



Signal Changes: Parking, Automation & CRE's Future

There's more to the coming transportation revolution than driverless cars. Decisionmakers must weigh the broader implications of coming wholesale changes to an overlooked asset class.

KEY ISSUES ADDRESSED IN THIS YARDI THOUGHT LEADERSHIP PAPER

- How technology will redefine the role of cars
 - Impact on the demand for parking and property-level implications
 - Underwriting investment and development to incorporate a potential paradigm shift
 - Evaluating strategies for best use of existing parking assets
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INTRODUCTION

"If we can design cars with no drivers, we can design buildings with no parking." That bold vision was offered by Massachusetts Institute of Technology fellow Paige Pitcher during a TEDx Talk in 2017. While the day she foresees is still some years away, it underscores the necessity for real estate stakeholders to grasp the significance of the evolution of parking for developing, managing and investing in commercial properties.

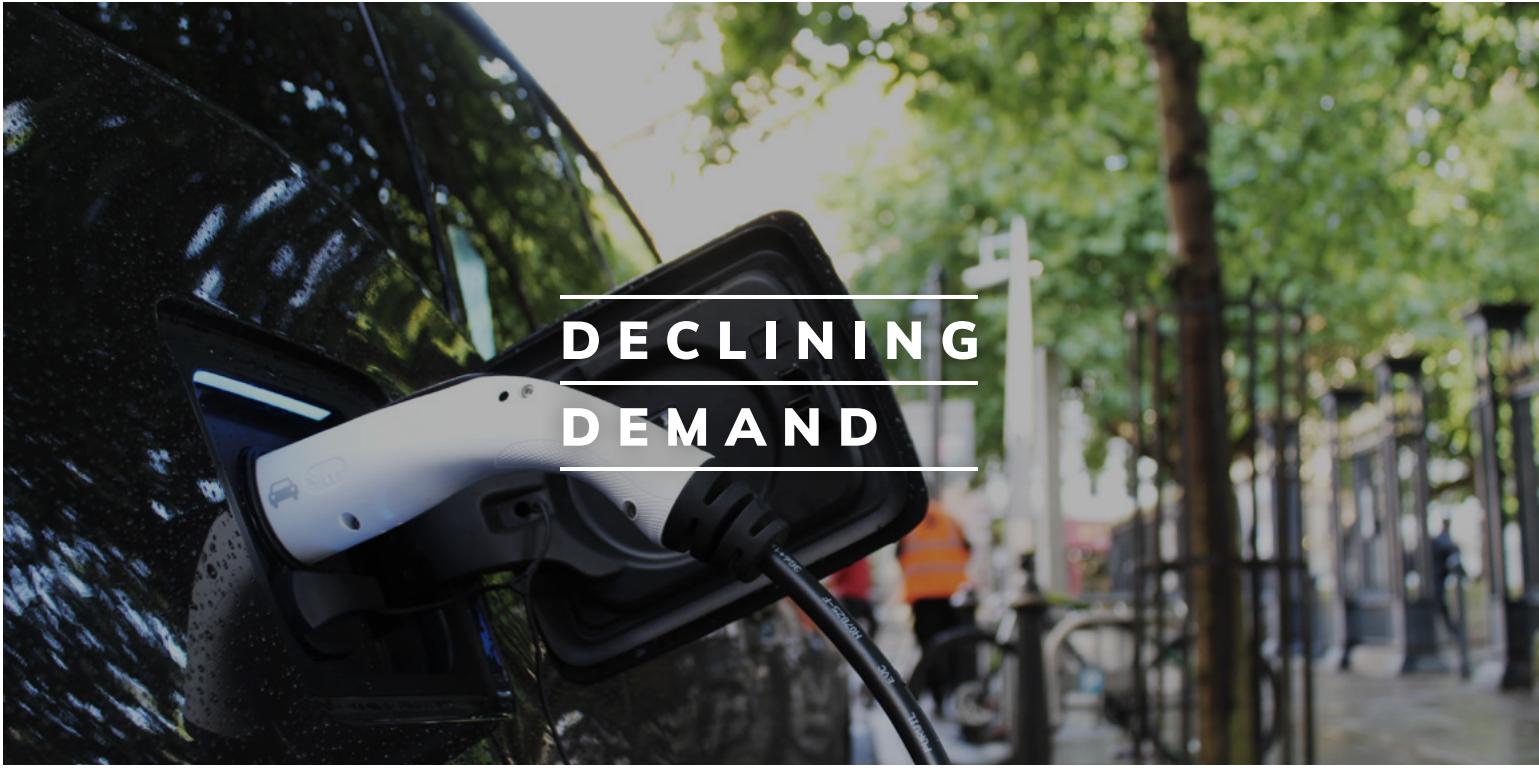


For all the media attention garnered by the advent of autonomous-vehicle technology, the implications of changing parking dynamics for investors, asset managers and property managers — though much less publicized — should not be underestimated. Though parking considerations will likely remain a factor in commercial and multifamily assets for decades, drastic reductions in the size and shape of parking facilities will directly affect the bottom line of commercial assets.

Considering the throughput time of most commercial asset categories, coupled with the rapid advancement of these technologies, it becomes clear that planning now for future needs is necessary to avoid obsolescence and reduce construction and

maintenance expenses. But that underscores a dilemma: how to plan for needs that are still unclear, or build for a technology that is still in its infancy?

Despite a large number of unknowns surrounding land use and parking in particular, current trends suggest that owners, investors and developers would be prudent to adopt a flexible, forward-thinking approach: evaluating local conditions for indications of reduced future demand for parking; assessing existing parking facilities for their role at the property and their potential for future use; and, for new development, considering innovative approaches, such as automated parking and flexible designs that can readily accommodate future repurposing.



DECLINING DEMAND

Santa Monica, Calif., is among a handful of cities that have reduced or eliminated minimum parking requirements for new development.
(Constance Farrell/City of Santa Monica)

The Brookings Institute puts the number of cars used for commuting—either in carpools or alone—at 115 million. In coming years, that may be a thing of the past. The daily commute of the American worker is being informed by such new technologies as autonomous vehicles, ride hailing and computerized parking. A growing number of local jurisdictions are setting the stage for a less car-dependent future. Among the cities that have reduced or eliminated minimum parking requirements for new development are Washington, D.C.; Buffalo, N.Y.; Santa Monica, Calif.; and Salt Lake City.

These signs all point to a dramatic long-term reduction in the need for parking. The Transportation Revolution, a collaboration between the Urban Land Institute and Green Street Advisors, suggests that real estate investors can reasonably expect demand to decline 50 percent over the next 30 years. "The impact will be highly asset specific, but the surge of new land should negatively impact values where higher and better uses are lacking," the report states. The nation's total parking footprint has been estimated at some 25,000 square miles nationwide; at least one provider of automated, or robotic, parking technologies claims to be able to reduce that volume by half.

In her master's thesis, which studies the interaction of autonomous vehicles, parking and commercial real estate, Pitcher projects that 55 percent of vehicles will be driverless by 2042. Accordingly, demand for parking will decrease 33 percent.

She describes a time when a car deposits a passenger at a drop-off area, generates a text message to notify that customer that it has located a parking spot, and "slips into that spot with inches to spare. ... Then it waits for you to summon it at the end of the day." Or perhaps the car never parks, but responds continuously to calls of others seeking to transport; the technology already exists.

Watershed change looms for parking, "and there remains room for improvement, or even hope, of this largely under-considered asset class," she writes. "The same technology that nearly brought parking's demise may offer opportunities."



AvalonBay Communities' 668 Alameda in downtown Los Angeles will incorporate parking facilities with built-in flexibility to accommodate potential future repurposing. (AvalonBay Communities/BNIM)

Before those opportunities fully present themselves, challenges await in both technology and development strategies. But even now, forward-thinking developers and investors are setting the example for the industry by embracing flexibility and adaptive re-use. These participants are acting on the idea that the coming reduced demand for parking will greatly boost the redevelopment value of centrally located sites now used for parking.

Los Angeles, a city synonymous with the car, presents an example of one early adopter. AvalonBay Communities is thinking years ahead in its parking plan for 668 Alameda, a 475-unit community in

downtown L.A.'s trendy Arts District. Scheduled for a 2019 construction start, the property will include 516,000 square feet of live/work space and 61,200 square feet of commercial space, according to documents filed with the city.

BNIM, the project's architect, is designing the property's two levels of underground parking so that they can be repurposed for retail, entertainment or other uses if demand for parking at the property dwindles. One key departure from conventional design is that the floors of the two parking levels will be flat rather than sloped in order to make possible future conversion easier.



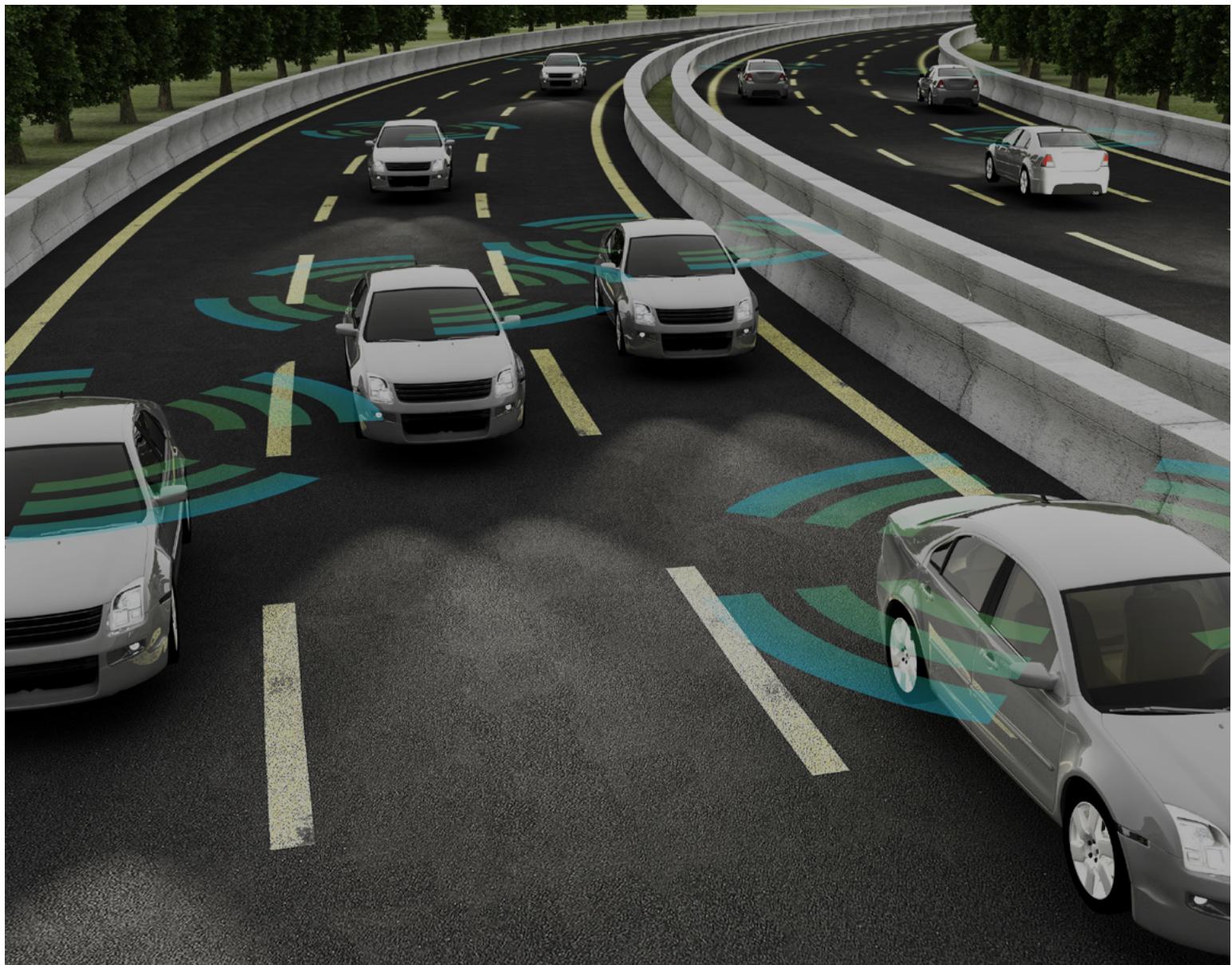
Pitcher's thesis establishes three financial models for analysis, using the base assumption of a 250-space structure in an urban location and applying national averages for revenue, vacancy and expenses. The first model considers a parking structure with no changes in demand triggered by autonomous vehicles. The second provides a 25-year fixed hold on the parking structure and factors in triggers of expanded automated vehicle use.

The third scenario also includes automated vehicles, but adds an option to sell the property from years two to 25. With the caveat that applying hard numbers to hypothetical situations is a difficult exercise, Pitcher finds a negative net present value in all cases, despite consistently positive cash flows as measured by EBITDA. The clear indication is that parking alone—no matter the allowance for automated vehicles—creates a drag on returns. The strategy then shifts to cutting costs and minimizing that drag.

It should be noted here that the negative NPV of the first scenario, which assumes that demand for autonomous vehicles will have no impact, is grounded in conventional performance metrics. In particular, projections point to increased cap rates set against sluggish rental growth rates.

Projections for reduced parking needs imply other challenges for an industry that generally gravitates toward traditional patterns of analysis. "Real estate investors typically do a great job assessing intermediate-term cash flow prospects," observe Dave Bragg and Stephen Pazzano, co-authors of the ULI/Green Street Advisors report.

But as the report frames the problem, the impact of up-and-coming driving technologies will unfold beyond the standard seven-year period associated with conventional IRR analysis. That, in turn, could result in asset mispricing. So for institutional investors and others that prefer decades-long holds, it could be vital to extend projections well beyond the seven-year mark. In many cases, underwriting assets will require scenarios that factor in reduced parking needs and evolving property configurations, both stemming primarily from new driving habits.



That, in turn, raises another crucial issue: How quickly and enthusiastically the public will embrace self-driving vehicles. Most automakers project availability as early as 2020 but do not anticipate that the public will be fully committed that soon.

And recent events may further delay that inevitability. In a March 2018 incident that made national headlines, a driverless vehicle operated by Uber struck and killed a pedestrian in Tempe, Ariz., despite the presence of a human driver in the vehicle. A preliminary review by city police suggests that the pedestrian stepped into traffic too quickly for either the automated system or the human driver to react. Nevertheless, Uber pulled its automated vehicles from the road, and the incident may slow the public's embrace of self-driving vehicles.

Another factor that may affect drivers' embrace of the new technology is that not all such vehicles are created equal. Automation will be variably priced, with higher costs for cars offering more sophisticated functions like self-parking. Some estimates place the initial premium for automated cars at \$10,000.

These circumstances raise crucial questions: How do we build today for a future use? How do we contain costs? Will building codes keep up with the new dynamics of building design or cling to traditional, outdated ratios of density to parking?

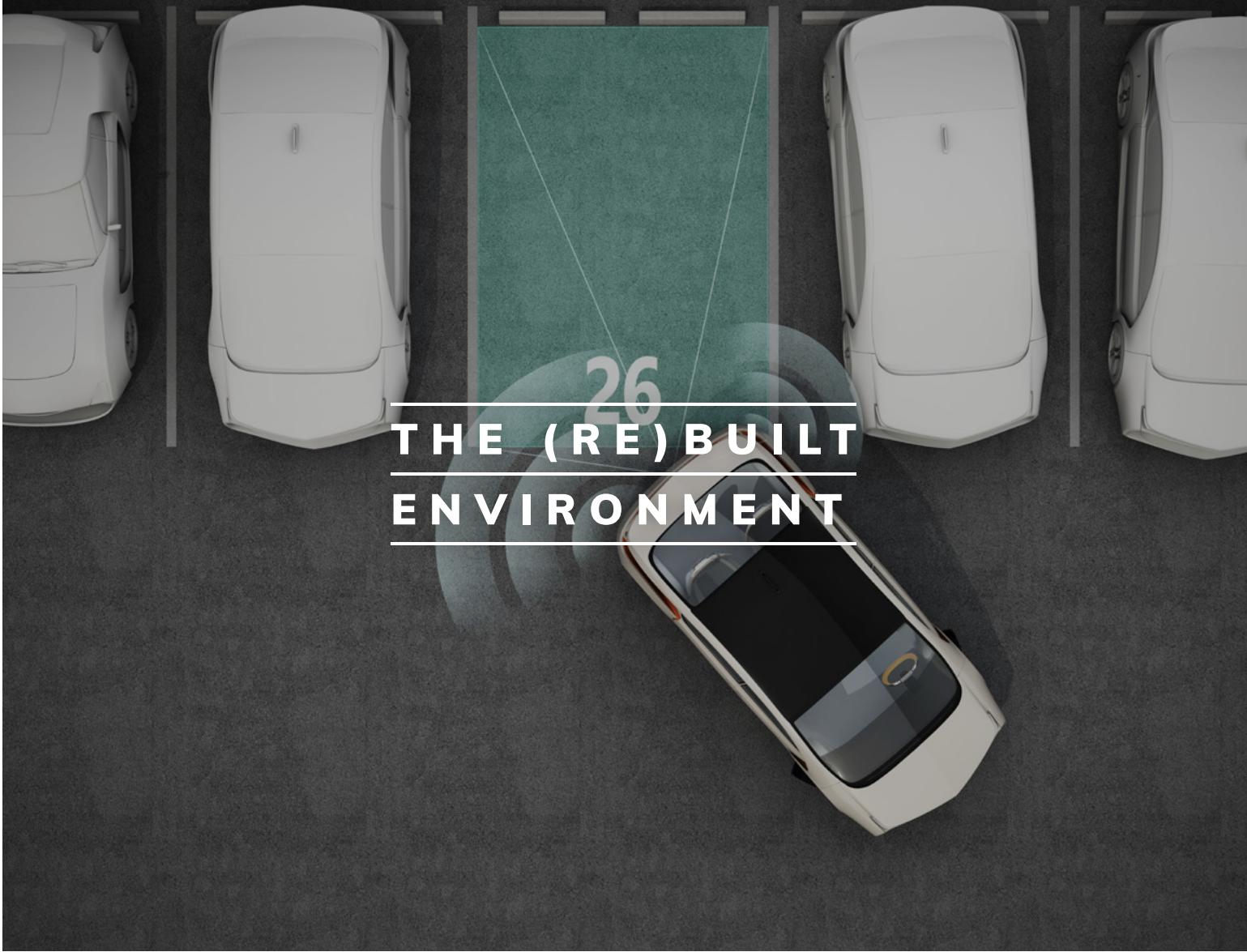


BRIDGING THE GAP

Broad answers are emerging to some of these questions. "It seems that the most prudent way to approach city code changes is first on a case-by-case basis," observes Steve Weikal, head of industry and alumni relations for MIT's Center for Real Estate. "The most forward-thinking entities tend to respond when new technologies are presented to them, rather than changing codes across the board and finding that only one developer out of a hundred was ever going to implement the changes."

The ULI/Green Street report speculates on other ways that the increasing acceptance of autonomous vehicles could affect real estate strategies. By making commutes easier and less expensive, AVs would further raise the importance of office locations in central business districts. Another, more surprising possibility runs contrary to a longstanding, widespread goal adopted by cities nationwide. As self-driving cars bring large numbers of commuters directly to work or to a transit hub, transit-oriented development could decline as a policy priority, likely reducing incentives for developers and investors to sponsor new projects.

Though most projections related to autonomous vehicles understandably focus on the office, residential and retail sectors, the supply chain could be affected, as well. If reliable self-driving technology could extend to long-distance trucks, it would enhance efficiency and reduce the waiting period for products in distribution centers. That streamlining, in turn, would decrease the footprint required for warehouses, pushing more volume to smaller, closer-in distribution centers. Conversely, as automated vehicles trim the parking component at regional malls, the newly freed space would invite redevelopment for hotel, office, residential and other projects.



26 THE (RE)BUILT ENVIRONMENT

Autonomous vehicles address only one part of the transition from traditional parking; the parking structure itself will tell the rest of the story. Particularly for new development, automation may offer an attractive tool to reduce the parking footprint and expand productive, revenue-generating space.

Unlike with a conventional parking structure, the driver exits the process early and is not needed to guide the car into its final location. In the first step, the driver parks on an access pallet and steps out of the vehicle. Next, light sensors take the car's measurements. A storage and retrieval unit (SRU) then moves the vehicle to a parking space. When the driver returns to retrieve the vehicle, the process starts in reverse. Individual parking spaces do not require space for passengers to get in and out of a vehicle, which allows the overall size of the parking facility to be compressed.

Providers of automated parking systems make some compelling claims that their systems save space, as well as reducing development and maintenance costs. Robotic Parking Systems Inc., which has installed its products in locations as diverse as Hoboken, N.J., and Dubai, cites a typical 40-story office tower as an example. The Clearwater, Fla.-based firm estimates that automation would reduce the parking footprint by seven floors, expanding the footprint available for rentable office space by as much as 47 percent. At the same time, more efficient use of the space used for parking would increase capacity from 2,300 to 3,400 cars.



Automated parking providers contend that their systems can reduce overhead and use space more efficiently, thus expanding the footprint available for rentable space. (Robotic Parking Systems Inc.)

Development costs also favor automated facilities, Robotic Parking contends. According to its estimates, turnkey completion pencils out to \$38,000 per space as opposed to \$47,500 per space for conventional parking. The savings result from a variety of factors, such as lower energy outlays for lighting and ventilation and reduced labor costs stemming from a decreased need for attendants. By cutting down on idling time and emissions in general, the systems can also diminish a property's carbon footprint.

Other strategies to optimize the parking layout could make incorporation of automated parking facilities even more favorable. Data providers that automatically tally

traffic ebb and flow are emerging, such as Smarking, a four-year-old firm with MIT roots that counts Brookfield Properties and Boston Properties among its clients.

Smarking automates and streamlines parking data collection to help owners analyze demand patterns by tenant, allocate inventory based on data and price inventory based on demand. In so doing, the technology is a sort of automated, shared-desk concept for cars, providing a tool to maximize land use and help increase revenue. For instance, "it could enable an owner to park 600 cars with spaces for only 400," Weikal says.



OLD STRUCTURES, FRESH OPTIONS

Given the variety of variables related to parking, the facilities primarily seem to represent a cost of doing business, rather than a profit center. "Parking in the short term is a risky investment, and in the longer term may not be a viable asset," says Pitcher. "There is a high degree of exposure of parking garages to changes created by autonomous vehicles, illustrated by significantly negative net present-day values and minimal returns. This exposure will continue to grow as the stock of parking spaces increases with minimum parking requirements for new construction."

That scenario seems to consign a great deal of well-located inventory to the scrap heap, but it also suggests a new era of opportunities. Demolition opens up the site for sale or redevelopment, but solutions short of removing the structure are also coming to the fore. Recapitalizing and repurposing the structure may be an attractive option, Pitcher notes, citing such uses as data centers and last-mile logistics space, as well as self-storage facilities and apartment amenity floors.

Others second Pitcher's notion about the potential to transform surplus parking space into productive new purposes. "We can transform those floors into residential, hotel, office and retail uses," Amy Korte, principal designer at Boston-based architectural firm Arrowstreet Inc., recently told Boston.com. "There are a number of uses that will make our cities better." The growing need for distribution points for same-day deliveries is also increasing value of the space for the industrial sector.

These solutions are by no means restricted to central business districts. Reduced demand for parking will extend to suburban locations where parking areas can be converted to more profitable uses. Rick Caruso, founder of an eponymous Los Angeles-based development company specializing in upscale retail, is thinking ahead. In an interview with the Los Angeles Times, Caruso said that he is anticipating opportunities to develop retail and multifamily properties on space currently used for parking.



THE TAKEAWAY

A new era is dawning for car travel and parking that carries far-reaching implications for real estate. New technologies are redefining the concept of parking, sweeping away both old revenue and outdated definitions. With that in mind, developers, owners and investors will need to embrace the repurposing of parking footprints for higher, more profitable uses.

Change is inevitable, and with this leap in the technology so close at hand, it becomes clear that we must match that potential with an equal degree of flexibility in how we envision—indeed, how we define—parking.

Despite a considerable number of unknowns, current trends suggest that owners, investors and developers would be prudent to adopt a flexible, forward-thinking approach. That strategy should start with continued, careful monitoring of local market conditions, demographic trends and driving habits for indications of declining demand for parking. Stakeholders should assess parking facilities in their portfolios for both current value and potential for future use. When considering development or redevelopment opportunities, project sponsors would be well advised to evaluate new tools like automated parking systems and flexible building designs. In this time of rapid change, the ability to adapt to the evolution of mobility will provide a distinct competitive advantage

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