

The United States has seen an uneven adoption of broadband, by any socioeconomic measure, especially in rural areas. Without access to reliable high-speed broadband service, it is more difficult to: keep pace with the increasing knowledge base; provide high-quality learning environments; improve competition in global markets; and provide cost-effective medical, healthcare, or emergency services. These shortcomings are particularly critical for rural areas, and are mainly due to technology deployment costs and high customer/user subscription costs.

Both wired services, and current 2G/3G wireless networks cannot fill many broadband needs for unserved and underserved communities due to their lack of sustainable high broadband rates imposed by legacy design and bandwidth restrictions of existing spectrum. Therefore, a need exists to expand and enhance wireless broadband services with 4G networks that take into account broader subscription demographics in socioeconomic terms.

In order to provide data transfer rates required by today's applications, wireless communication must deliver a comprehensive solution where voice, data, and multimedia are provided "anytime, anywhere" at much higher data rates and sensible costs. The overarching goals for 4G wireless broadband includes increased capacity per base station, higher data rates (up to 100 Mbps for mobility), and lower costs.

Sustainable and ubiquitous wireless at broadband target rates of greater than 100 Mbps are very dependent on receiver design at the base station and end user device. Current low cost receiver technologies are adequate for performance under unchallenging environments and advanced receivers, requiring multiple antennas, provide improved performance but at a much higher cost.

Acorn has developed a new patented receiver that significantly reduces the cost of a device while enhancing its efficiency. This technology was developed over six years and involves highly innovative mathematical breakthroughs. It is available to provide an effective and efficient wireless broadband solution that leverages existing infrastructure and emerging 4G wireless technology. Third party studies show that Acorn's technology can boost broadband spectrum efficiency by as much as 80%.

This proposal outlines innovative technical and business approaches (in terms of execution and engagement with communities) that will help advance the technology, create jobs, and enhance and enable access to broadband in unserved and underserved areas. The innovative approaches provide a sustainable basis to improve broadband access by public safety agencies, and economically expand the broadband infrastructure into rural areas. BTOP funding will provide the opportunity to create a sustainable program for the development, and distribution of a technology that will increase broadband demand, stimulate economic growth, and help achieve the goals for wireless broadband with far greater equality among socio-economic communities.

Acorn proposes to utilize BTOP funding to complete development and initial production of advanced wireless receivers that will meet the broader needs of broadband subscribers through wireless networks. Acorn will implement an innovative and sustainable program to provide up to one free or low cost receiver to an "in-need" end user for every five receivers sold. Additionally, Acorn will implement an outreach program designed to provide broadband equipment, education, awareness, training, and support to community institutions, job-creating strategic facilities, and vulnerable populations.

As part of the effort to equalize socioeconomic adoption for “in-need” end users, Acorn will form partnerships with public and private organizations that have established relationships with end users in unserved and underserved communities. We believe this is an effective way to place broadband in communities where it is needed the most. This grass roots effort should help remove barriers to adoption of broadband, especially among vulnerable populations, that result in an innovative and persuasive solution to enable and encourage adoption and use.

The goal is to create an innovative and sustainable program that can reach communities throughout the US and create a private-public relationship that can serve as a test-bed or proof of concept for sustainable, viable, and scalable projects.

The Acorn program will target rural communities nationwide, but applies equally to urban and international communities that desire cost-efficient broadband.

Acorn has a team of highly experienced engineers and business executives that will lead the overall program. These individuals have delivered high technology products to the wireless market, and have a proven track record of identifying critical needs and effective design solutions. Acorn’s core team has a combined, directly related experience of over 100 years. Acorn’s patent protected inventions have their genesis in applying advanced receiver techniques to 2G networks by USC Professor, Jason-fellow, and Acorn co-founder Al Despain. Since 2005, Acorn has evolved the original Despain work to highly complex 4G wireless standards in coordination with UCLA’s Professor Ali Sayed (Chair of Elec. Engineering) and UCSD Professor James Zeidler.

Acorn envisions the creation of more than 45 jobs directly related to design, manufacturing, sales, and distribution of the advanced wireless receiver. Through outreach, awareness, training, and new adoption of 4G broadband, we estimate that Acorn will more than 100 jobs related to new use of broadband within the first two years of operations, and thousands over the program lifetime.

Acorn estimates the cost of the project to be approximately [REDACTED] with nearly 50% contribution by Acorn and income generated by the project. This includes all costs associated with development, operations, sales, marketing and outreach.