



LTE & WiMAX: a Fixed Line Broadband Alternative

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WiMAX & LTE in Rural areas

Population density is critical to bus case
Subscribers expect to Pay a Premium if no other
means of connections

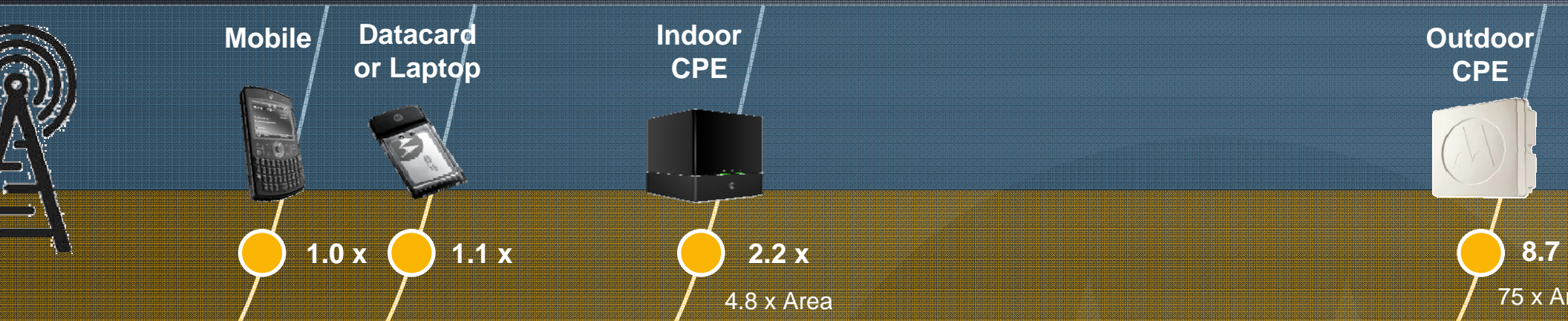
Right combination of Coverage, Capacity & true
broadband User experience is essential for
Economically viable wireless fixed line BB service

LTE & WiMAX: potentially viable technology for addressing “Digital Divide”

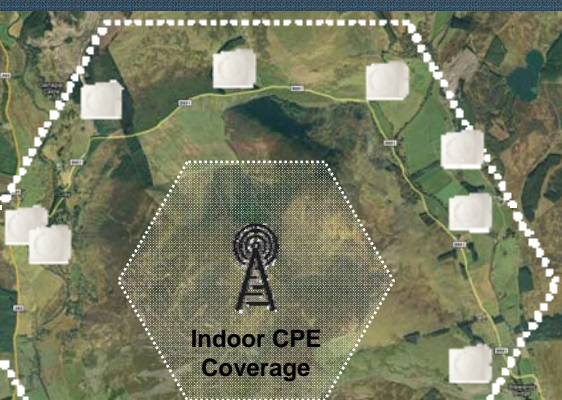
| Different Business Model | USER EXPERIENCE | SPECTRUM FLEXIBILITY | SPECTRUM AVAILABILITY | DEVICE & Silicon |
|---|--------------------------------------|---|--|--|
| Fixed Wireless vs. Mobile Cellular New Revenue Sources | DSL/FLBB like Data rate & Latency | 1.4MHz to 20MHz bandwidth => simplify refarming | Some existing URBAN spectrum unused in rural areas | Early Silicon CPEs/Dongles Vs. Mature Silicon Handsets |

How far into rural can wireless based Broadband service be economically viable?

Device Type Impact



CPE have a significant impact on reach & rural wireless business model



Sparsely populated area

Outdoor CPE for very large coverage

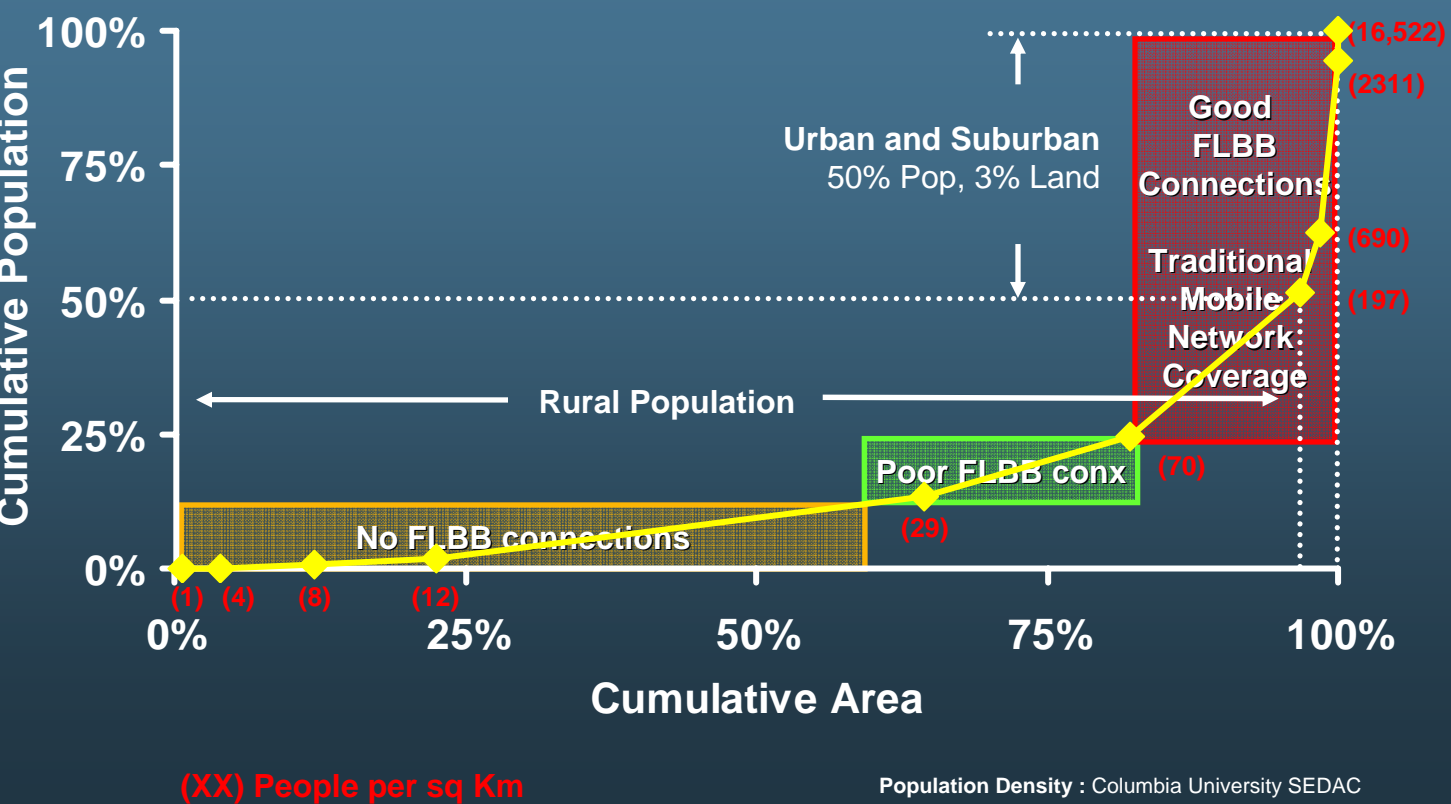
Clustered communities

Cell site optimized for coverage of hamlet

Hybrid design Indoor and Outdoor CPEs: (few outside of coverage)



Market Examination – France & Model Conditions



| | Population | Area |
|----------|------------|-------|
| Total | 65M | 550K |
| Urban | 5.5% | 0.04% |
| Suburban | 43.2% | 3.3% |
| Rural | 51.3% | 96.7% |

| | Fixed |
|---------------|-------------------------|
| ARPU | \$50 |
| Penetration | 20% HHs |
| Avg User Data | 53 kbps with 20x OS |
| Dimensioning | 124 kbps UL >>1 Mbps DL |

Fixed Broadband Market Examination

Positive NPV

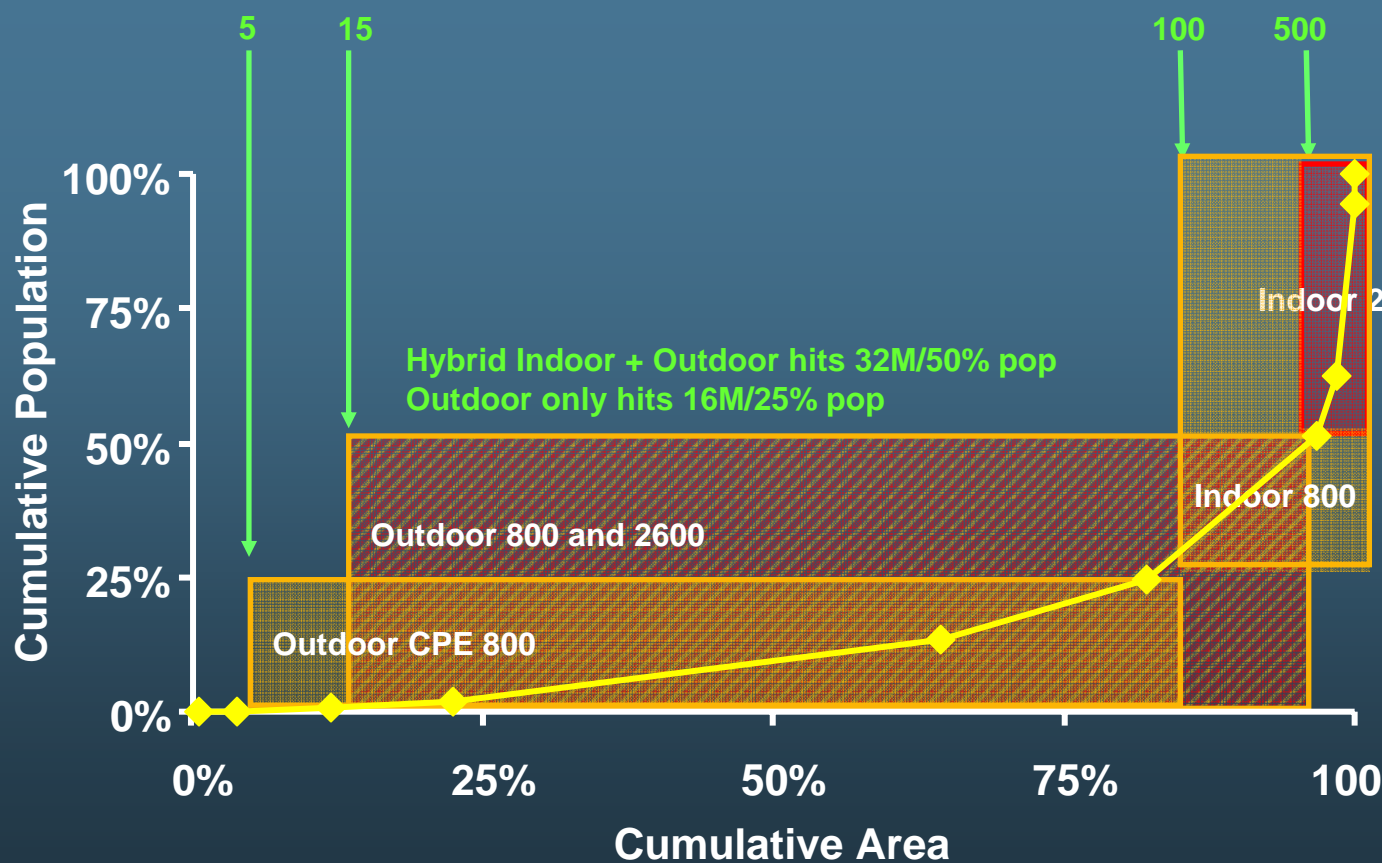


Urban and Suburban

Site Density similar to Mobile Network
 Coverage Avg: 3 - 7 sq/km
 10% of 20% uptake of larger numbers
 800MHz offers 225% "coverage" site
 advantage vs. 2.6GHz
 BUT, 800MHz offers 25% "capacity" site
 advantage vs. 2.6GHz

Rural

Site Density applied to Fixed ONLY
 Coverage Avg = 400-600 sq/km
 Outdoor CPE: limited path loss,
 more power uplink
 800 and 2600 nearly the same at the
 lowest densities



Both LTE 800 and 2600 yields positive NPV deep into Rural Areas



thank you