

***Why 5G
can't
succeed
without a
small cell
revolution***



Small cells will be the foundation of future nationwide 5G networks; however, the US is currently unable to deploy them at the scale and speed required. Industry coordination around three measures could transform the scenario for small cells in the US, making 5G a reality.

While 5G offers faster speeds and lower costs, it requires a buildout of the wireless network, in the form of small cells, at a scale and speed that the telecom industry hasn't undertaken before.

One FCC commissioner recently estimated that the US needs 800,000 small cells to make 5G a reality. International Data Corporation (IDC) expects over two million—by 2021. By comparison, the existing 2G/3G/4G network, built over many years, has just over 200,000 cell towers.

The telecom industry has already been using small cells to extend coverage and improve service quality for 3G, 4G, and LTE wireless networks. Verizon, for example, stated in an FCC filing that 62% of its wireless deployments in 2017 were small cells.

Today, however, deploying a single small cell can take up to 24 months, with heavy costs along the way. Unless the US can make the process faster and cheaper, China, South Korea, and other global competitors will likely continue to pull ahead in the race for 5G.

The solution? Industry collaboration to transform small cell permitting and deployment. We'll tell you more about how to make this happen on page 4, but first, some background on small cells.

Why small cells?

Small cells are low-powered radio access points that connect mobile devices to mobile networks over a small area. They typically reuse frequencies on an extremely dense basis to take full advantage of available spectrum.

For 5G, network operators are planning to use not just the low- and mid-band spectrum that existing cellular networks mostly rely on. They will also need high-band spectrum, which carries over shorter distances than the lower frequencies that currently dominate wireless networks. Carriers will therefore need a much larger number of access points, which cover smaller areas, to roll out 5G.

In other words, they need small cells.



Small cells: The challenges

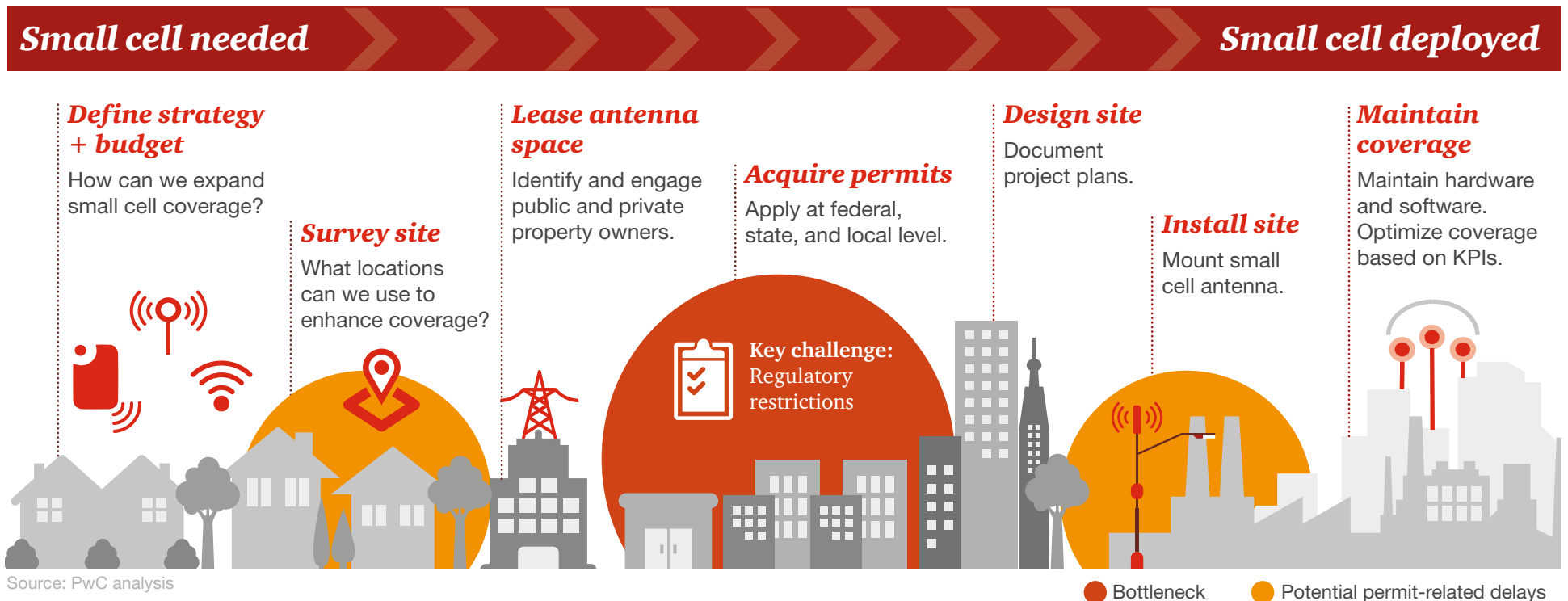
Why does it take so long and cost so much to deploy small cells? We first addressed this question in a 2013 issue of PwC's *Communications Review*. Five years later, many of the same issues persist.

One challenge lies in identifying all the millions of necessary locations, including co-location opportunities. Another related challenge lies in acquiring permits for these locations, after public and private property owners have been identified and engaged to lease antenna space. A recent **FCC order** has eased the burden of federal and tribal reviews for small cells, but the local review process remains slow and costly. It also varies across the thousands of deployment jurisdictions nationwide.

There's also the challenge of operational costs. Aside from the need to upgrade service architectures as well as operations and business support systems (OSS/BSS), operators will have to pay to lease, deploy, and maintain sites for most of these new small cells.

Using public infrastructure is a straightforward way to control this cost. Leases on publicly owned structures, such as light poles and traffic lights, typically cost less than a tenth of what privately owned structures, such as billboards and office or residential buildings, charge.

But the approval process for public leases can easily take a year or more for a single small cell.



The solution: Working together

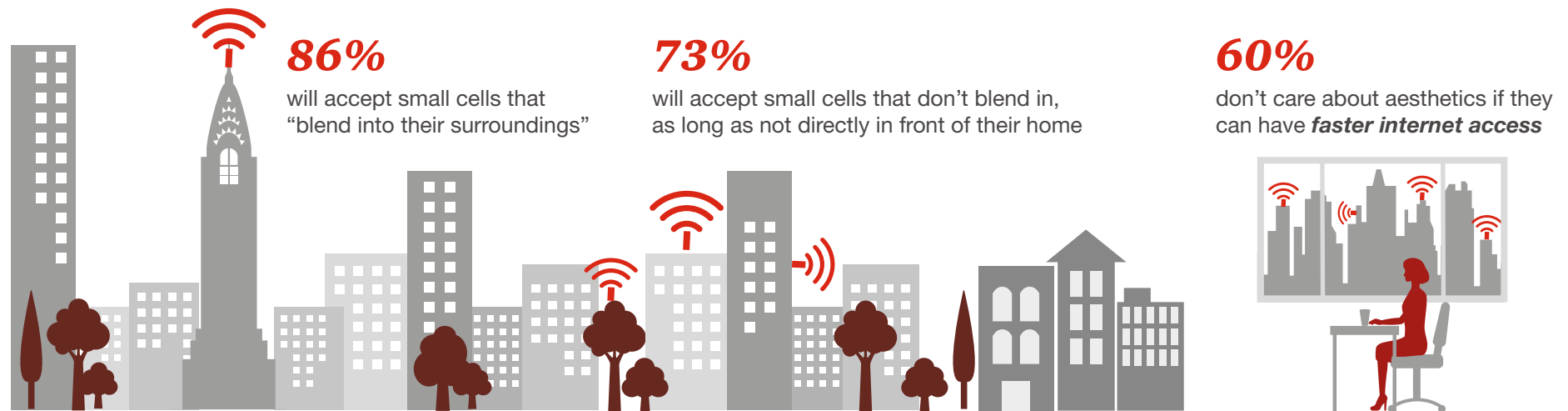
Network operators can work with city officials and other stakeholders to overcome these challenges—by creating a framework that easily identifies the best sites for small cells, expedites permission for their use, and keeps costs under control. Here's how:

1. Win stakeholder support for 5G and small cells

Few consumers want traditional cell towers on their street, but small cells are different: they can easily blend into the urban environment. Once residents understand (a) the benefit of 5G and (b) the unobtrusive nature of a small cell, their viewpoint can change.

In a recent PwC Consumer Intelligence Series flash poll survey, consumer acceptance was overwhelming—after we defined the benefits of 5G and the lower visual profile of the corresponding small cells. If network operators could more effectively explain 5G and small cells to city officials, local businesses, and community groups—and if they would also commit to installing small cells as unobtrusively as possible—public skepticism over small cells might well evolve into acceptance, possibly even enthusiasm.

Faster internet access wins over consumers



Q: What if we told you that equipment, known as small cells, is required for 5G. Small cells will consist of pieces of equipment placed on streetlights or utility poles—for example, in your neighborhood or even in front of your house—often accompanied by containers the size of mini refrigerators on the ground or pole. Please tell us how much you agree or disagree with the following statements about 5G and small cells. Base: 800

Source: PwC, CIS Flash Poll, May 2018.

2. Reform city permitting to balance agility and oversight

Currently, local regulatory requirements are nearly identical for macro cell towers (which can be over 150 feet tall and may require freestanding buildings for network and power equipment) and for small cells (which are similar in their environmental impact to much more compact, unobtrusive Wi-Fi hotspots.) More appropriate regulations for small cells could provide sufficient oversight while greatly easing 5G rollout.

Another obstacle is that most cities review small cell applications one by one. A better option is for the industry to work with cities to adopt a three-tiered approach to small cells.

The first tier would cover light poles and traffic lights in commercial zones, near high-rise buildings, along highways and major streets, outside malls and shopping

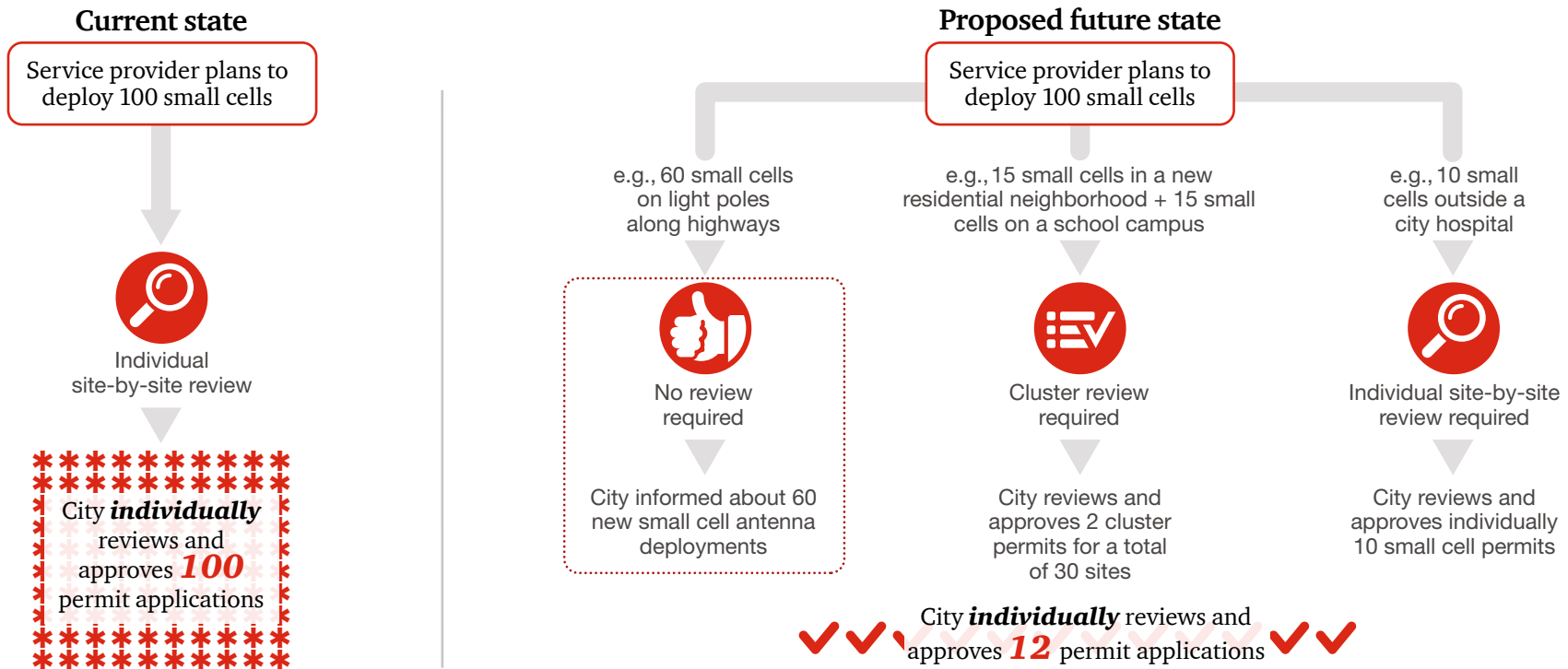
centers, and near government buildings. Here, small cells wouldn't need a permit, so long as they complied with a previously agreed-upon set of standards for size and appearance. The network operator would just inform the city of the planned locations.

The second tier would cover residential neighborhoods, parks, and school campuses. For this tier, service providers would have to request a permit. But they could do so for many small cells at once: A cluster of light poles and traffic lights within a reasonable radius.

Only the third tier, covering historic monuments, hospitals, and other highly sensitive areas, would still require individual permits for each small cell.

Together, these changes would make it easier, quicker, and cheaper to acquire city permits while maintaining robust oversight.

City permit reviews by exception for small cells



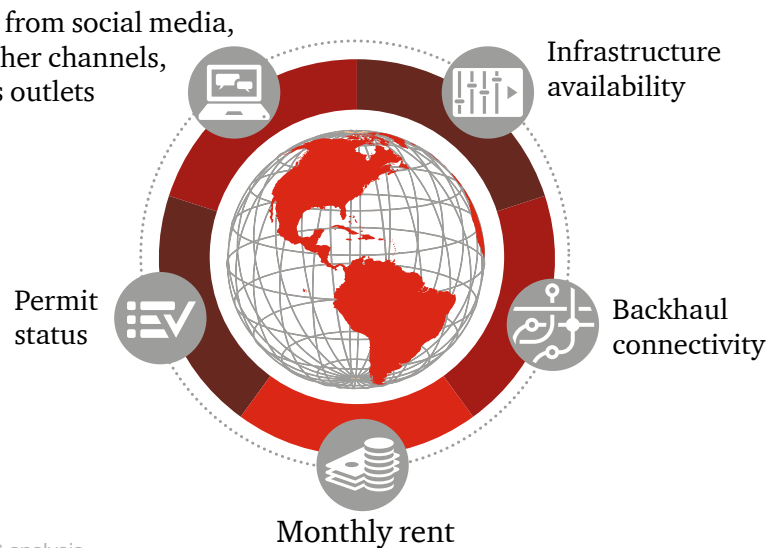
Source: PwC analysis

3. Establish a nationwide small cell information exchange

Industry and government collaboration could further advance small cells through a nationwide small cell information exchange (SCIX).

To ease small cell deployment, this digital platform would hold real-time information about availability, backhaul connectivity, monthly rent, and permit status for infrastructure capable of hosting small cells. To help both deployment and operations run more smoothly and at lower cost, the SCIX would also include data from social media, weather, and news platforms. If the major players all participate, the SCIX would also make regulators' task easier, since the platform would provide clear insights into the network.

National small cell information exchange



Source: PwC analysis

The value of such a platform has been proven in other sectors. For example, PwC has developed a similar exchange for healthcare—[DoubleJump](#)—that collects information from multiple public and private sources to guide decisions for patients and healthcare teams.

Why 5G can't succeed without a small cell revolution

Market-based solutions

Carriers need an enormous increase in their small cell networks to roll out 5G, but cities can't manage a massive influx of permit requests. It can take a year, on average, for cities to process a single approval.

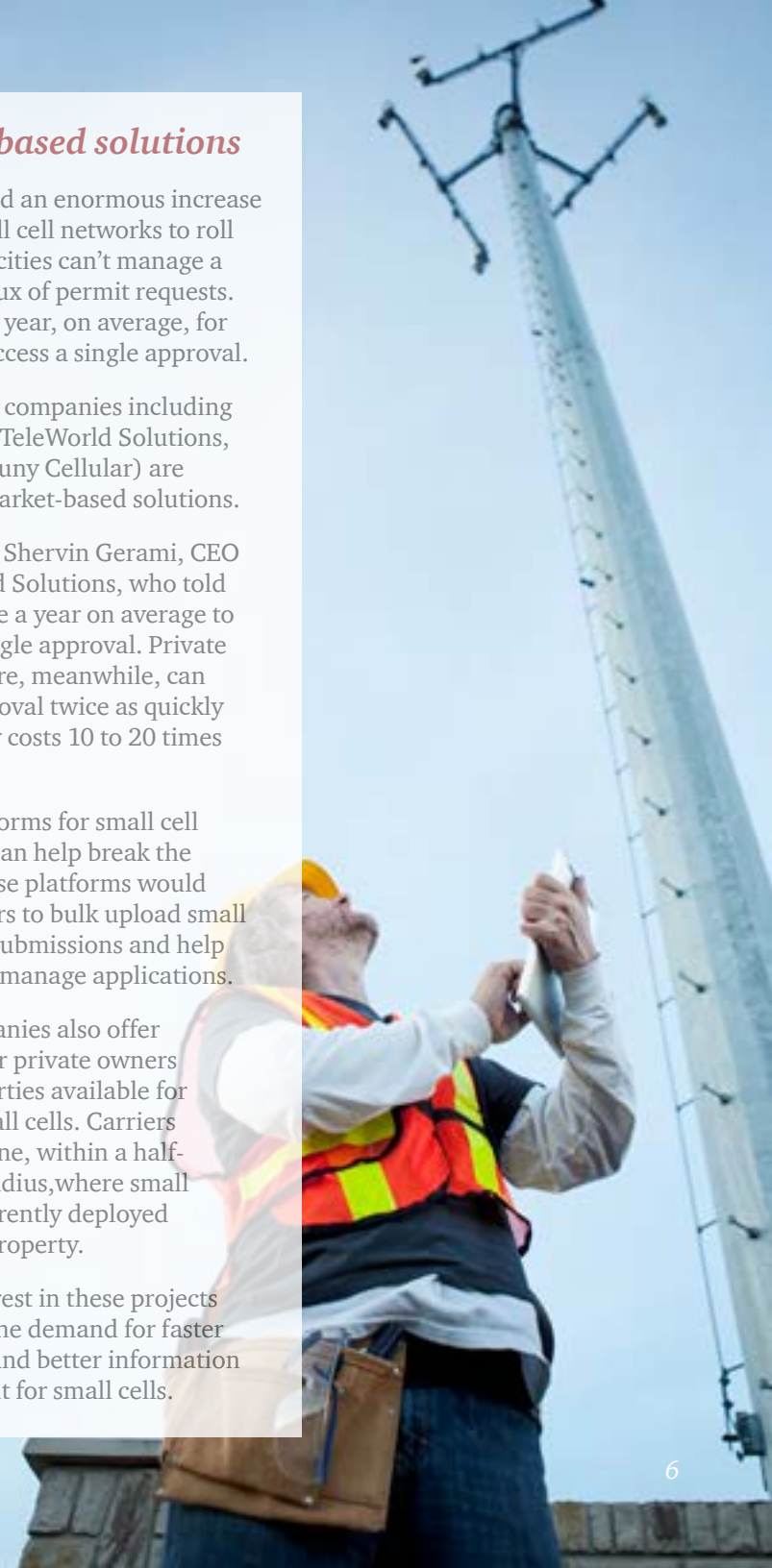
In response, companies including SNL Kagan, TeleWorld Solutions, and SCIX (Sunny Cellular) are exploring market-based solutions.

We spoke to Shervin Gerami, CEO of TeleWorld Solutions, who told us it can take a year on average to receive a single approval. Private infrastructure, meanwhile, can deliver approval twice as quickly but typically costs 10 to 20 times as much.

Digital platforms for small cell permitting can help break the logjam. These platforms would allow carriers to bulk upload small cell permit submissions and help cities better manage applications.

Some companies also offer an option for private owners to list properties available for outdoor small cells. Carriers can determine, within a half-mile or so radius, where small cells are currently deployed on private property.

Market interest in these projects is a sign of the demand for faster permitting and better information management for small cells.



The way ahead

5G needs small cells, and small cells need a faster, more cost-effective rollout than is currently possible in the US. The federal government has already taken a big step, by easing the review process for small cells.

Industry must now do its part: work jointly with local and state governments to improve public understanding, reform the permitting process, and create an information management platform.

These measures would support a rapid 5G rollout with lower deployment and operating costs to strengthen US telecom leadership.

Without action, the small cell bottleneck will persist, slowing the widespread availability of 5G for several years. Other countries will take the lead in next generation telecom, along with the many future industries that will depend on it.

Several countries already have strong public-private coordination around 5G and small cells. China, for example, has a national plan for 5G to launch in 2020 and reach over 400 million people by 2025 while massively building out small cells.

2020 is just around the corner; the US can't afford to wait. The telecom industry and local governments should act now—or risk being left behind.



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