Briefing No. 2

ROANOKE
PLANNING, BUILDING
and DEVELOPMENT

Wireless Telecommunication Facilities Policy Update

April 4, 2016

THE ATLANTIC GROUP
OF COMPANIES, INC.

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Agenda

- Technology and Legislation Changes
- Results
- Future Technology
- Challenges

Technology Changes

- 2004- 2016 – What just happened ?
  - 12 Years.....
  - 3-G to 4-G
    - 80% Voice & 20% Data =3G
    - 80% Data & 20% Voice =4G
  - Market Penetration of Wireless Subscribers
    - Under 30 years of Age = 85%+
    - Over 30 years of Age = 68%+

Technology Changes

- Smart Phones and Tablets
  - Applications based
  - Broadband Speed
  - Data driven
  - Netflix,HULU, etc…
  - Reseller Carriers (Frog Wireless, Track Phones, etc.)

- Television changed from Analog to Digital

- Network "Maturity"

Legislation

Local government Review of Existing WTF's

Section 6409 of the Middle Class Tax Relief and Job Creation Act of 2012

- **Shall not deny, and shall approve, any <u>eligible modification</u> of a legally established facility that does not <u>substantially change</u> its physical dimensions.**

- **Eligible Modification**
  - **Collocation of new transmission equipment; or**
  - **Removal or replacement of existing equipment**

Legislation

Local government Review of Existing WTF's

Section 6409 of the Middle Class Tax Relief and Job Creation Act of 2012

- **Substantial Change**
  - **Increase tower height by more than 10% or 20 vertical feet;**
  - **Require installation of more than standard number of equipment cabinets (over 4) or more than 1 new equipment shelter;**
  - **Increase tower girth by more than 20 feet; or**
  - **Excavate around tower site beyond existing boundaries**

Legislation

Unlicensed Frequency Spectrum

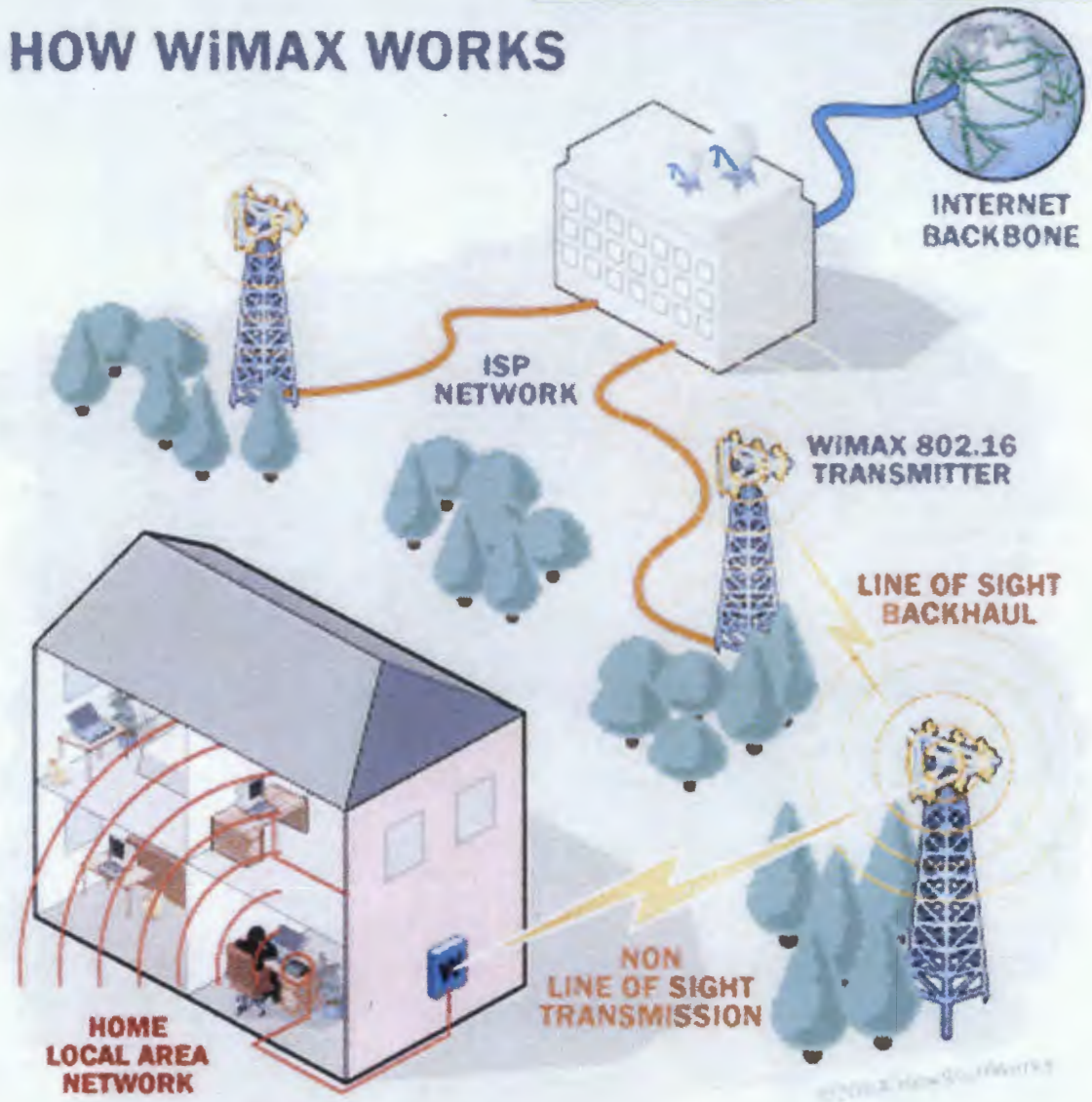
- Art 15 CFR 47 :Unlicensed Wi-Fi Spectrum

  Revise Part 15 rules that permit Unlicensed National Information Infrastructure (U-NII) devices in the 5 GHz band.

  The NPRM would open up 195 MHz of additional spectrum, with the use of spectrum-sharing technologies envisioned as one way to make the spectrum available to private as well as federal entities.

  - 2.4 GHz currently open.

Future


HOW WiMAX WORKS
INTERNET BACKBONE
ISP NETWORK
WiMAX 802.16 TRANSMITTER
LINE OF SIGHT BACKHAUL
NON LINE OF SIGHT TRANSMISSION
HOME LOCAL AREA NETWORK

Legislation

White Space = "White-Fi"

The FCC has adopted rules to allow unlicensed radio transmitters to operate in the broadcast television spectrum when that spectrum in not used by a licensed service.

The unused spectrum is often referred to as "white spaces" and can represent a significant amount of unused spectrum in some areas.

There is pending litigation on usage of these frequencies in Federal Court.

TV White Space:

Enabling connectivity, enhances life, connecting business (eGov Services)

TV White Space (TVWS) for connectivity

TV White Spaces Signals Penetrate More Walls and Obstacles.

- In a typical home, a Wi-Fi signal can penetrate up to two walls. At the same power, a TV white spaces signal can penetrate more walls and obstacles, enabling whole home media distribution.
- This will simplify and enrich in-home/in-building networking opportunities.

Results

- Usage growth has risen by approx. 35%
- Smartphone/Tablet innovation and Deployment
- Applications Usage
  - Commerce
  - Communications
  - Entertainment
  - Functionality

- Wireless Providers Seek quicker Time Lines
- Smaller Site closer to users. (Homes, Business, Recreation)

Results

- Licensed Providers have Federal Requirements
  - NEPA
  - Section 106
  - FAA
  - FCC
- Unlicensed Providers do not have the same requirements.
- "Strategic Partnerships" will be commonplace in the future depending on where the service is located within the network.

Future

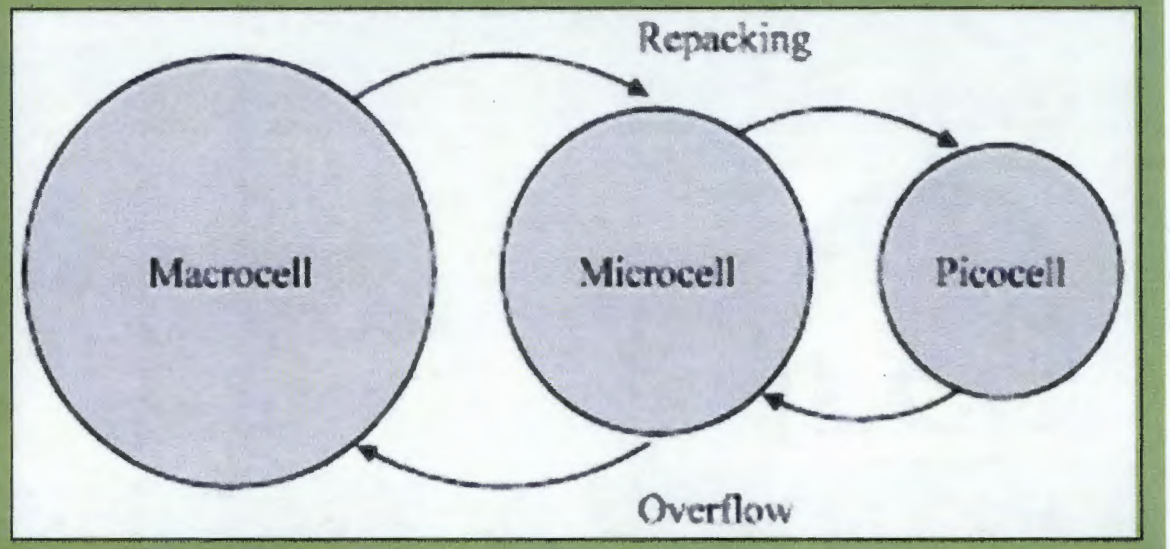
2016 – 2020 – Near Future

- Macrocell integration of Microcell and Minicell/Picocell technologies within the same Provider network.

- Distributive Antenna Systems

"WTF" Hierarchy

Classes of Towers

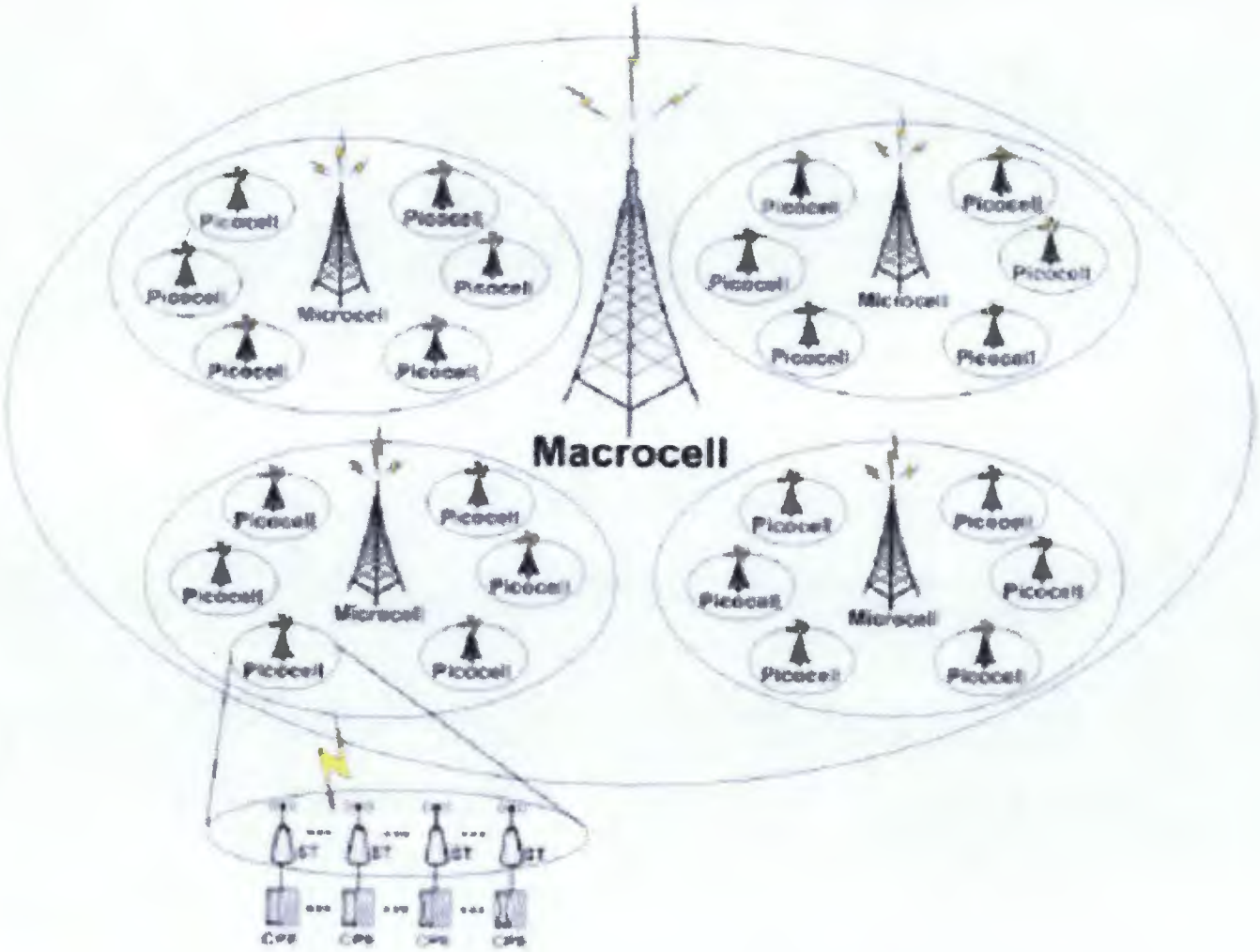


Future

2016 – 2020 – Near Future

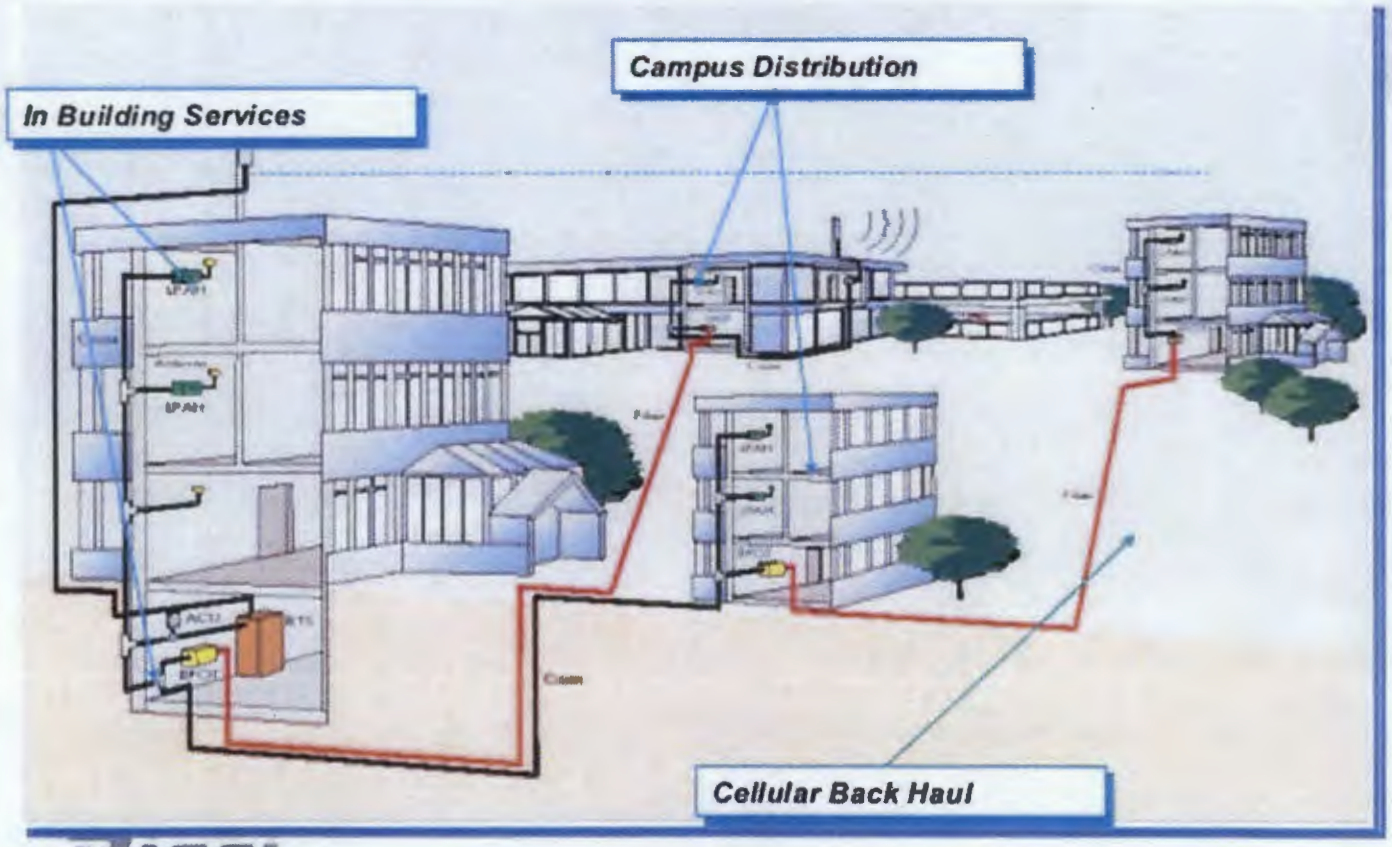
- Shorter distances from the Antenna to the "Device" which results in:
  - More co-locations of WTFs on buildings and structures
  - Shorter Towers
  - Less equipment and antennas
  - Greater "In-Building" penetration

Future



Future

Distributed Antenna Systems



BICSI

Future

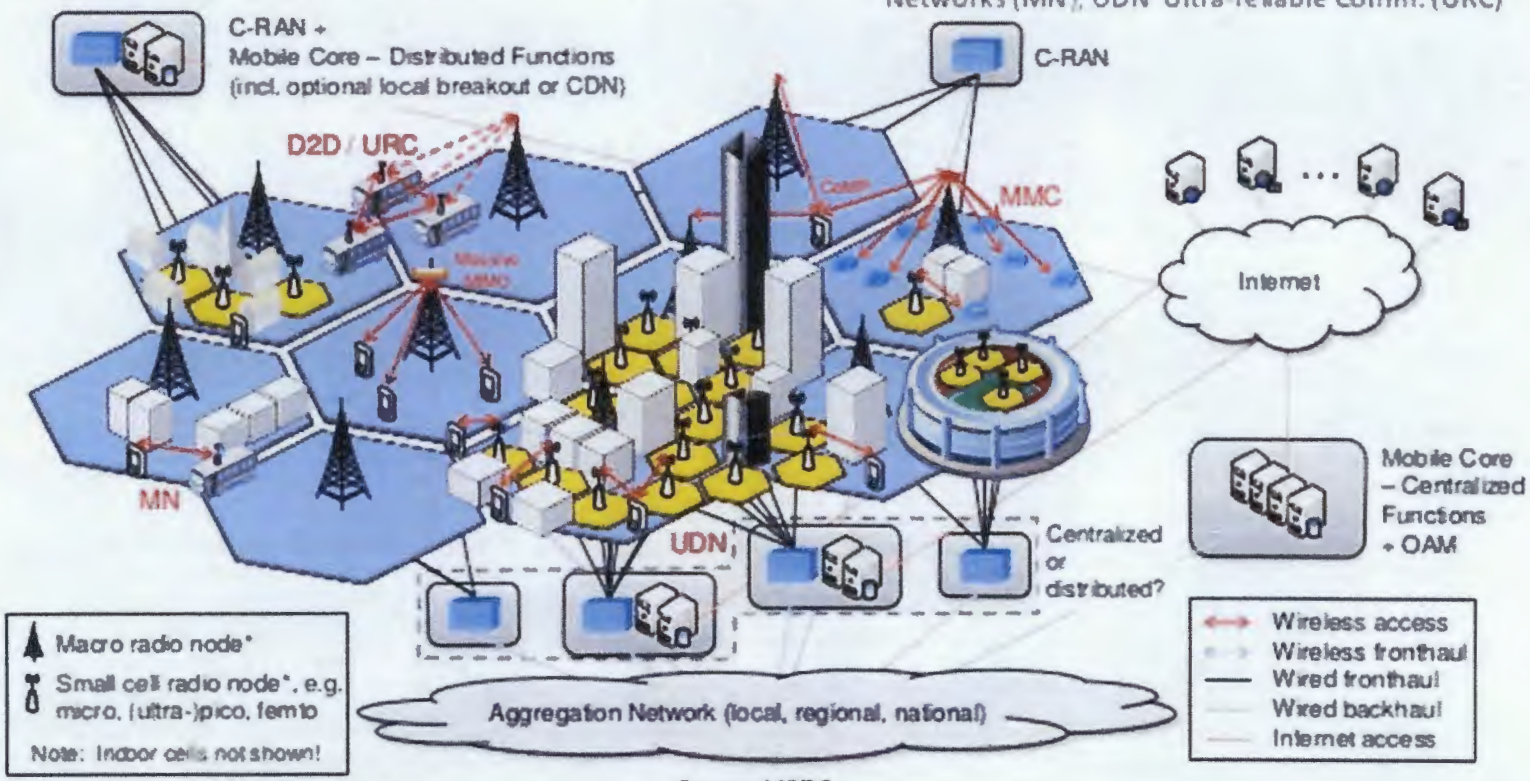
2020 and Beyond – Foreseeable Future

- Hybrid Networks from different/competitive providers.
  - "Last Mile" Network-Customer/Subscriber Provisioning
  - Middle Network – Cell Site Provisioning
  - Backhaul Network- Trunking Provisioning
  - Switching Network – Network Provisioning
  - Global Network – WWW. Provisioning
  - Intelligence Network – Data base/Cloud Storage

- Who will provide what service to what Subscriber? = Strategic Partnerships

5G Architecture (METIS)

- Amazingly Fast scenario
  - high data rates & network capacities
- Ultra-Dense Networks (UDN)
  - ISD about 10 m
  - >= 1 radio nodes per room
- Local break out & Distributed mobile core functions
- Accelerated content delivery
- Tech. Dependent
  - D2D, MMC (Massive Machine Comm.), Moving Networks (MN), UDN Ultra-reliable Comm. (URC)



*Only Remote Radio Units (RRUs) assumed

Source: METIS

Challenges

- Role of City Government ?
  - Citizen demand for services.
  - City, State and Federal requirements as "Gate Keeper".
- Many more local Providers (Unlicensed) .
- Many more Applications.
- Establish regulatory processes that encourage wireless telecommunications facilities that are appropriate for our community.

Next Steps

Develop New Policy

- Public Input Session -Thursday April 7th
  - Drop-in Noon-1:30 and 6pm-7:30
  - Municipal Building, Room 181
- Planning Commission
  - Work Session: April 8th
  - Public Hearing: May 9th
- City Council
  - May 16th

Modify Ordinance

- Draft new wireless telecommunications facility regulations.