Babilon Mobile
Baicells Case Study

Overview

The sparsely populated and mountainous country of Tajikistan is landlocked in central Asia and contains an estimated population of 9.5 million peoples spread across 143,100 square kilometers. The country is mostly occupied by rural residents with roughly a quarter of the population residing in urban areas. Tajikistan's natural topography, combined with the rural population, has challenged the country to provide its citizens with widespread, available Internet access.

In 2003, Babilon-Mobile launched a national 3G network under a license issued by the Ministry of Communications of Tajikistan. For the past 18 years, Babilon-Mobile has running its GSM/UMTS/HSDPA network, but when the company looked to upgrade this network to begin offering high-speed internet services it was determined that they would need a full end-to-end solution that could be quickly setup and easy to maintain.

Overview - Cont

Babilon-Mobile began hunting for LTE and 5G solutions to usher Tajikistan into the era of modern connectivity. Ultimately, the company settled on Baicells Nova249 operating in Band B3 to deliver LTE to Tajikistan's residents while continuing to develop the infrastructure to support a full 5G network deployment.

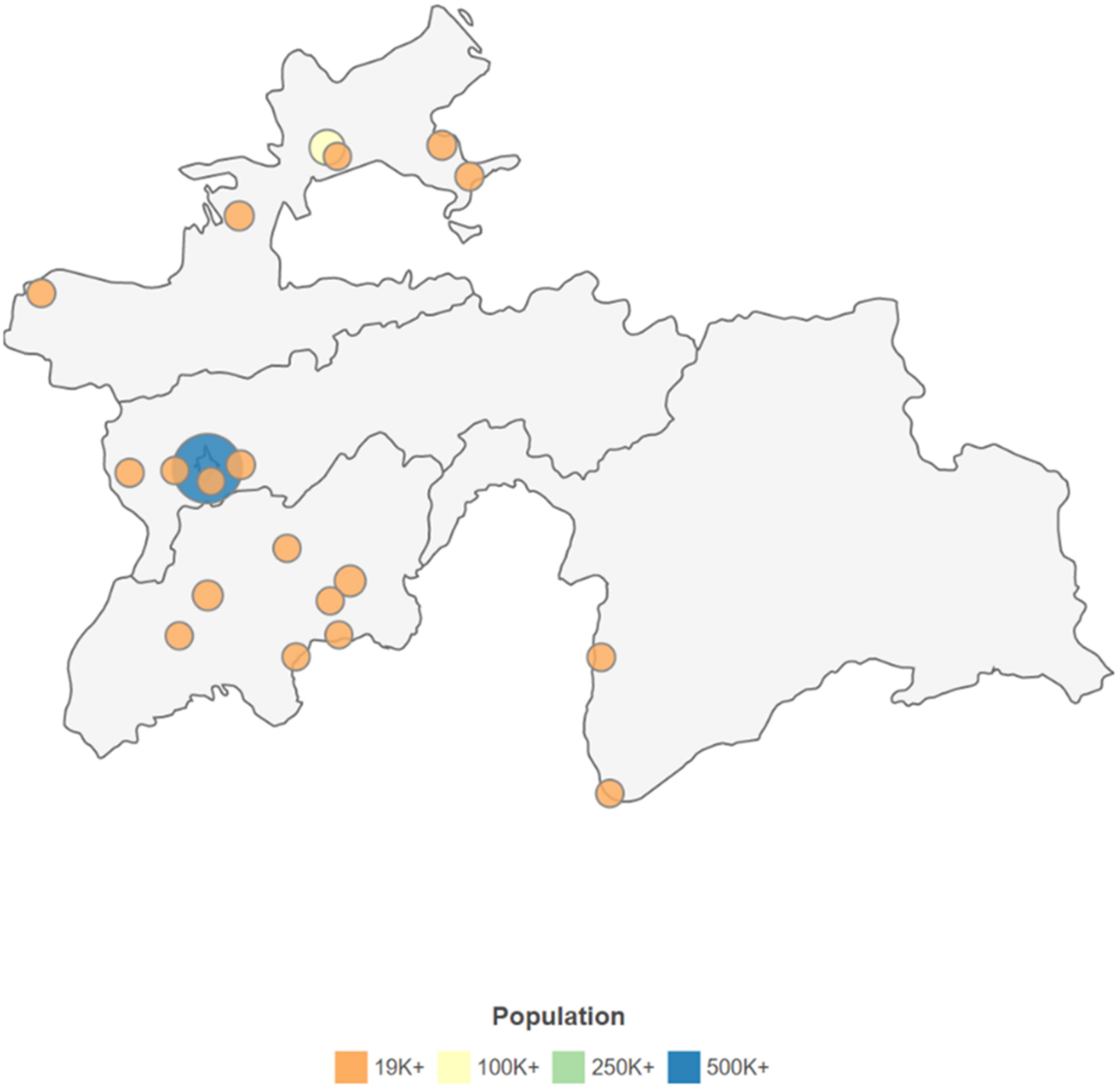


Figure 1: Tajikistan Population Density Map -

https://worldpopulationreview.com/countries/tajikistan-population

The Problem

The wide-spread population and terrain of Tajikistan contribute significantly to the lack of internet connectivity across the country. In 2009, it was estimated that only 9% of the population had access to a reliable internet connection. By 2020 that number had increased to roughly 22%. As of 2022, the percentage of the population that has internet stands at 40%. Clearly, gains are being made but there is still an overwhelming majority of the population that is left without internet access. With most residents residing in rural areas, there needed to be significant increases placed towards improving the infrastructure to make it possible to connect more citizens to the internet.

Babilon-Mobile originally leveraged 3G solutions when it began building internet infrastructure in 2003. As the world began to shift to 4G technologies, Tajikistan was left in the past and is catching up on the technology.

Ultimately, the problem Babilon-Mobile has encountered in connecting the Tajikistan people has shown itself to be threefold. First, the population location and geography require Babilon-Mobile utilize a wireless solution to connect the citizens of Tajikistan. Second, rising prices of hardware slowed the development of the wireless infrastructure needed to provide internet connectivity. Third, licensed solutions would greatly expand the cost of the wireless network. Baicells offered a license free solution that made it easy for Babilon-Mobile to quickly connect their customers and know the exact cost of deploying the network.

The Solution

Babilon-Mobile choose Baicells LTE because the solution had a low total cost of ownership, was supported by world-renowned partners, and had the strong support of Baicells staff. Baicells Nova249 gave Babilon-Mobile the ability to rapidly increase its wireless infrastructure due to the hardware's high-efficiency setup that can be quickly and easily deployed. Today, Babilon-Mobile covers seven cities on its Baicells network, and this number continues to grow.

In addition, Baicells can build custom solutions for organizations depending on their deployment scenarios. Babilon-Mobile is deploying across both urban and rural environments, so working with a vendor that can design, develop, and deliver a variety of small cells was influential when determining which LTE and 5G hardware vendor to select for the Tajikistan deployment. Baicells products range from femto to macro cells, with a common design theme focused on being quick and easy to setup, install, and maintain. With this plug-and-play design philosophy, along with the ability to provide custom solutions for different environments, Baicells became an easy choice.

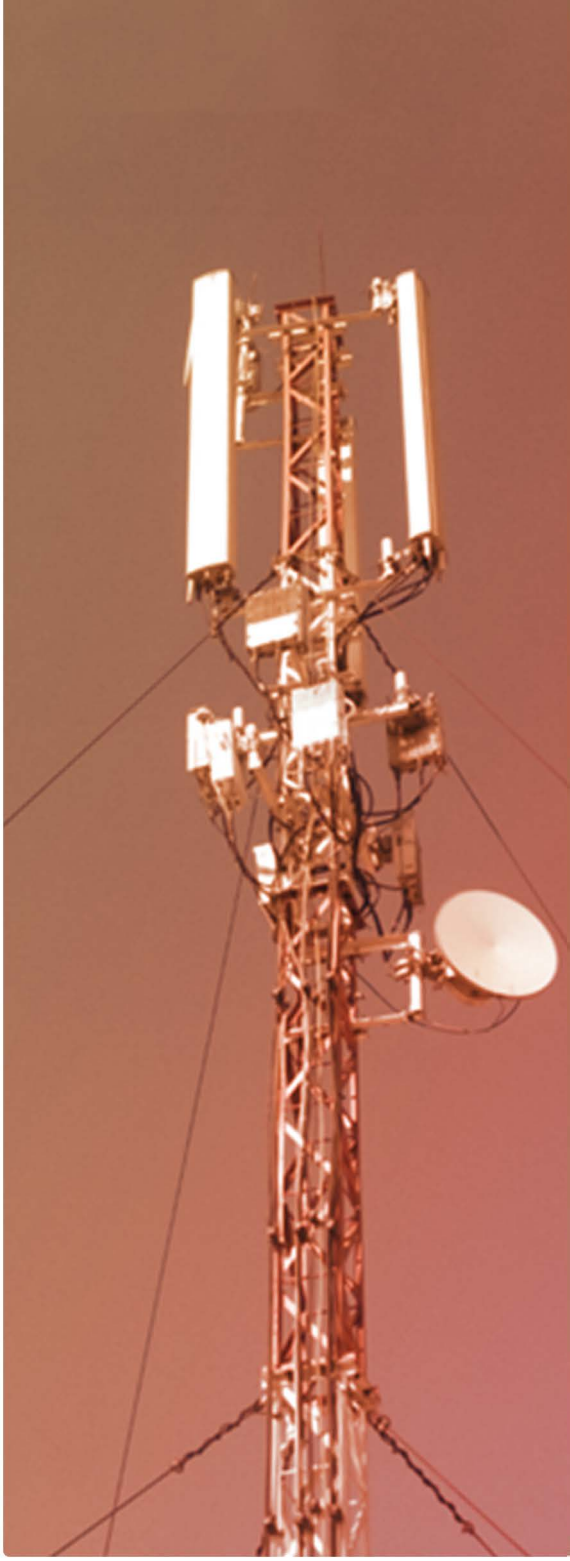


Figure 2: *Nova249 installed on a tower*

Babilon-Mobile selected the Nova249 as its primary hardware piece because it could be easily installed, it supported a various backhaul solutions, it had an incredibly low-cost, and came equipped with an innovative HaloD feature.

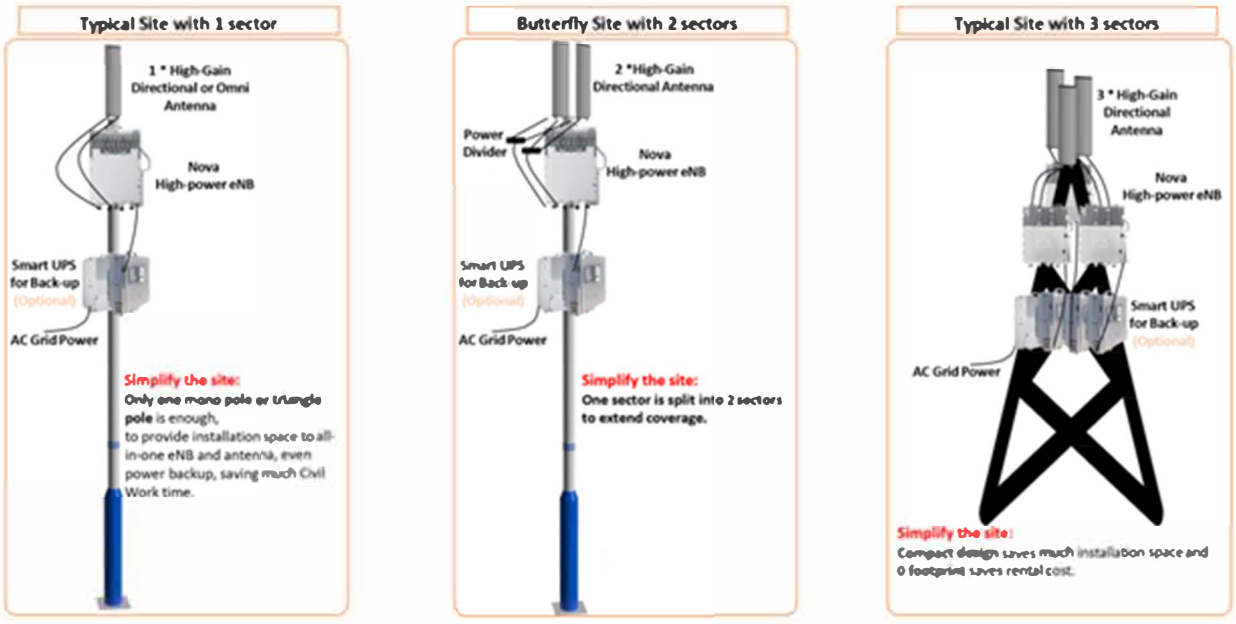
HaloD is a unique optional feature of Baicells FDD eNB's that can chain three base stations to operate as a single radio to drastically increase the performance of the base station. When HaloD is enabled, the OMC and EPC recognize all three base stations as a single cell. This single cell only requires one IP address to be associated with the backhaul network, and the entire site only requires a single backhaul cable.

HaloD can help simplify deployments by reducing the materials required per site, while empowering the site to fulfill the needs of the end-users.

From box to tower, Babilon-Mobile was able to install a Nova249 within a three-day window. The first day the organization would perform a site survey, the next day they were able to install and commission the eNB, and on the third day Babilon-Mobile was able to complete a full day test to determine the base station's viability. All this was possible due to the base station's integrated baseband unit (BBU) and remote radio unit (RRU). These elements eliminated the need to setup the equipment in a lab while keeping the equipment incredibly compact to minimize tower real estate. From setup to installation, the Nova249 reduced the setup time of network hardware by an estimated 60-80% per unit.

Babilon-Mobile didn't have to look far to find a backhaul solution for the Nova249. This base station can use backhauls from public broadband, IPRAN, PTN, GPON, microwave, and satellite. The versatility of the Nova249 allows Babilon-Mobile to deploy the radio on nearly any deployment scenario. This ability made it easier to install the base station and further cut down on potential operational costs.

The Nova249 was typically installed in three different configurations, dependent on needs of the end-users. The first configuration included a single mono pole, with a base station and one high-gain directional or omni antenna. These deployments were quick to setup to provide internet service in a limited area when reaching limited users. The second configuration was a butterfly site that contained two high-gain directional antennas with a single base station. This deployment split the Nova249 into two sectors to provide extended coverage to end-users without greatly increasing the cost of the installation. The final configuration contained three base stations, each attached to a high-gain directional antenna. This provided the greatest capacity and throughput but the compact design of the base stations enabled Babilon-Mobile to save money on tower real estate.



Last, but not least, the Babilon-Mobile network is able to track and maintain the Baicells network through the Baicells operator management console (OMC). This web-based GUI can be easily accessed to give network administrators the ability to monitor each element of the network and provide alarms and performance report to ensure the network is operating at peak efficiency.

The Conclusion

Babilon-Mobile is tackling an enormous task. The organization is evolving the existing GSM/UMTS/HSDPA network and connecting a largely unconnected, rural population through LTE technology. When the original network's hardware was determined to be too expensive to build the wireless network, Babilon-Mobile turned to Baicells to maximize the network's ROI and speed of adoption.

To grow the 4G network, Baicells Nova249 was selected. The Nova249 was determined to be cost-effective, supported by Qualcomm Ventures, and could be deployed in a variety of different scenarios to maximize the products efficiency. The radio could be installed incredibly quickly and generally cut deployment costs up to 80% per site.

Lastly, since Baicells offers a full end-to-end network solution, the Baicells network came fully equipped with an OMC so Babilon-Mobile could efficiently manage and maintain the LTE network that was built. The OMC allowed the company to connect customers in seven different cities to the network, effectively growing the population that had access to reliable, high-speed internet.

For more information about Baicells products, visit baicells.com.