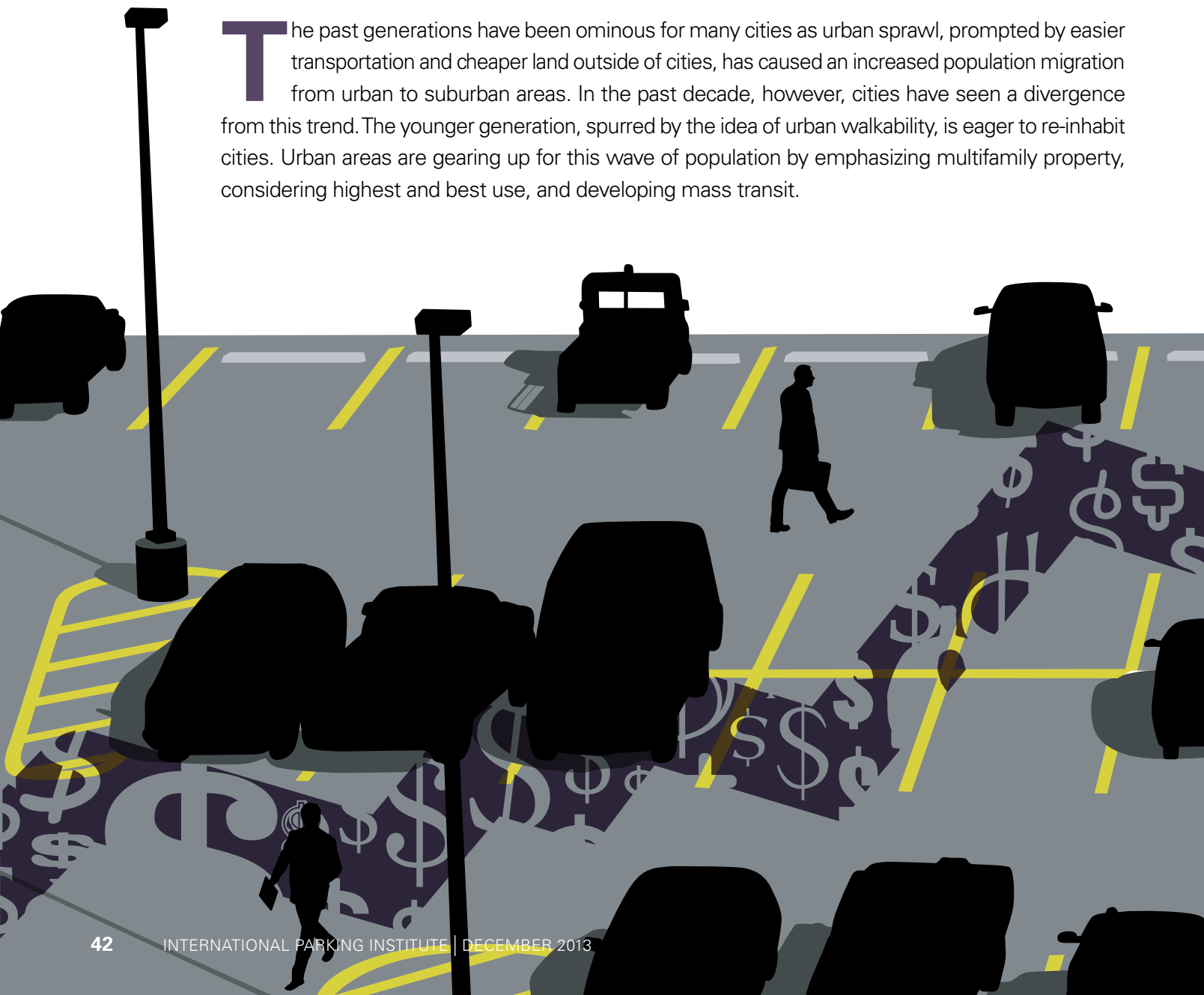


Urban Parking as Economic Solution

An undergraduate student discovers parking offers a host of urban solutions, but picking the right form is key.

By Andrew R. Long

The past generations have been ominous for many cities as urban sprawl, prompted by easier transportation and cheaper land outside of cities, has caused an increased population migration from urban to suburban areas. In the past decade, however, cities have seen a divergence from this trend. The younger generation, spurred by the idea of urban walkability, is eager to re-inhabit cities. Urban areas are gearing up for this wave of population by emphasizing multifamily property, considering highest and best use, and developing mass transit.



One factor that will stay constant throughout the infill of urban America is the importance of passenger vehicles and parking. Many cities are trying to figure out how to design and manage their parking infrastructures more efficiently. With urban revitalization efforts underway in many cities, the timing is opportune for instituting changes in parking infrastructure and transportation behavior.

It is projected that by the year 2050, 460 million people will live in the U.S. An increasing population translates into an increasing number of passenger cars. In 2012, there were approximately 300 million registered cars in the U.S.; that represents half of the world's passenger cars. This number is sure to grow in the coming years as America continues to rebuild its infrastructure and as its economy rebounds. Because the supply of cars is due to increase, the demand for parking will likewise increase.

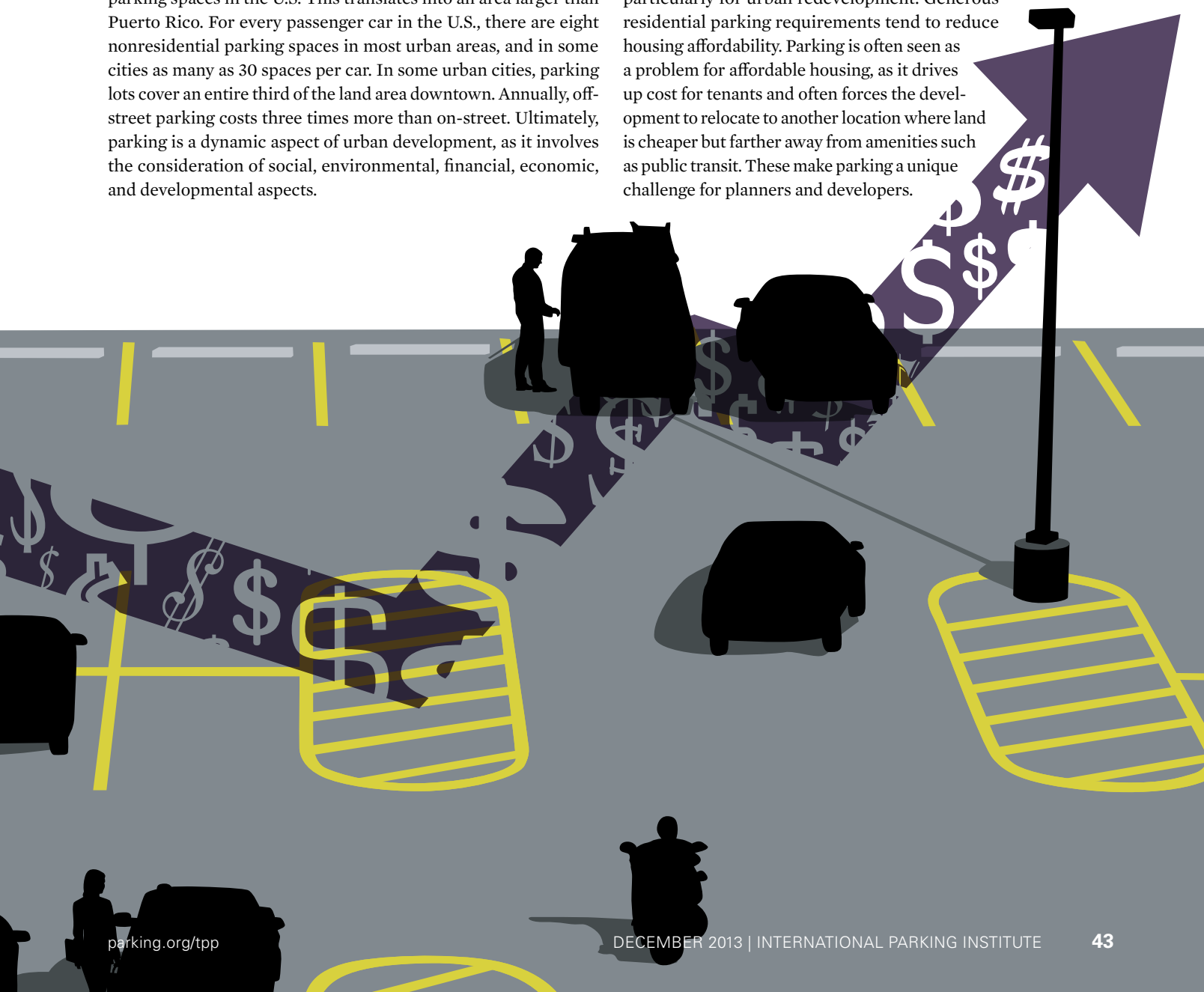
Just how important is parking? MIT Professor and author Eran Ben-Joseph, Ph.D., estimates there are 800 million surface parking spaces in the U.S. This translates into an area larger than Puerto Rico. For every passenger car in the U.S., there are eight nonresidential parking spaces in most urban areas, and in some cities as many as 30 spaces per car. In some urban cities, parking lots cover an entire third of the land area downtown. Annually, off-street parking costs three times more than on-street. Ultimately, parking is a dynamic aspect of urban development, as it involves the consideration of social, environmental, financial, economic, and developmental aspects.

Parking and Economic Development

During the urban sprawl movement, residential population wasn't the only factor to relocate as businesses, jobs, and capital spilled out of the cities. Parking is directly correlated to economic development, as one open on-street parking space is valued at \$20,000 per year in revenue to local businesses and the local government.

Ben-Joseph wrote in his book, *Re-Thinking a Lot*, "Generous parking requirements and low parking prices tend to discourage infill development and encourage sprawl. As a result, it tends to increase per capita vehicle ownership and use and reduces the viability of other modes such as walking, cycling and public transit." (See the May 2012 issue of *The Parking Professional*.)

Adequate parking will increase the value of residential, retail, multifamily, and commercial property. Low-income housing could be affected by parking, because parking represents about 10 percent of typical building development costs and sometimes more, particularly for urban redevelopment. Generous residential parking requirements tend to reduce housing affordability. Parking is often seen as a problem for affordable housing, as it drives up cost for tenants and often forces the development to relocate to another location where land is cheaper but farther away from amenities such as public transit. These make parking a unique challenge for planners and developers.





The struggle many cities are facing is keeping a balanced ratio of population to parking spaces. As urban development grows, parking must also increase, but determining the appropriate amount is challenging as too little parking could inhibit further growth and too much is wasted area that could be used for other economic purposes. With each on-street spot valued at \$20,000 per year in revenue to the local economy, keeping the balance is simple economics, but it creates a unique challenge for most cities.

San Francisco is experimenting with a revolutionary new way to manage on-street parking. By determining the population of each block and distributing parking spaces, and meters accordingly, the system *SFpark* is able to charge different rates at meters depending on demand, day of the week, and time of day. This system helps reduce traffic congestion, consumer waiting time, and emissions from vehicles while increasing the amount of open, on-street parking spaces available to consumers. Donald Shoup, Ph.D., of UCLA developed demand-based parking, which strives to maintain an 85 to 15 percent ratio of parked cars to vacant spaces. *SFpark* accomplishes this by setting variable prices at meters based on the demand for that particular area. By making these rates as well as traffic congestion available online and through any smartphone, *SFpark* enables citizens to decide whether they should walk, take public transit, or drive their own vehicles. Innovative, efficient systems such as this will continue to grow in popularity around the U.S. as the demand for improved urban parking increases.

Unique Solutions

Each kind of parking option presents a unique solution to the question of modern urban parking. Surface lots are the most common, consisting of paved asphalt or concrete with scattered planter beds and trees for minimal green space. A typical parking space is 8 to 10 feet wide and 18 to 20 feet long, which averages about 144 to 200 square feet per parking space. However, urban planners generally allow for 330 square feet per space in off-street parking.

Surface lots are popular because of their affordability in comparison to other parking structures. In 2012, a

surface lot parking space cost an average of \$4,500 to construct. They are also the easiest and quickest in terms of construction. The uses of a surface lot do not stop at parking, as many are used for local festivals, charity fundraisers, and local farmers markets.

Surface lots are not without their negative effects, however. One must keep in mind the opportunity cost of constructing a surface lot in an urban area; in most cases, this is the number of parking spaces given up by not constructing a parking structure or another building that could stimulate economic growth. Highest and best use of an area must also be considered, as a surface lot could be better used as a restaurant or other form of business that could generate tax revenue.

Asphalt parking lots must be repaved every 20 years, whereas a parking structure can last 50 years without major reconstruction. “A better parking lot might be covered with solar canopies so that it could produce energy while lowering heat. Or perhaps it would be surfaced with a permeable material like porous asphalt and planted with trees in rows like an apple orchard, so that it could sequester carbon and clean contaminated runoff,” writes Ben-Joseph. Surface lots are unique as they are some of the few places where pedestrians and cars can coexist. Ultimately, surface parking lots should be considered when there is a small demand for parking, if the cost of land is inexpensive, and if green methods can be implemented to increase their functionality.

Above-ground structural parking offers a vertical solution, allowing for more parking spaces per acre of urban land than surface lots, but at a higher cost. Structured parking requires more capital investment and longer construction times than surface lots. However, parking garages have more longevity than surface lots. For the average five-story, 145,000-square-foot parking garage, the estimated construction cost is \$8.56 million. This means the construction cost for one structured parking space is \$22,688.

Cost of maintenance must also be considered in parking garages; this could include cleaning crews, gate operators, and security. Parking structures must be equipped with proper ventilation, elevators, and fire escape routes.

Parking structures can be separate from or attached to the building which they serve. The “Texas-donut” style of parking structure—plain decks defined by surrounding buildings—allows for a more dense-built environment, while increasing the aesthetics of a development by essentially hiding the parking facility behind the façade of other structures. Texas-donut style also provides for a more secure parking garage than a traditional, on-street

parking structure. Essentially, vehicles and pedestrians in a Texas-donut style facility will be subjected to less crime than a parking garage whose façade is open to the street. Ultimately, structured parking should be considered when demand for parking is high, and the cost of land is expensive.

Underground parking is the third and most expensive option for urban parking. The most costly aspect of sub-terrestrial parking is the excavation. Construction cost of one underground parking space is between \$34,000 and \$45,000. A two-story, 100,000-square-foot underground parking facility is estimated to cost \$6.9 million.

Underground structures are more challenging from an engineering and geological standpoint. They must include ventilation, hydraulic pumps, and proper rainwater disposal. During Hurricane Sandy, an underground parking lot employee in New York City died due to the inadequate water disposal system and the rising floodwater. Nevertheless, one benefit of underground parking is the undisturbed aesthetics of the urban landscape, because the parking area is seemingly hidden.

This beneficial attribute can also cause problems with the underground infrastructure of subways. The opportunity cost associated with underground parking is the immense amount of capital that could be spent on other aspects of the city. Underground facilities are mainly used in areas where land is expensive and capital reserves are high. Ultimately, this form of parking is not conducive for many urban areas, yet if a city places a high priority on maintaining aesthetic beauty, sub-terrestrial parking could be a beneficial option.

Mechanical stacking is the most modern form of urban parking available today. Essentially, a hydraulic system lifts cars into vertical slots, similar to a large-scale forklift at a home improvement store. Many European countries have experimented with this form of parking and believe it can revolutionize urban parking. However, each space is estimated to cost eight times the amount of one surface lot, which translates to \$36,000.

This form of parking removes the component of human error when parking. It also eliminates the necessity of human design elements such as elevators, fire escapes, and ventilation. This allows for more dense parking, which means more urban area will be left open for development.


When compared to the other three forms, this style of parking requires the least amount of regular maintenance. Because these parking facilities are almost exclusively run by mechanical systems, there is essentially no crime. Conversely, the main hindrance to this form of parking is the cost of the technology; because of this, cities have been hesitant to commit to this form of urban parking.

Ownership

The final aspect of parking that should be taken into consideration is that of ownership and control. Who should have ownership of a city's parking services? Similarly, who should control them?

Typically, the local government retains ownership of most of its parking lots and facilities, and occasionally grants control to private companies. Most cities hire management companies to operate the facilities or create a parking authority that is a quasi-governmental unit to operate both off- and on-street parking operations. In 2008, Chicago made history by selling the ownership of all parking meters to a private corporation for a 75-year period for \$1.15 billion. Chicago has come under criticism since then and its own Inspector General's office determined after analysis they should have negotiated a shorter lease period as they left significant future earnings of \$1.3 to \$2.5 billion on the table. News headlines have called Chicago the poster child of everything that can go wrong with privatization. However, public-private partnerships allow local governments to blend the best of both worlds in which the government can ensure that citizens and taxpayers are best served in the long run while private investment can provide the influx of capital needed to build or maintain parking assets, driving economic development.

This revolutionary transition from public to private has not gone unnoticed by other cities. Los Angeles, Indianapolis, and Pittsburgh have each conducted feasibility studies about the possibility of implementing similar parking systems. New York City and Cincinnati are in the process of leasing parking meters to a private entity. Parking authorities are another example of a unique solution to the question of urban parking in America.

Ultimately, parking plays and will continue to play an essential role in the revitalization of urban areas. Each form of parking structure has its own benefits and disadvantages. Similarly, each form of parking structure has its effect on the environment. Technology will surely weigh heavily into operation of parking facilities in the future. Each city in America is unique which means collaboration between planners, local government, and the public is essential to creating a sustainable parking system for each individual city. As governments face budget deficits and must leverage the assets of parking facilities, they will be forced to look at public-private partnerships. To cite the phrase, "If you build it they will come." But without building and investing in parking facilities, they will not come. Parking drives economic development perhaps more than ever in today's urban resurgence. 



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