Microsoft Airband Initiative

August 2017

Microsoft

Microsoft Mission
Empower every person and every organization on the planet to achieve more.

Satya Nadella

Major Challenges & Opportunities for Impact

Internet Access	Energy Access
49% of the world is offline.	1.3 billion people worldwide lack access to electricity.

People without access to the internet and power simply won't take part in the digital economy.

Microsoft Airband Initiative Overview

Mission

Our partnership-based model delivers products, solutions, and business models designed to enable billions more customers to affordably get online and access online applications and services.

Objectives

Develop a pipeline of new partnerships and projects to incubate new approaches

Commercialize, grow, and scale existing engagements

Develop affordable Internet access, energy access, and other enabling ecosystems

Areas of Focus

Internet Access

Energy Access

How

Commercial Partnerships
- International
- Rural America
- Hardware innovation

Grant Fund
- Annual grant awards primarily in Africa

Focus on Key Enabling Verticals
- Education
- Healthcare
- Agriculture

Our Portfolio: 40+ Active Projects

Current Project Countries (~24)

Map markers:
- Washington
- Maine
- New York
- Michigan
- Virginia
- California
- Kansas
- Georgia
- Jamaica
- Haiti
- Colombia
- Argentina
- Ghana
- Nigeria
- Rwanda
- Uganda
- Kenya
- DRC
- Tanzania
- Zambia
- Malawi
- Namibia
- Botswana
- South Africa
- Pakistan
- Nepal
- Maharashtra
- Andhra Pradesh
- Karnataka
- Taiwan
- Philippines
- Indonesia

Internet Access				Energy Access	
4.1M Population Under Coverage	200K Monthly Active Users	210 K-12 Schools Connected	85K K-12 Students Connected	6 Azure IoT & AI Lab Residencies	500,000 Azure Clean Energy Connections

The Problem

US broadband access by county
(Average percentage)

- 0% - 32%
- 33% - 66%
- 67% - 100%
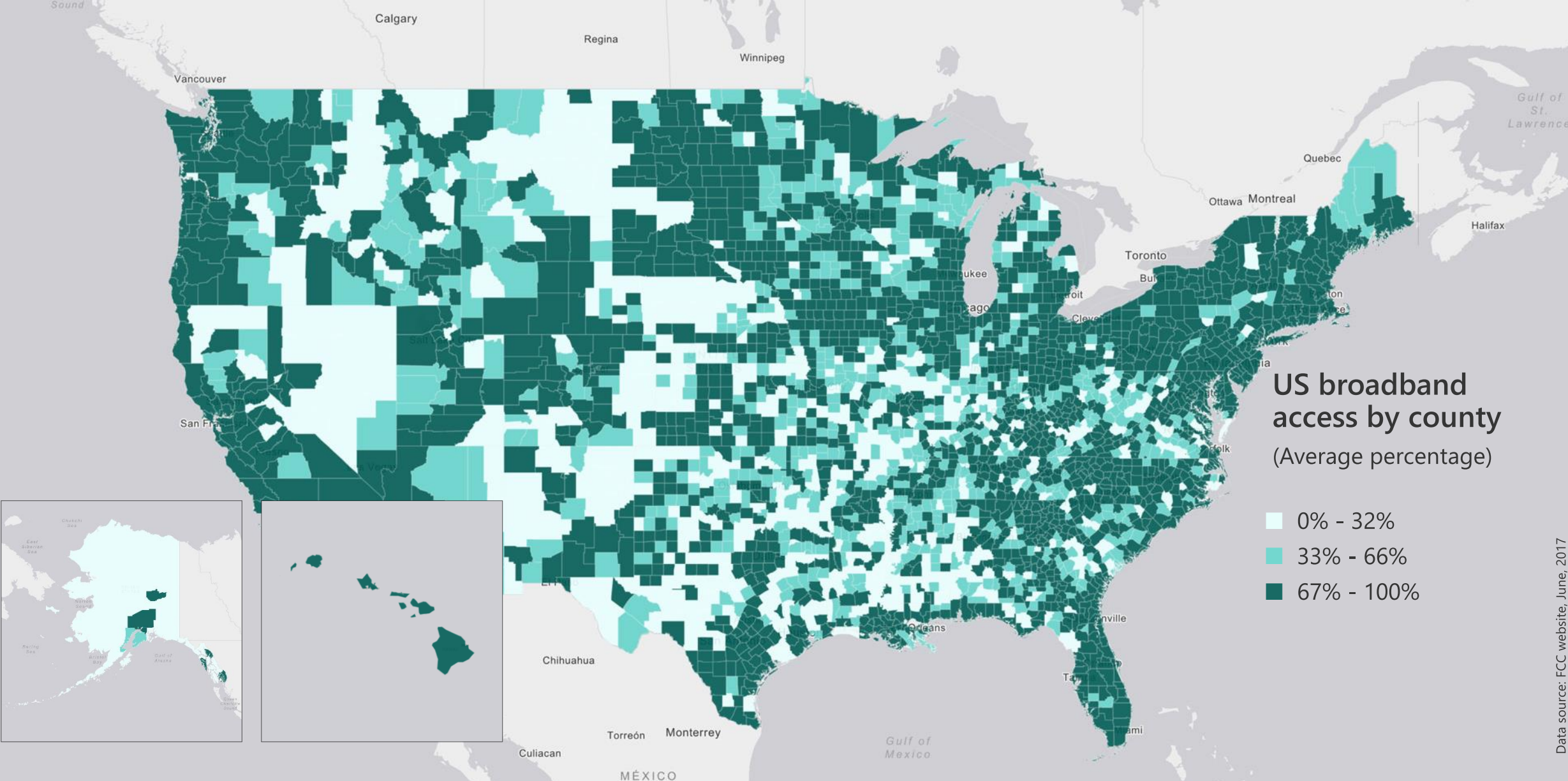
The Goal and Strategy

- To **connect the 23.4 million people living in rural America** that do not have access to broadband connectivity **by July 4, 2022**

- Microsoft will invest in **projects, partnerships and programs** that connect **2 million by 2022**

- Achieved through combined:

  - **Private sector capital investments** focused on expanding broadband coverage through new technologies; and

  - Targeted and **affordable public-sector support.**

- Approach is a **mixture of technologies** for rural communities - TV white spaces, satellite and fixed wireless and fiber

- **TV white spaces will provide the best approach to reach the 80%** of this underserved rural population

Why this? Why now?

- **Inclusive Thinking:** need to be more inclusive of and attentive to needs of all Americans

  "It's fair to say the election raised our level of consciousness, as it did for a great many people in the country. It certainly caused us to reflect on the fact that we had been pursuing these projects to a greater degree in rural Africa than rural America...." Brad Smith

- **Stalled Progress:** despite the disparity, progress to close the broadband gap has plateaued

- **Four inhibitors:** 1) high costs for last mile investments; 2) absence of new and alternative technologies; 3) regulatory uncertainty; and 4) market conditions

- **What's Changed:** last few years have seen: 1) advancements in technology; 2) newly adopted standards; 3) business model innovations; & 4) growing demand for cloud services.

- **New Research:** BCG study suggests that a combination of technologies can substantially reduce the total cost by ~80% v fiber alone ~50% v fixed wireless

- **Our mission & business:** cloud services are making broadband a necessity to start and grow a small business and take advantage of advances in agriculture, telemedicine & education.

Microsoft Airband Initiative

Microsoft will invest and serve as a catalyst for broader market adoption through:

1. **Direct projects** with telecommunications operators to bring broadband coverage to 2 million people over 5 years, including having 12 projects in 12 states over the next 12 months;

2. **New partnerships** to help deliver digital skills training in rural communities and advance the use of cloud services. Under this pillar we announced a new multi-year/multi-million partnership with America's largest youth development organization, 4-H; and

3. **Stimulate investments by other private-public organizations** through a technology licensing program that provides royalty-free access to at least 39 patents and sample source code related to technology we've developed to better enable broadband connectivity through the use of TV white spaces spectrum in rural areas.

What's Next?
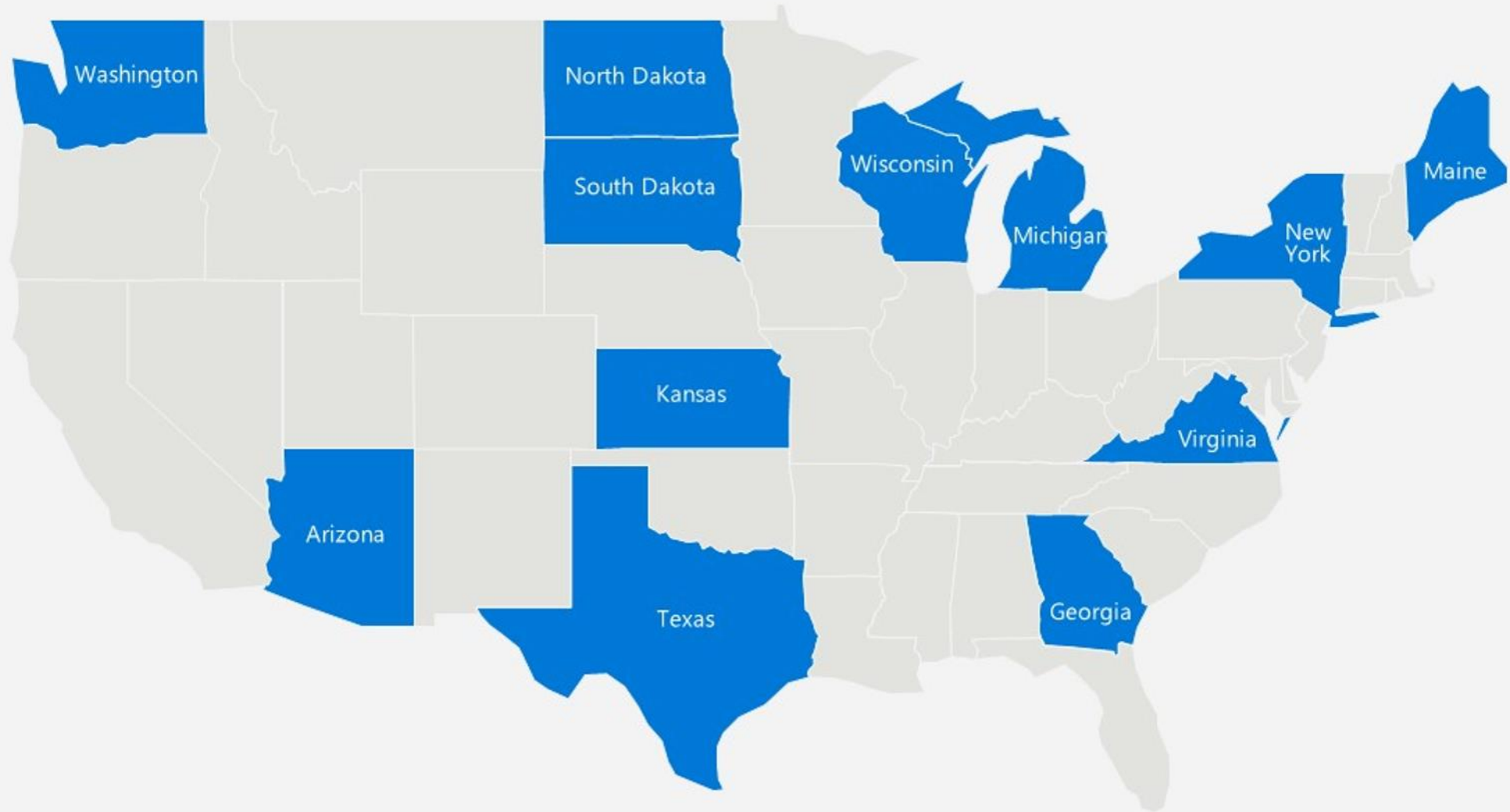
Hillman, MI

Mr. Dave Post (A village manager and chairman of Hillman community radio)

He is the first TVWS customer to get the service in Hillman, MI. He was getting speed less than 2Mbps DL with his current service. With the new TVWS installation, he is getting 20Mbps DL and 20Mbps UL. He is very satisfied with the service and plans to work from home with his new internet connection. He plans to prepare more material using his new internet connection for Hillman community radio.

Scott City, KS

Mr. Erik Wiechman

The first deployment in Scott City, KS. He is a farmer and a student. He was having a lot of challenges downloading educational material and submitting homework assignments on time with his current internet service. After the TVWS deployment he was able to get 15Mbps DL speed. He gave us his feedback the next day describing how satisfied he is with his new connection and how he stayed late that night working and enjoying his fast internet connection.

Almira, WA

First install at Almira, WA. Kari Schuler, the first customer to get the service, was able to get 7.5Mbps DL at 8.3 miles away from Almira site

One solution in the internet connectivity toolkit – TV White Spaces

What is TV white space?

- Unused spectrum such as traditional UHF and VHF broadcast spectrum
- Regulators allow wireless access devices to transmit on these unoccupied channels as long as they do not interfere with TV broadcasters and other licensed users.

Who does it benefit?

Seniors	Librarians	Families
Teachers	Students	Business Owners
Executives	Farmers	Entrepreneurs

How does it work?

- Network operators can cost-effectively deploy wireless networks that deliver fast, reliable, and affordable Internet access in rural and underserved communities
- Leverage schools, libraries, or other anchor institutions with high-capacity connections to extend broadband solutions
- TVWS signals can travel over long distances, and penetrate natural and man-made obstacles to cover entire rural communities
- TVWS signals penetrate through more walls and obstacles, enabling whole home media distribution

TV White Spaces – Key Success Factors: Scalable & replicable

Supportive Regulator
- Forward-thinking, supportive, and credible spectrum regulator willing to enable access to TVWS on terms favorable to investment

ISP Partner
- Motivated, competent, financially secure, and reputable local partner with experience deploying wireless networks and a business model that can sustain a network built at scale

Aligning with Policy Priorities
- Project aligns with government priorities: education, e-government, telemedicine, agriculture, small business enablement, public safety, environmental sustainability, etc.

Commercial Viability
- Service model and an identified location that maximize economic impact and business sustainability encompassing low-cost access, as well as services, devices and relevant applications and content

Co-Funding at the Seed Stage
- Seed money available to help launch a proof-of-concept network, service, and business model

Support from International Organizations
- Donor agencies, lending organizations, and NGOs playing a key role in facilitating inter-governmental collaboration on regulatory and technical issues

Links to further information

Microsoft Airband Initiative Projects

https://www.microsoft.com/en-us/affordable-access-initiative/home

Rural America Broadband Strategy

https://blogs.microsoft.com/on-the-issues/2017/07/10/rural-broadband-strategy-connecting-rural-america-new-opportunities/

TV White Space Technology

http://research.microsoft.com/en-us/projects/spectrum/default.aspx

Dynamic Spectrum Alliance

http://www.dynamicspectrumalliance.org/

Vital Role of the Public Sector

Public sector will play as part of this strategy through three related governmental measures:

1. **Use of Spectrum:** The FCC needs to ensure the continued use of the spectrum needed for this mixed technology model.

2. **Infrastructure Investments:** infrastructure investments should include targeted funds on a matching basis for the capital investments

3. **Data Collection:** improved data collection about rural broadband coverage.