

AT&T and Small Cells

Enhancing our network to meet consumer demand today while preparing for the technologies and innovations of tomorrow.

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AT&T External Affairs

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AT&T in Colorado

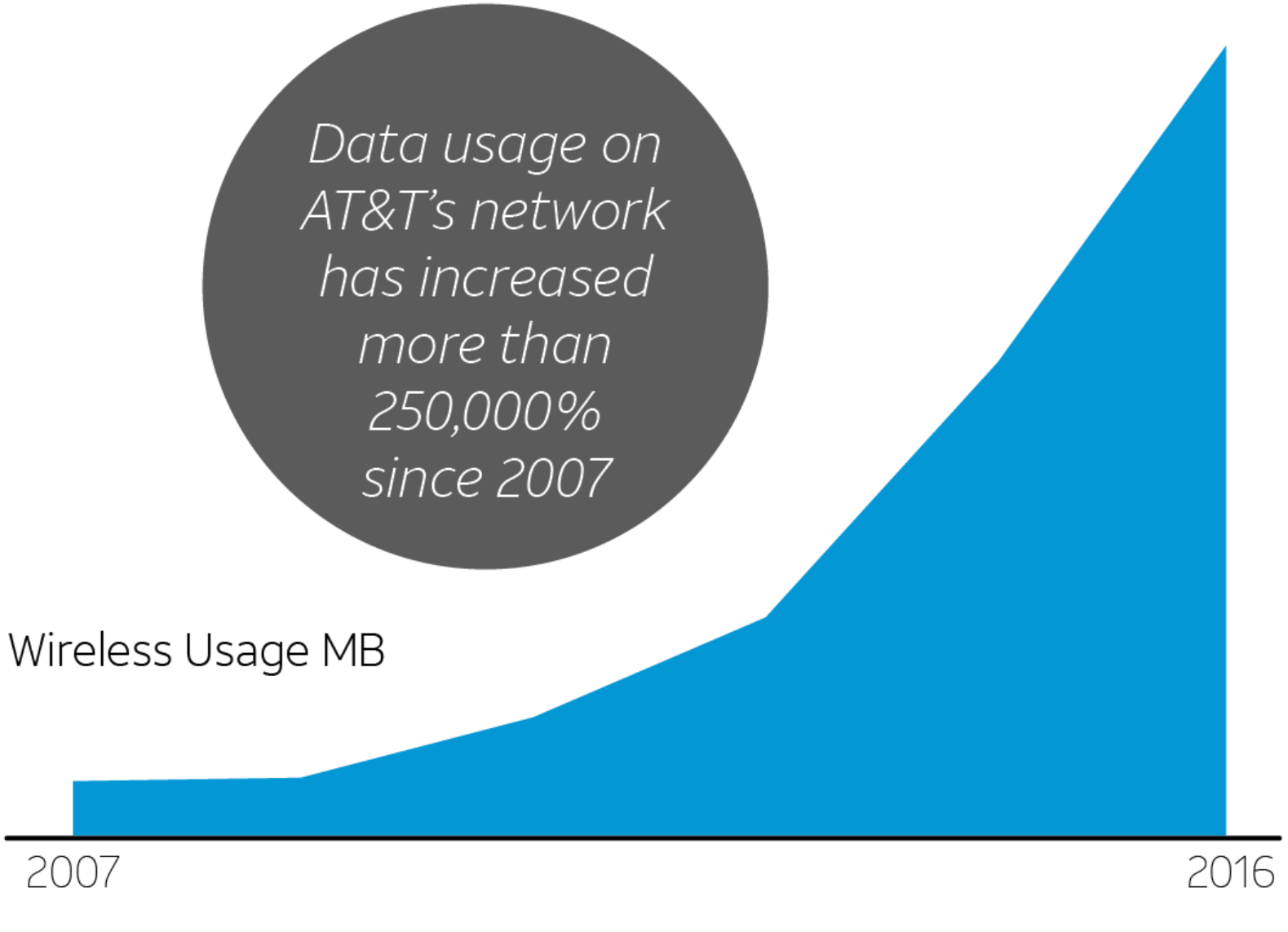
More than $580 million invested by AT&T in its best-in-class wired and wireless networks in Washington from 2013-2015.

More than 3300 employees working in Colorado as of December 31, 2016.

More than $3.4 million contributed by AT&T, the AT&T Foundation and our employees from 2013 - 2015 through giving programs in Colorado.

Why small cells?

What the demand looks like on AT&T's network:



Different types of cell sites

Macro Cells

The more "traditional" cells that you see atop free standing towers, buildings, water tanks

Coverage radius measured in miles – cover the most people over a large area

Small Cells

Flexible network solutions – like mini-macro cell site – that can be readily deployed to specific locations

Provide enhanced voice and data services by helping bolster network capacity in more specific places

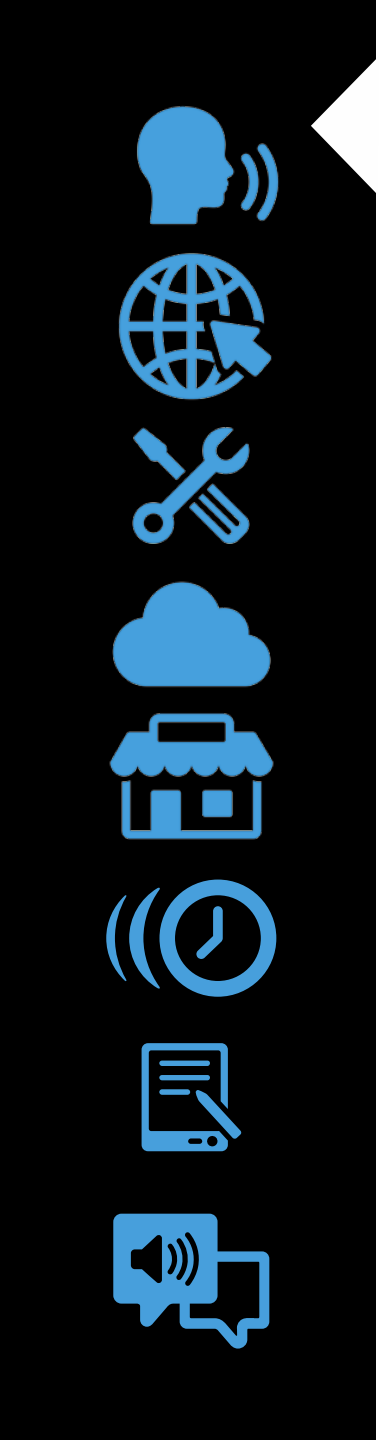
Distributed Antenna System

Alternative solution that provides coverage over specific, high-use target areas.

Typically used for high-use areas like arenas, stadiums, convention centers

Wi-Fi Hot Zones

Deliver high speed internet access, mainly for outdoor coverage.



Why Small Cells?

A new network architecture is needed

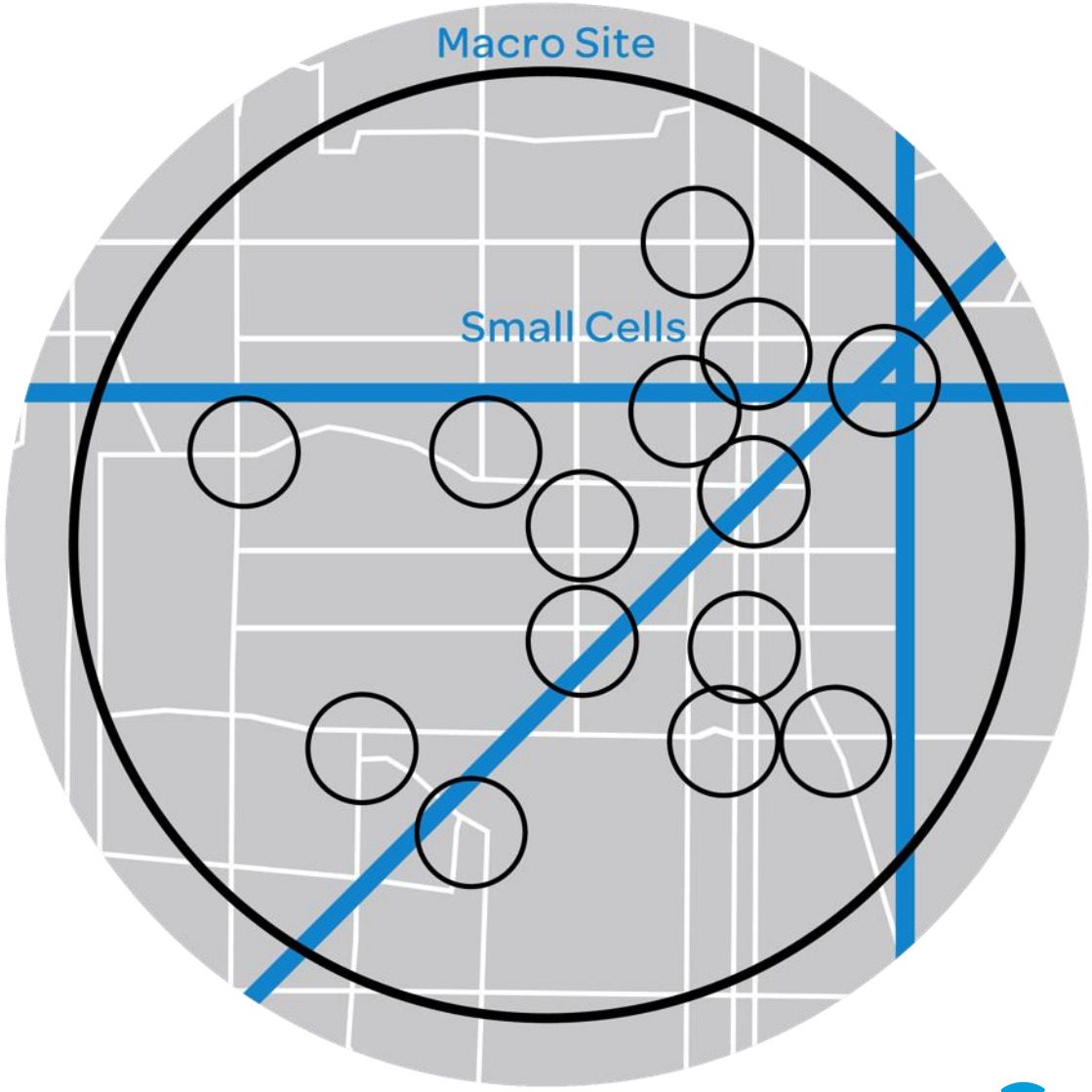
There are generally three ways to increase capacity in the network:

- License more spectrum from the FCC.
- Upgrade existing cell sites to use new technology.
- Build more cell sites.

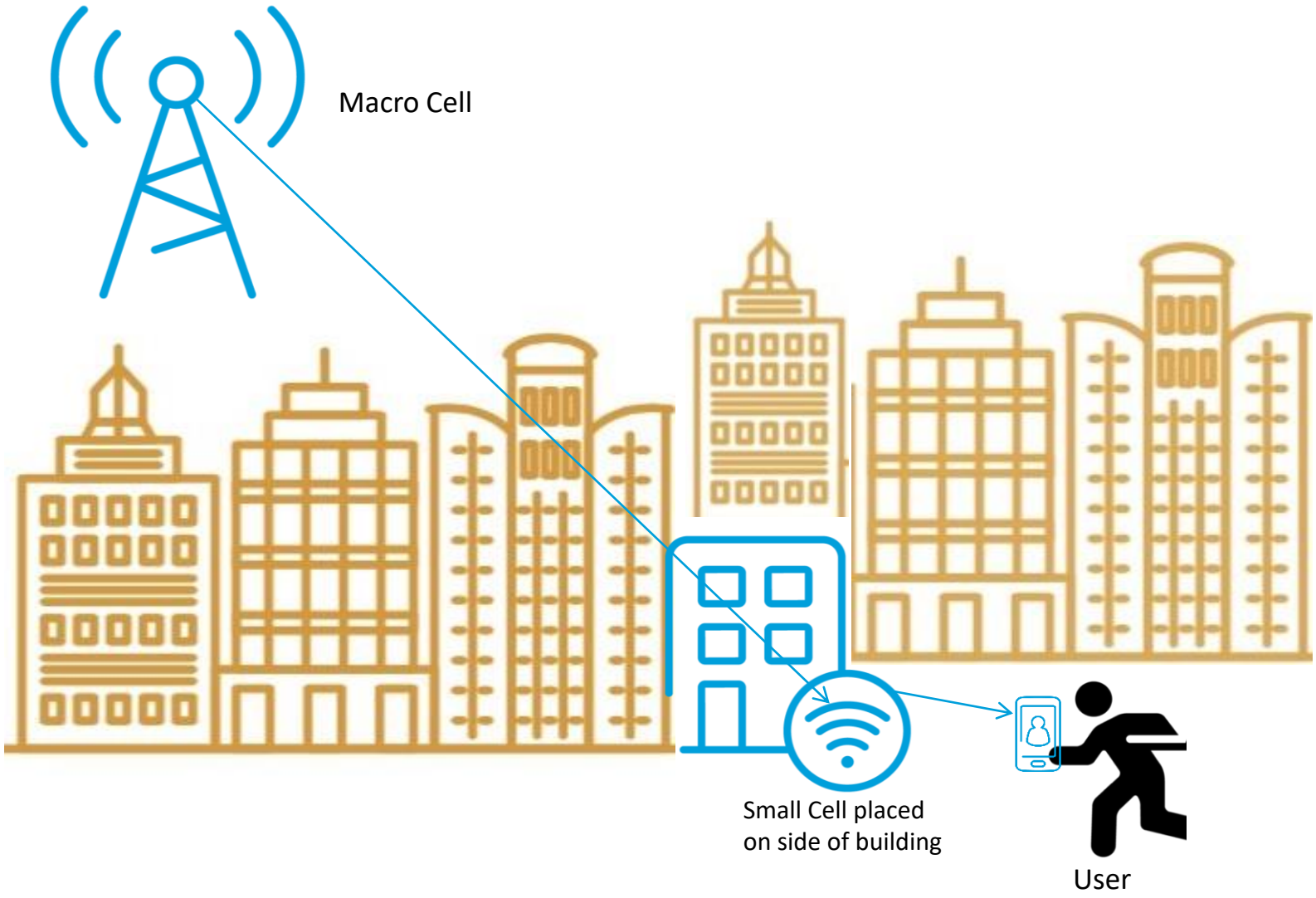
Small cells are flexible network solutions that can be readily deployed to specific locations, including:

- Where customers are prone to experience connectivity issues
- Heavily populated areas that need more network capacity
- Areas that can’t effectively be served by a traditional macro cell

Small cells can densify our network to meet customer demand



Small cells help to bring the network “closer” to its users to deliver increased data capacity, faster connectivity speeds and an overall better wireless experience.



Small cells and future technologies

This allows us to provide a better LTE experience today while also allowing us to prepare for the technologies of the future…

...such as **5G**, **smart cities** and new developments in the **Internet of Things** (IoT).

What is a small cell?

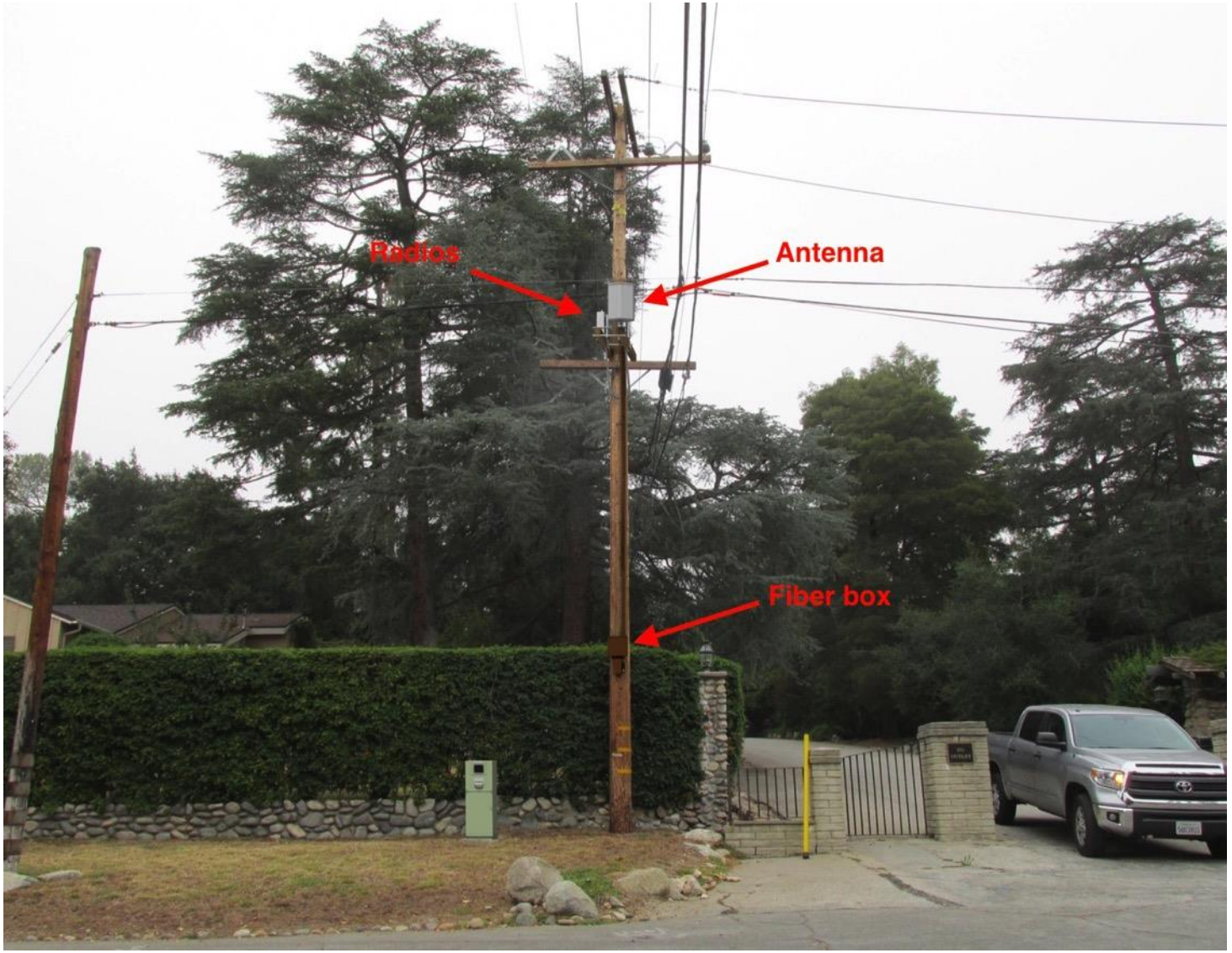
Small cells are **precisely targeted** solutions and can cover up to 1500 feet.

- They provide enhanced voice and data services to allow **faster downloads** and **improved call quality** within its coverage area.

Examples of small cells in different environments…

Example small cell configurations, actual small cells may differ.

Example small cell photo-simulation, actual design may differ.



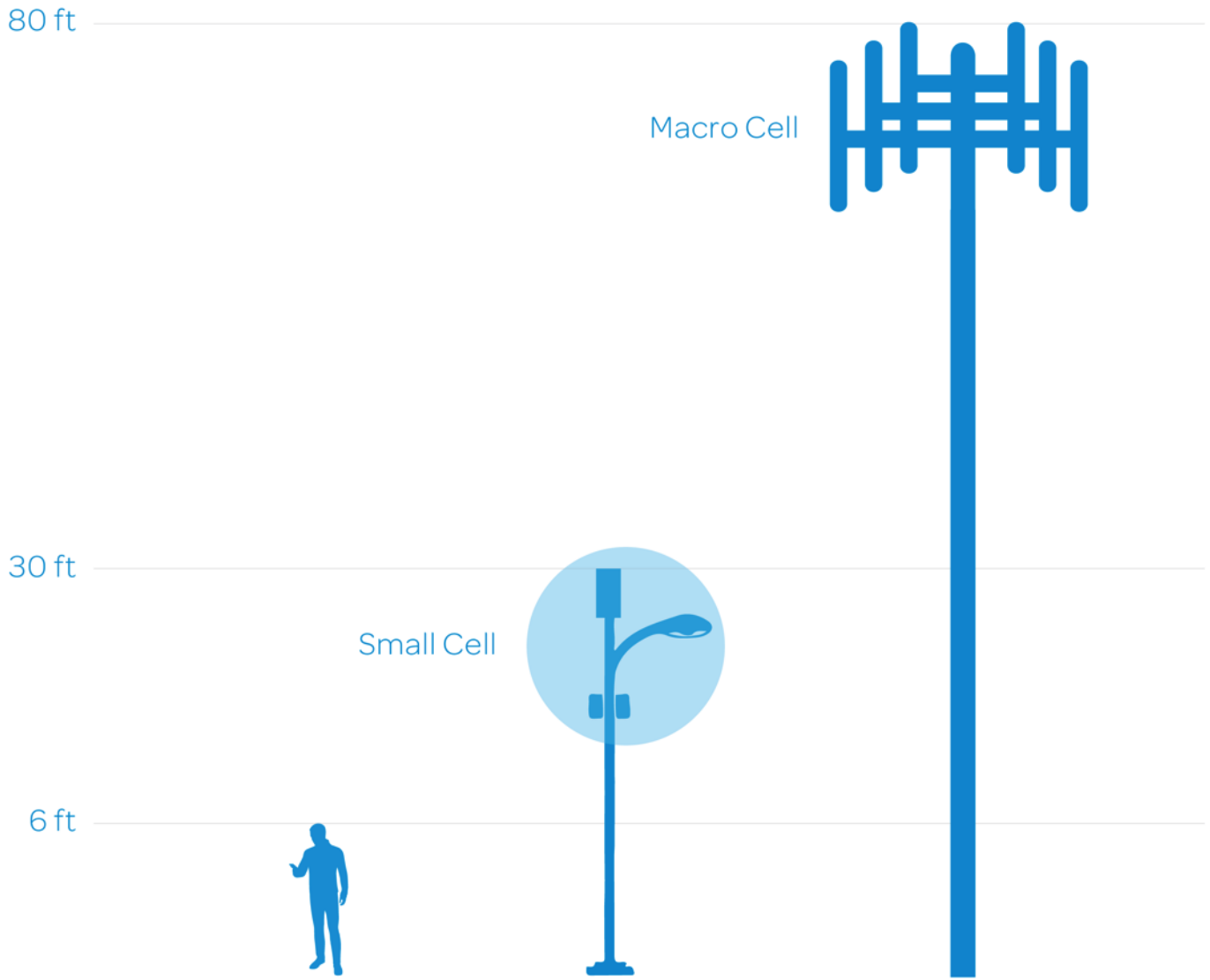
Example small cell photo-simulation, actual design may differ.

Policy considerations

We recommend:

- ✓A batch process for small cell networks
- ✓A streamlined siting process for small cells
- ✓Colorado legislation paving the way

Different technology, different process



This slide depicts a graphical representation of small cells and macro cells. The actual equipment, size and design may vary.

…For small cell networks … a single local government ENTITY … shall allow the applicant … to file a consolidated application and receive a single permit for the small cell network instead of filing separate applications for each individual small cell facility..

Small cells are helping us keep up with rising consumer and business demand and prepare our network for the future.