5G Rural Revenue Opportunities
Agenda

• The Rural 5G Business Model “Layer Cake”
• Broadcast over 5G
• Rural Industry IoT Opportunities
  • Agri-Tech
  • Tourism
  • Salmon Farming
  • Public Health
  • Renewable Energy Industry
• The 5G Ecosystem Opportunity
The “Beyond the City” Connectivity Challenge

“But nobody lives there ...”
Rural: The Economic Significance

The Anchor Tenant Opportunity

It’s more than Consumer Mobile ....

- Agriculture
- Tourism
- Salmon Farming
- Renewable Energy
- Whisky
- Public Healthcare
- ...... the list goes on ....
The 5G RuralFirst Approach
Rethinking the Business Model
The 5G RuralFirst “Business Layer Cake”
Beyond the City Connectivity

The Service Provider Dilemma

<table>
<thead>
<tr>
<th>Spend</th>
<th>Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>$$$</td>
<td>$</td>
</tr>
<tr>
<td>$</td>
<td>$$</td>
</tr>
<tr>
<td>$$$</td>
<td>$$$</td>
</tr>
</tbody>
</table>

Challenges:
- Poor customer experience
- Subsidies
- Regulation
- Not spots
- Licence obligations
- Bad PR
- Politics

A New Perspective

Beyond the City*

Sub-urban

City

Sub-urban

City

The Digital Supply Chain, 1000's of use cases

EMBB tariffs + FWA

A Few EMBB tariffs
Contributors to the Rural Business Model
Anchor Tenants and the Enterprise Services Opportunity

FUTURE
Timeline & Value (and there is more)

TODAY

Traditional MNO Model

- Autonomous Cars
- Connected Roads e.g. Black ice detection, rubbish bin monitoring
- TV/Radio Broadcast
- Local Industry e.g. Salmon farming
- Farming/Agri-Tech Supply Chain
- Tourism
- NHS – Health Service
- Emergency Services Network
- Consumer/Business Internet
- Consumer phone services

© 2019 5G RuralFirst and/or its affiliates. All rights reserved. 5G RuralFirst confidential.
Is 5G the

“One Network To Rule Them All”
Broadcast over 5G

The One Network To Rule Them All

- The multiple TV/Radio distribution networks of today
- The 5G Opportunity: Genuine mobile network “broadcast”
- Rural opportunity: Deliver multiple services over common infrastructure
- Longer term objective to transition from terrestrial broadcast to IP/5G
- Significant service provider opportunity
- If and only if ... pervasive coverage
BBC – 5G Broadcast Radio - Trial

Coverage

Feedback

“I now have a large choice of stations readily available, most of which I’ve tried out!”

9 in 10 satisfied with the trial Internet service

“Strong uninterrupted listening. No more balancing radios in signal areas and wiggling aerials to catch a signal”
Rural Industry IoT Opportunities
Agri-Tech: Autonomous Tractor Use Case

Low Latency and High Speed Upload required

• Edge Compute (CUPS) on farm – world first (!)

• Business Outcome: Farmer productivity + reduced fertilizer spend + environmental advantage

• Are Farming “Co-Operatives” the key to unlocking the bigger connectivity opportunity?
Agri-Tech: 5G Healthy Cows

Selling Connectivity ..... Or Selling the App ?

• What:
  • IoT Collars from Afimilk
  • Connected Cow Portal
  • 20ms latency requirement –
    • to ensure Cow Collar battery life > 5 years
  • Value

• Value
  • Improved Cow Heat Detection ~25 days
  • 100 herd => 100 * 25 days more milk
  • ~£11K / year saving
  • ~1.5 year payback

• Subscription Model Opportunity – e.g. 5 Year Contract

The Strategic Question: Sell Connectivity or Sell the App ?
Tourism as a Connectivity Enabler?! 

• The Opportunity
  • £11.5 Bn economic value to Scotland
  • 340,000 tourist visitors expected in Orkney this year
  • Historic Scotland – West Coast 500 – Whisky Trail
  • Walking / Mountain biking / Skiing / Sight seeing …. 

• Challenges
  • Mass Tourism / Overload
  • The Tourist Experience

• The Strategic Question:
  • How can tourism help fund connectivity?

Potential improvements

Half (53%) gave a suggestion of something that would have improved their trip. Key points include improving digital connectivity, and lower costs

<table>
<thead>
<tr>
<th>Suggestion</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Longer stay / more time in Scotland</td>
<td>17%</td>
</tr>
<tr>
<td>Lower costs / less expensive</td>
<td>11%</td>
</tr>
<tr>
<td>Better roads / signage</td>
<td>11%</td>
</tr>
<tr>
<td>Better / free WiFi</td>
<td>10%</td>
</tr>
<tr>
<td>Greater 3G / 4G / mobile coverage</td>
<td>9%</td>
</tr>
<tr>
<td>Better quality / more local food</td>
<td>7%</td>
</tr>
<tr>
<td>Better / cheaper public transport</td>
<td>5%</td>
</tr>
<tr>
<td>Better accommodation</td>
<td>4%</td>
</tr>
<tr>
<td>Longer opening times</td>
<td>3%</td>
</tr>
<tr>
<td>Better currency exchange rate</td>
<td>2%</td>
</tr>
<tr>
<td>More information / simpler maps</td>
<td>2%</td>
</tr>
<tr>
<td>Fewer midges / midgie control</td>
<td>2%</td>
</tr>
<tr>
<td>Less litter</td>
<td>2%</td>
</tr>
<tr>
<td>Better customer service</td>
<td>2%</td>
</tr>
<tr>
<td>Better parking</td>
<td>1%</td>
</tr>
<tr>
<td>Better drivers</td>
<td>1%</td>
</tr>
<tr>
<td>More to do / more activities</td>
<td>1%</td>
</tr>
<tr>
<td>Something else</td>
<td>10%</td>
</tr>
</tbody>
</table>

WiFi/4G are #4 & #5 improvements requested

>>

control of vicious West Highland Midgie #12 😊

(Source: VisitScotland 2016/17)

Wi-Fi control of West Highland Midgie #12 😊
The Challenge:

Transforming the Tourist Experience at the 4,500 year old “Ring of Brodgar” in the Orkney Islands, Scotland
Transforming The Tourist Experience

What the 5G RuralFirst Network Enables on the Orkney Islands

• Augmented Reality on the Orkney Tourist Buses
  • Nextgen “Virtual Tourist Guide”
  • Funded by Cisco UK&I – Living Popups (LA, USA)
  • Demonstrate “Vertical Industry Aligned” 5G Service opportunities

• Outcomes:
  • Improved tourist experience esp at unmanaged sites
  • Revenue model to fund local neutral host ISP

• The Next Step?
  • Tourist overload management (future)

The Strategic Question: Sell Connectivity or Sell the App?
The Challenge:

The UK’s Biggest Food Export is farmed in Scotland’s Highlands and Islands. The Missing Ingredient? Connectivity.

The opportunity is top line service provider revenue.
Connectivity and Salmon Farming

Seawater Health Monitoring

• The Challenge
  • Salmon – Significant UK Export
  • Connectivity Limited
  • Fish health & Environmentally Challenged

• The Use Case: Protecting Fish Health
  • Measuring parameters inside and outside salmon cages (pH/dissolved oxygen/ salinity/ temperature) – via LoRa
  • Benefit: Avoids occasional large scale loss of entire pen fish stock (~£0.5M/pen)

• Future: 4K & 8K Video Upload from Salmon Pens – to drive cost efficient automate feeding

• Business Model:
  • High value Enterprise Grade 5G Services – Private/Neutral Host/MNO ?
  • Collaborative Ecosystem Approach: Outcome focused, not Cost-Plus
  • Service Provider/Salmon Technology Providers/Salmon Industry
IoT Opportunities: Managed Services

From Public Healthcare --- to Renewable Energy (!)
What Next? - Making It Happen
The 5G Ecosystem Opportunity
Example: Agri-tech Connectivity Business Models

Industry structure options & implications

<table>
<thead>
<tr>
<th>Prime</th>
<th>As is: Today</th>
<th>Revenue Share</th>
<th>5+ Year Contract</th>
<th>5-10 Year Contract</th>
<th>Revenue Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISV/Farming App Provider</td>
<td>ISV/Farming App Provider</td>
<td>SP IoT Ecosystem</td>
<td>ISV/Farming App Provider</td>
<td>SI</td>
<td>Group of ISV/Farming App Providers</td>
</tr>
<tr>
<td>SP SIMs &amp; Data</td>
<td>SP IoT Ecosystem</td>
<td></td>
<td>ISV/Farming App Provider</td>
<td></td>
<td>Farming solution vendors</td>
</tr>
<tr>
<td></td>
<td>Group of ISV/Farming App Providers</td>
<td></td>
<td>SP IoT Ecosystem</td>
<td></td>
<td>Group of farms (Co-op)</td>
</tr>
<tr>
<td></td>
<td>SP IoT Ecosystem</td>
<td></td>
<td></td>
<td></td>
<td>SP IoT Ecosystem</td>
</tr>
</tbody>
</table>
Conclusion

• Rural Connectivity Is Challenging
• Demand for 5G Services Exists “Beyond the City”
• Deploy 5G Where Needed
• Exploit New Tech – SDR, Spectrum Sharing
• Innovation is Key – from Smart Masts, Rural Ready Radio to Solar Panels and Ecosystems
• Anchor Tenants are Key – The Place to Start
• Imagine new partnerships– Neutral Host Operators (CloudNet, Broadway) could solve some of the MNO coverage challenges
Thanks