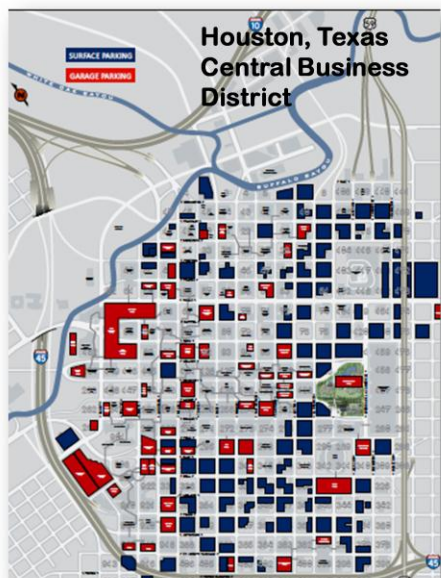
The importance of parking can also be felt in two other ways.

1. Significant space and money are devoted to off-street and on-street parking.
2. On-street parking affects traffic flow, while illegal parking on the sidewalk affects pedestrian safety because pedestrians are forced to walk in the street.

These complicated impacts have significant technical and policy considerations. We will discuss these in the next slides.



Lots of Space Devoted to Parking



- Parking uses more land area than buildings
- Over 75% of space dedicated to road transport when streets are included

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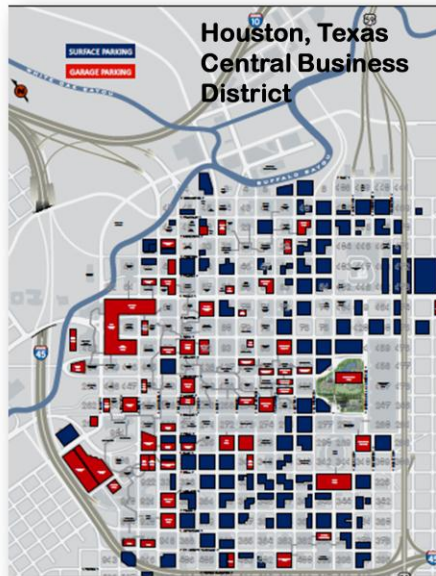
8

Houston, Texas, is a good example of how unmanaged parking can affect the development of a downtown (central business district) of a city. The colored (red or blue) areas are surface parking lots and parking garages.

About half of the land area in downtown Houston is used for off-street parking. When the area devoted to streets is included, over 75 percent of the land area in downtown Houston is devoted to motorized vehicles. This means that less than 25 percent of the land area is devoted to commercial, employment, or residential uses — the land uses that we normally think that cities should support! People must walk further to use public transport or for personal and business interactions.



A Group of Buildings, Not a City



- Buildings are separated by parking
- Each building is a destination
 - Increased walking distances
 - No synergy of buildings into a larger destination

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Unmanaged parking affects the “walkability” of a city. When every other block is used for parking, buildings are separated and become separate destinations.

This has consequences. The number of destinations within walking distance decreases dramatically. This reduces the number of walk trips and encourages people to make motorized trips between sites.

Also, there is no synergy of sites into a “larger” destination. People travel to these places for one purpose (e.g., work) instead of several purposes (e.g., work, shopping, dining). People make separate trips to serve each purpose instead of traveling once to the downtown area and then walking to several locations.

Unmanaged parking encourages the construction of separate buildings, but does not encourage the construction of an integrated, desirable city.



Good Public Transport Affects Downtown Parking

City	Parking Coverage ¹	Parking Spaces per Job	Jobs
Houston	57%	0.61	118,889
Los Angeles	81%	0.52	206,474
Vancouver	42%	0.44	104,000
Brussels	45%	0.31	144,906
Paris	23%	0.20	862,180
Singapore	19%	0.16	280,000
San Francisco	31%	0.14	291,036
London	16%	0.12	1,142,781
New York	18%	0.06	2,305,545

¹ Parking Coverage = Land area that would be covered by surface and garage parking if it was spread over a horizontal lot as a percent of total land area.

Source: Kenworthy and Laube, *An International Sourcebook of Automobile Dependence in Cities, 1960-1990*

Cities have addressed parking needs in downtown areas in different ways. There are considerable differences in the amounts of parking provided as compared to the number of jobs in the downtown areas. Cities like Houston and Los Angeles provide about one parking space for every two jobs. In contrast, cities like New York, London, and San Francisco provide one parking space for every seven to ten jobs.

What is one factor that explains this difference? The provision of good public transport. The public transport services in New York, London, and San Francisco are more frequent and comprehensive than the services operated in Houston and Los Angeles.

A Tale of Two Convention Centers



770,000 Square Feet
5,600 Dedicated Parking Spaces

700,000 Square Feet
0 Dedicated Parking Spaces

Source: Manville and Shoup, Parking, People, and Cities

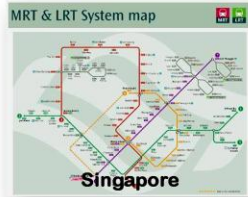
A comparison of two convention centers shows the impact that good public transport service can have on parking needs. Both convention centers are successful, but operate in different transportation environments.

The Los Angeles Convention Center was built at the intersection of two major freeways at the southwest corner of downtown Los Angeles. This site was chosen to provide good automobile access. A total of 5,600 parking spaces were constructed to support the 770,000 square foot facility.

A similar convention center was constructed in San Francisco (700,000 square feet). It was built in the heart of the downtown area. Since the center was well-served by public transport and near other existing off-street parking facilities, no new dedicated parking spaces were constructed.

Key Factors for City Differences

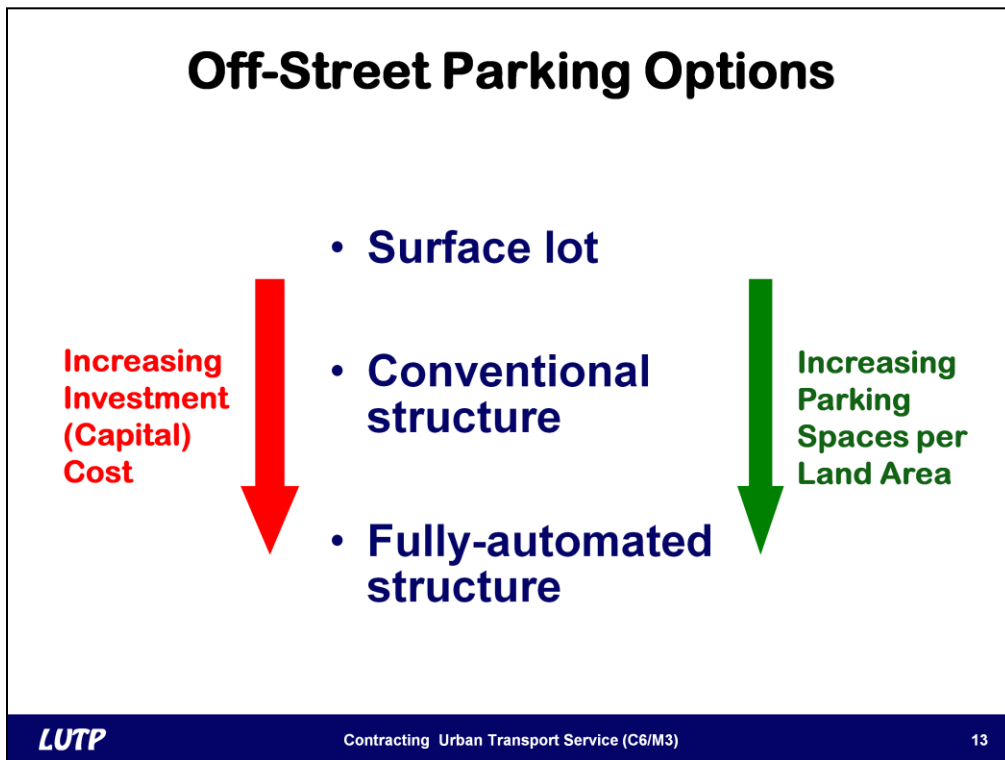
- **Public Transport Availability**
 - **Cities with better systems have low spaces per job**



- **Land use and development**
 - **Cities with more walkable, high-density development need less parking**

Many experts cite two factors for city differences in the amounts of parking provided in downtown areas. One obvious factor is the level of public transport service provided. Cities with low parking spaces per job offer high-quality public transport services that are competitive alternatives to motorized travel. People considering travel options to downtown are aware of the public transport services because they are visible.

A second factor is land use and development. Cities with high-density development need less parking because some trips can be made by walking and, therefore, are much more enjoyable places to work, shop, and visit. In low-density environments, these trips can not be made by walking and require travel by motorized vehicles.



There are three common off-street parking options. The parking options vary in terms of the investment costs and the numbers of parking spaces that can be provided on the land parcel. We will discuss how these options differ in the next three slides.

Surface Lot Off-Street Parking

- **Costs**
 - **Capital: land acquisition, construction of structure**
 - **Operating: attendants (common)**
- **Provides least number of parking spaces per surface land area**
 - **Vehicles only parked on ground level**
 - **Space for aisles, access lanes can equal space to park automobiles**
- **Car stackers can increase capacity**



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Car Stackers

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Surface lots require the least capital investment of the parking options. The investment costs consist of the land purchase costs and the costs for paving the lot.

Generally, surface lots are staffed with attendants. However, some lots are unattended and use self-pay technologies to collect parking fees.

Surface parking provides the least number of parking spaces per land area because vehicles can only be parked on the ground level.

Also, significant amounts of space are required to provide lanes to give access to the spaces. In large lots, the access space can almost be equal to the space used to park automobiles. In rare cases, some parking lots use car stackers increase capacity by parking two vehicles in the same ground space.



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Conventional Parking Structures Off-Street Parking

- **Costs**
 - **Capital: land, construction cost for structure**
 - **Operating: attendants (common)**
- **Larger number of parking spaces per surface land area**
 - **Multiple-level parking uses either ramps or elevator**
 - Per floor, less parking than surface lots



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Conventional parking structures require a larger capital investment than surface lots because a structure must be constructed. Commonly, the structures are built above ground to minimize construction costs although some underground parking is provided in situations in which residential or commercial space is built on top of the parking.

Generally, conventional parking structures are staffed with attendants. However, like surface lots, some parking structures are unattended and use self-pay technologies to collect parking fees.

Conventional parking structures provide a larger number of parking spaces per land area because parking is multi-level. Vehicles are moved to different levels using either ramps or lifts. Ramps are commonly built internally within the structure, but sometimes are built along side the structure in an attached tower.

While the parking structures overall provide more spaces than surface lots, less parking is provided per floor because extra space is used by the ramps or elevators.



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Automated Parking Structures Off-Street Parking

- **Costs**
 - **Capital: land, construction cost for structure, software/hardware for vehicle parker**
 - **Operating: no attendants (common)**
- **Largest number of parking spaces per surface land area**



**Delhi's Sarojini
Nagar Market**

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Automated car parking systems are a recent parking approach that uses automation to park automobiles. The driver leaves the car inside an entrance area. A mechanical car lifters raise the vehicle to another level for proper storing. The vehicle is transported vertically (up or down) and horizontally (left and right) to a vacant parking space. When the vehicle is needed, the car lifters transport the vehicle back to the same area where the driver left it.

Automatic parking structures provide lower building cost per parking slot, as they typically require less building volume and less ground area than a conventional facility with the same capacity.

Other building costs maybe lower. For example, there is no need for a ventilating system since cars are not driven inside and attendants may not be needed. However, there is the added capital cost of the car lifters.

There are very few automated parking structures in developing countries. The picture shows the vehicle storing technology that is being used in the Sarojini Nagar Market in Delhi. The parking facility was opened in 2011.



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High Costs of Providing Off-Street Parking

- **Construction only, no land (e.g., Chicago¹)**
 - Surface lot \$4,000 per space
 - Above-ground garage \$20,000 per space
 - Underground garage \$30,000-\$40,000 per space
- **Operating/maintenance costs**
 - Could equal 20-100% of construction costs
 - Note: Construction costs spread over life of garage²
- **Total daily cost² (not including land)**
 - \$2 (surface) to \$23 (underground)



¹ Northwestern University

² 15 year life, 5% interest, O/M costs 50% of annualized capital costs

It has been argued that governments should provide off-street parking. This can be very expensive. For example, in Chicago, the typical construction costs are:

- \$4,000 per space for a surface lot
- \$20,000 per space for an above-ground garage
- \$30,000-\$40,000 per space for an underground garage

The operating and maintenance costs also are high and can range from 20% to 100% of the construction costs as spread over the life of the garage (e.g., 15 years @ 5% interest). The wide range reflect differences in levels of automation (e.g., self-park versus attendants) and structure type (e.g., surface lot, garage).

When these costs are added together, the daily **costs** can range from \$2 to \$23. Charging any less means that driving and parking would be subsidized by the government.

Policy Considerations Off-Street Parking

- **Parking spaces are costly**
 - **Motor vehicles are at rest 95% of time**
 - **Significant cost per vehicle**
- **Opportunity costs for other uses**
 - **Land**
- **Impossible to provide “enough” parking at all places**
 - **True when motorists want to park for “free” or at reduced rates**



When cities develop policies regarding off-street parking, three factors should be considered.

First, the costs of the parking spaces are high and can range between \$2 and \$23 per day. These are significant costs for parking vehicles that are at rest 95% of each day. Often, a small number of vehicles benefit from these large investment costs.

Second, parking uses up substantial amounts of precious urban land and precludes its availability for other purposes. Using off-street space for parking, particularly garages, eliminates using the space for commercial, employment, or residential purposes. In many developing countries, the space used in parking one car is enough for a home for a family of five people.

Economists call this an “opportunity cost.” The decision to use land for parking means missing the opportunity to use the land for commercial purposes or for a home for a family of five people.

Finally, choices must be made regarding where and how much off-street parking is provided. It is impossible to provide “enough” parking at all places where motorists want to park, especially if parking is “free” or subsidized in some way.

Government Provision of Off-Street Parking

- **Key policy: Minimize provision of subsidized off-street parking**
 - **Users make efficient choices if they bear the full costs of their selection**
 - e.g., take public transport, car pool
 - **Development will be more efficient and user-friendly**



Cities that view parking as a strategic choice are moving toward different policies from those traditionally followed.

One key strategic choice is to minimize the provision of subsidized parking. This encourages users to make efficient choices of travel modes because they will have to consider the full costs of their decisions.

In the long term, land will be developed and used to maximize the best economic return. Parking is provided, but at higher costs that reflect the economic value of the parking spaces. The land use will be more efficient and walkable (user-friendly).

It is important to recognize that good public transport services are needed to support these strategic choices. If this is not done, these policies will have undesirable consequences such as increased congestion and dispersed development.

Building Permit Requirements Are An Important Parking Policy!

- **Off-street parking requirements**
 - **X spaces per 1,000 square meter**
- **Can be minimum or maximum**
 - **Minimum**
 - Most common US approach (e.g., LA)
 - Encourages auto use and lower densities
 - **Maximum**
 - New York, Paris, London
 - Support increasing densities

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Building permit requirements are a second important parking policy. The amount of required parking is based on a measure of building activity such as floor area (square meters) or employment (jobs).

The most common approach is to set minimum parking standards — for example, at least *X* spaces per 100 square meters. This supply-oriented approach tries to satisfy all demands for parking. It often means that the new building site will be low-density because surface parking is low-cost. Many cities use this approach, including Delhi, India. Most new apartment complexes in Delhi are required to use the ground floor for parking and provide one parking space for each residential unit.

However, a small number of cities (e.g., New York, Paris, London) set maximum parking standards. This approach supports increasing densities, but may not meet all parking demands.

Calgary TOD Guidelines for Building Location

Not This

- Side-entrance do not connect to buildings
- Oversized parking lots separate commercial buildings from streets
- Pedestrians discouraged from walking to adjacent buildings

This

- New development continues to build to street
- Density and location of buildings support public transit
- Parking located behind buildings

Buildings should be grouped together to allow for easy pedestrian access between buildings and to frame the pedestrian spaces, which makes for easily legible routes

Source: http://www.calgary.ca/DocGallery/BU/planning/pdf/tod/tod_policy_guidelines.pdf

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The physical location of parking also affects the walkability of developments. Governments can require buildings to front streets to provide convenient access to bus/metro stops. Applied to adjoining land parcels, small urban nodes can be created to provide walkable connections between buildings and create a critical mass for small, convenience businesses, such as cafes, small food stores, and barbers

The City of Calgary (Canada) has a transit oriented development (TOD) guideline that creates urban nodes. The figures show the differences between unmanaged and managed location of buildings.

Calgary's guidelines require that buildings be grouped together on street fronts. This allows pedestrians to easily walk between buildings. Any further building expansions must also be on the street front, and not behind the building. Calgary requires that parking be placed behind the buildings.

The Calgary urban nodes may also create opportunities for other businesses (e.g. sandwich shops) because pedestrians can walk easily between buildings. The nodes are also more efficient because they require fewer bus/metro stops to serve the same number of businesses.



On-Street Parking Problems

- Public demand for more parking spaces
- Increased traffic congestion
- Increased vehicle-pedestrian conflicts due to illegal on-street and on sidewalk parking



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Cities should also develop strategic policies about on-street parking. Three common problems occur as the result of poor on-street parking management:

- Public demand for more parking
- Increased traffic congestion, and
- Increased pedestrian-vehicle conflicts due to illegal parking on street and sidewalks.

Public Demand for More Parking

- 100% or even >100% use of current legal spaces
- Public pressure for more
 - Residential, employee, customer parking
 - Street space for deliveries, bus stops, taxi stands, drop-off/pick-ups
- The different street space needs conflict in time and space



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The most obvious problem is the public demand for more parking spaces. Often, almost all of the available spaces are occupied during active periods of the day.

Different groups complain about adequate parking:

- Residents, employees, and employers complain there is insufficient long-term parking (9-24 hours).
- Customers and retail business owners have different concerns — they are looking for short-term parking (1-4 hours).
- Business owners and freight delivery companies complain about the need for curb space for delivery trucks and vans.
- Public transport and taxi providers are looking for space for picking up and dropping off of passengers.

The different parking and street space needs conflict in time and space.



Increased Traffic Congestion

- **Circulating vehicles looking for parking, loading/unloading areas**
 - **30% or more traffic in central areas of some cities**
- **Parking violations impede traffic, pedestrians**
 - **Use available, costly land**
 - **Bus stops, loading zones blocked**
 - **Buses and trucks double-park in traffic travel lane**
 - **Pedestrian crossings blocked**
 - **Parking on sidewalks makes pedestrians walk in the street**



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Poor parking management also affects traffic congestion. Local traffic congestion is increased by circulating vehicles looking for on-street parking. In some cities, vehicles searching for parking account for 30% or more traffic in central areas. In Sao Paulo, some freight companies report that more than half of truck operating time is spent looking for areas to load and unload.

Violations of existing parking regulations also impede traffic and pedestrians. When bus stops and loading zones are used by illegal parkers, buses and delivery vehicles often use the adjoining traffic lane. This reduces traffic flow and creates an unsafe environment for passengers using buses.

Illegal parkers may also park in pedestrian crossings and on sidewalks. Often, pedestrians will respond by walking in the street. This creates conflicts with the vehicle traffic and increases pedestrian accidents.



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Developing an On-Street Parking Management Strategy

1. Demand, Supply Analysis
2. Space designation
3. Pricing
4. Enforcement



A on-street parking management strategy is needed to comprehensively address on-street parking. There are four actions that should be taken:

- Demand analysis to determine the parking needs of different users by time-of-day and day-of-week
- Assignment of parking spaces by time-of-day and day-of-week
- Design of a pricing approach for on-street parking that addresses the fee structure and how the revenues are collected
- Development of an enforcement approach that addresses how illegal parking and violations in legal spaces will be handled and who the enforcing agencies will be

This four-step approach should be reviewed and updated periodically as city growth occurs and traffic conditions change.

On-Street Demand Analysis

- **Assess parking/street space demand**
 - **Purposes and durations**
 - Parking: Shoppers, employees, residents, patients, students
 - Street space use: Deliveries, buses, taxis
 - **Time**
 - Time-of-day, day-of-week
- **Data collection approaches**
 - **Street observations**
 - **Surveys of user groups**



The first step is parking demand analysis. Demand by travel purposes and durations must be determined by trip purpose and duration:

- Customers need short-term parking space (1-2 hours).
- Residents and employees require long-term parking (9-24 hours).
- Street space is needed for delivery trucks (1-2 hours)...
- ...and for buses and taxis (2-5 minutes).

Demand also varies by time-of-day and day-of-week. For example, customer parking is needed during store hours (e.g., 9 am to 9 pm) while most employee parking must cover typical working hours (e.g., 8 am to 6 pm). Customer parking is required every day, while employee parking may be needed only 5-6 days per week.

The demand analysis helps identify opportunities when parking can be shared among purposes. For example, parking used by employees during the day can be used by people attending theatres at night. Parking for employees on Mondays through Saturdays can be used by shoppers on Sundays.

The analysis usually relies on direct data collection. Common approaches include street observations and surveys of user groups such as employers, business owners, residents, and public transport providers.

Space Assignment

- **Prioritize curb space**
 - **Parking versus buses/taxis/deliveries, pick-ups/drop-offs**
- **Set different types of parking**
 - **Use results from demand analysis**
 - **Focus on highest vehicle turnover**
 - **Set duration (or no parking) by time-of-day, day-of-week**
- **Modify to reflect special local needs**
 - **e.g., residents**



The next step is to assign on-street space. Often, needs exceed the available space. Therefore, a prioritization scheme is needed to allocate the space.

Space should be allocated to achieve the best turnover (most users per day). Providing street space is costly in terms of street maintenance and opportunity costs (for example, the parking space could be used as another travel lane). By maximizing turnover, the costs per vehicle are minimized. This approach means that short-term parking needs (e.g., customers, deliveries, passenger pick-ups, drop-offs) are favored over long-term needs (e.g., employees, residents).

This assignment may need to be modified to reflect special needs such as residential parking. However, this should only be done if other parking approaches such as off-street parking are not feasible.

On-Street Pricing An Effective Management Tool

- Objectives
 - Match demand and supply
 - Reduce searching for spaces
 - Encourage high vehicle turnover, public transport use
 - Raising revenue is secondary, although can be important for sustainability



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A good pricing approach is needed to reduce parking demand and match parking supply. Without an integrated pricing approach, the parking demand will exceed the on-street supply and problems will continue.

The approach should be structured to reduce demand to match on-street parking supply that is provided in the assignment of on-street parking space.

Unlike other pricing applications, the objective of pricing policy is not to maximize revenues. Raising revenue is a secondary objective to encouraging turnover. However, the revenue earned can be an important component of making on-street parking management financially sustainable.



On-Street Pricing Principles

- **Price by duration of parking**
 - e.g., X per 15 minutes
- **Set price so demand = 85% supply**
 - Reduces searching
 - Typically will be higher than off-street parking
- **Limit duration of parking**
 - e.g. 2 hours



There are three key principles that should guide the pricing approach.

First, base pricing on the duration of parking so that the user pays more for parking longer. This encourages parking turnover.

Second, set pricing to provide 85% use during peak use periods. When prices are increased, some users may choose to make their trip by another mode, not make the trip at all, or use off-street parking. This reduces or eliminates increased traffic from searching for open parking spaces. By increasing on-street parking charges, off-street parking becomes more economically viable and may encourage selected private sector investment.

Third, limit the duration of parking. This increases turnover. It directly impacts users who wish to park for long time periods and helps make off-street parking become more economically viable.

On-Street Parking Revenue Collection Methods

- **Single Space Meters**
 - Cash oriented
 - Can vary charges by time-of-day
- **Contract parking attendants**
 - Contractors manage parking
 - Optimizes street space
 - Maximizes revenues
- **Multiple Space Pay and Display Meters**
 - Less visually intrusive
 - Can be cashless, easy to monitor revenues collected
- **Mobile Phone/IC card Technology**
 - Driver calls provide to start and stop the clock
 - Hand-held computers used to check
 - Cashless, easy to collect, easy to enforce



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Several approaches can be used for revenue collection. The traditional approach is single space meters. They require cash and can be programmed to vary charges by time-of-day.

In some cities in developing countries (e.g., Ahmedabad, Bangkok, Dhaka, Hanoi, Jakarta, Manila, Seoul) private companies are contracted by the government to manage the collection of revenues for on-street parking. This approach can maximize the use of street space since parking spaces can be adjusted to fit the lengths of parked vehicles. Parking revenues also are maximized since the

Multiple space pay and display meters are more robust. A user pays at a central paying location. The machine prints a time-date receipt that the user places inside his vehicle. This approach is visually less intrusive than single space meters. It can be cashless (e.g. by using credit cards), which improves revenue security and provides customer convenience.

Mobile phone technology is another option. The user calls a parking number and enters his space number first to start time measurement when parking, and to stop time measurement when exiting. The parking fees are billed to the user's account. Parking inspectors use hand-held computers to monitor payments.



Reasons for Cashless Parking

- Reduce money collection costs
- Revenue control
 - Theft
 - Internal control
- Information for planning



More and more sales transactions in the world are occurring in the world. Reduced money collection costs and revenue control are the major benefits. Cashless transactions reduce or eliminate the amount of money at a sales location. This reduces the potential for theft by outsiders at the sales location. It also reduces the potential for employee theft because there is electronic monitoring of payment.

Cashless parking also provides the provision of real-time information on parking activity by time-of-day and day-of-week. This provides a good picture of current parking behavior. The data can be used to assess parking needs, modify parking space assignments, and revise pricing approaches.

Residential On-Street Parking

- **A sensitive issue when:**
 - **Duration is limited**
 - **Parking spaces are limited**
 - **Fees are charged for on-street parking**
- **Parking permits for residents of immediate neighborhood is a common approach**
 - **Unlimited parking duration**
 - **Can be limited to days or nights**



Residential on-street parking can be a sensitive issue when developing a parking management strategy. It is a sensitive issue when fees are charged for on-street and parking spaces are limited (on-street and off-street).

A common approach to this issue is to provide residents with residential parking permits. This approach is used widely in Western countries.

This approach has not been used widely in other countries. However, an on-street permit system is being used in parts of Seoul, Korea. Permits are issued by the governments and give access to a shared row of permit-parking-only spaces, marked with a code painted on the street. Permits are available for day, night, or day-and-night permits.

On-Street Parking Enforcement

- **Critical for a viable parking program**
- **May require setting up special parking enforcement officers or use of contractors**
 - **Regular/traffic police may not view as a priority activity**



Enforcement is critical for a viable program. Parking enforcement can be handled by the regular police, the traffic police who manage street operations, special parking wardens, or contractors.

Experience from many cities suggests that effective enforcement may require setting up special parking wardens or using contractors. The regular and traffic police may not view parking enforcement as a priority activity. When police budgets become tight and staffing is low, police focus their attention on duties that are high priority.

Enforcement Issues







- **Enforcement authority**
 - Illegal parking
 - Parking violations in legal spaces
- **Enforcement methods**
 - Parking fines
 - Booting/towing vehicles
- **Enforcement agencies**
 - Regular/traffic police
 - Parking enforcement officers
 - Contractors

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A good on-street parking management strategy will specifically address enforcement issues. There needs to be a legal basis for enforcing illegal parking and parking violations in legal spaces. Sometimes this means either amending existing laws and regulations or passing new ones.

Enforcement methods should be addressed in laws and regulations. Usually, parking fines and sanctions are addressed. However, the ability to quickly tow vehicles is important. This helps restore smooth-flowing traffic and communicates to users that violations are serious and will be addressed promptly.

Finally, the enforcement agencies need to be clearly identified. If regular police are not used, then effective enforcement also requires empowering special parking police and permitting the use of contractors.

Summary



- **Parking is an important component of the multi-modal transport system**
- **Parking policies should be a key element of land use master and transport strategic plans**
- **The policies should address**
 - **Pricing, requirements for and regulation of off-street parking**
 - **Pricing and management of street space use and on-street parking**

This presentation provided a general overview of the importance of parking as an important element of a strategic transportation plan. The availability and pricing of parking impacts the use of motorized vehicles and public transportation.

Parking policies help shape how cities develop and function. The policies affect more than how vehicles are stored when they are “resting.” They impact how land-use development occur and how people travel.

The policies should address pricing, requirements for and regulation of off-street parking and pricing and management of on-street parking and use of street space. This integrated approach is needed to ensure that the parking policies support the achievement of the vision for the city.