

# “Challenging the last coverage frontiers for UK mobile radio”



What is the goal for a national mobile infrastructure ? to support affordable services that delivers *“any content at any location” at the right data speed (without constraint) to small inexpensive personal mobile devices*

The three big challenges in achieving this will be:

Network Competition

Network Capacity

*Network Coverage*

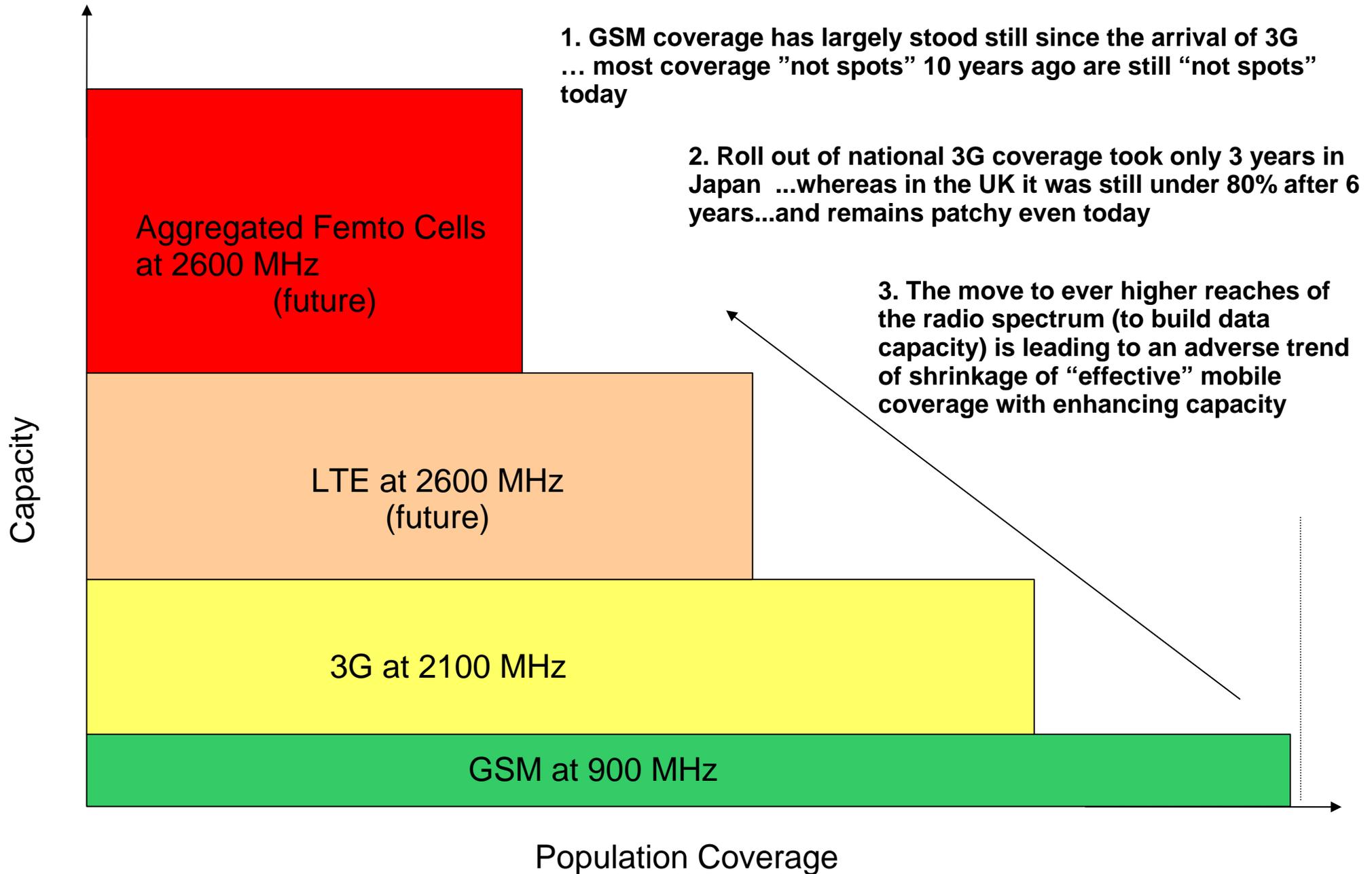


All are trending in the wrong direction

All need a revolution “to turn them around”

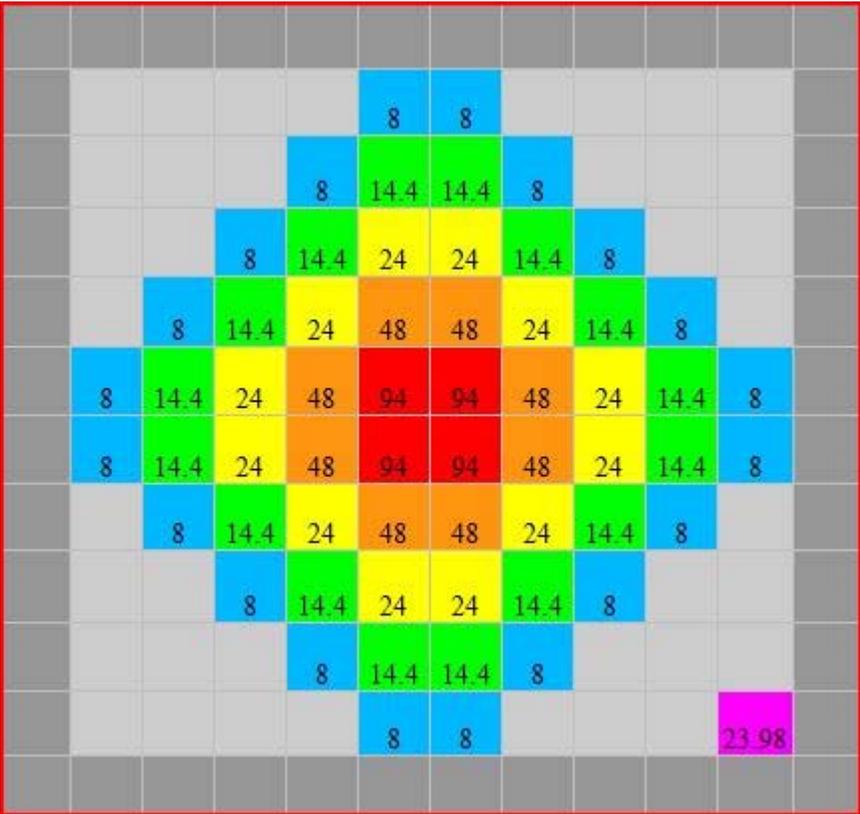
Since *the future* super fast mobile broadband will demand very short transmission distances – so **“the number of base stations”** our national infrastructure comprises will become a more central issue in measuring the “goodness” of the infrastructure

# Mobile Network Coverage has been trending in the wrong direction for the past 10 years

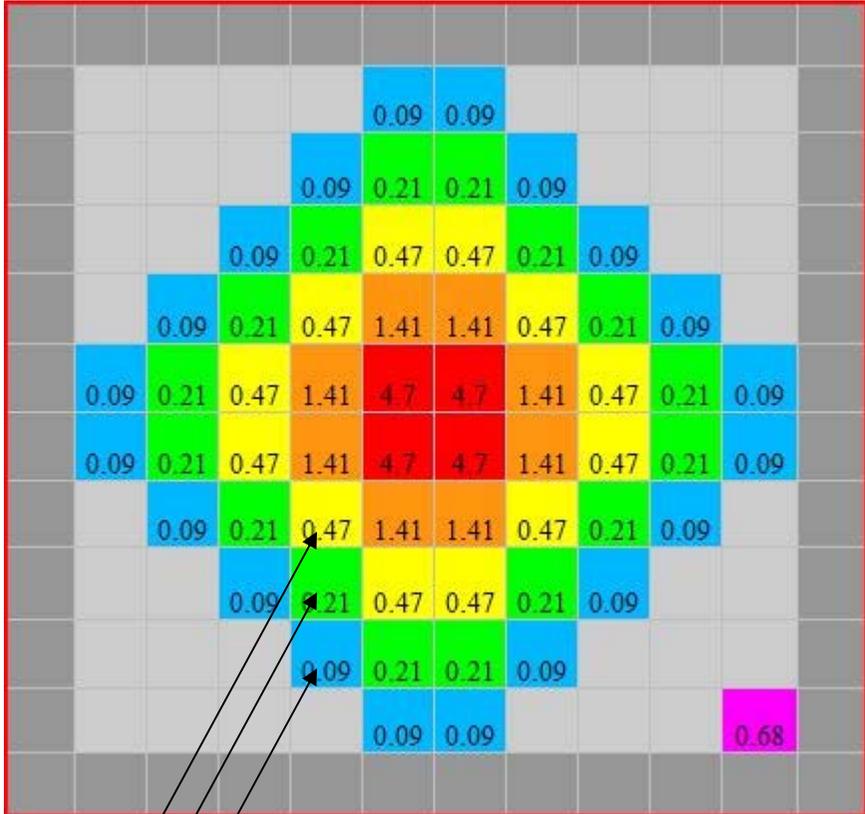


**Future build up of traffic (particularly video traffic) will lead to new more extensive mobile coverage “fringe areas” ...this time for reasonable data access speeds**

The Empty LTE Cell



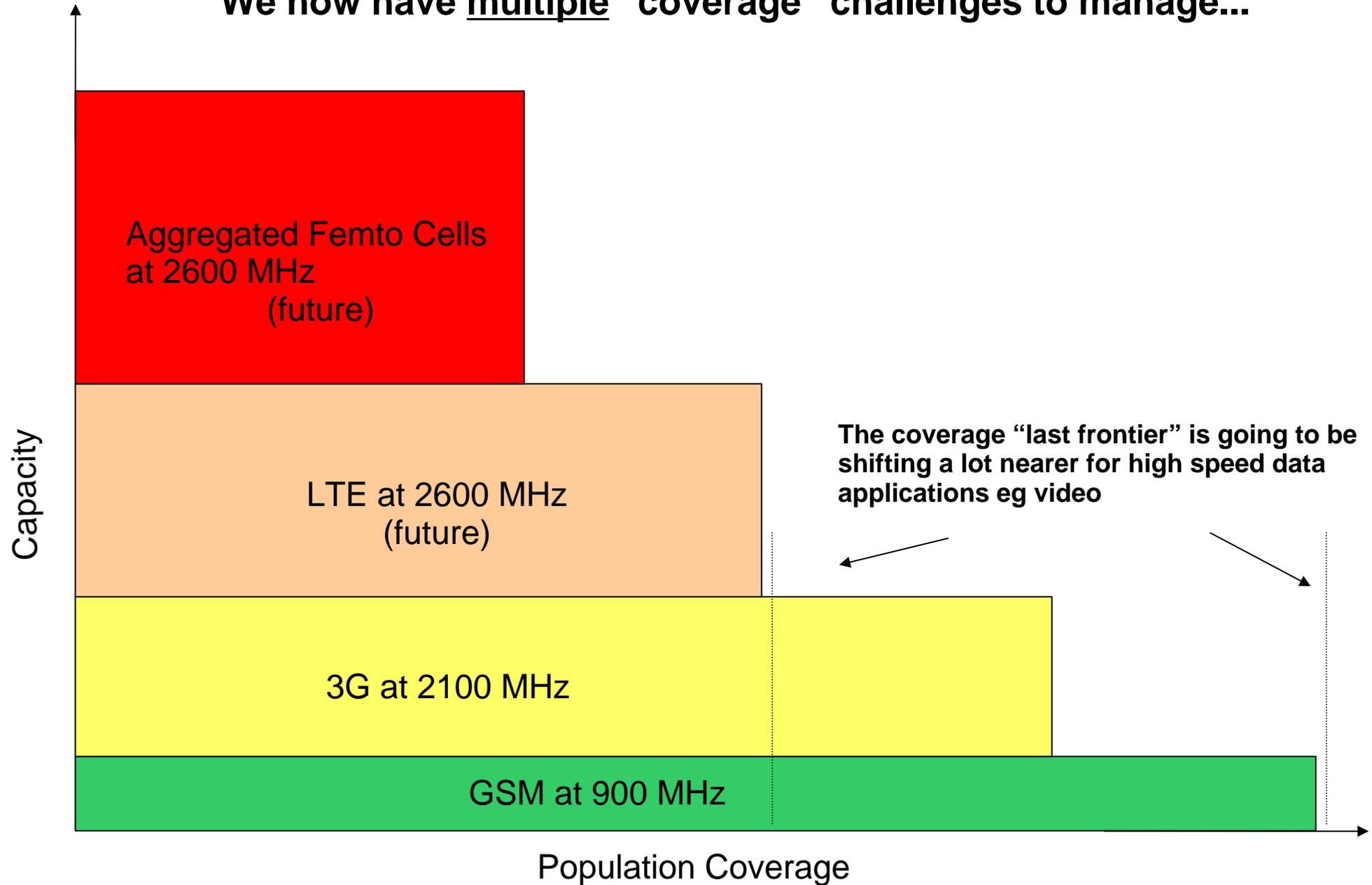
The very heavily loaded LTE Cell



The new coverage “fringe” areas

(Source of data for the model: Cisco)

We now have multiple “coverage” challenges to manage...



...and the only way to turn things around... **a lot more new base stations...!**

## **Why now is the time for some radical thinking about national mobile radio coverage...**

Three reasons why “now” is a critical juncture to address the mobile “Coverage” issue:

1. For the first time in over 25 years significant spectrum is about to be released that is lower than any that is currently deployed...800 MHz is a dream solution for rural coverage and turning around some of the adverse capacity/coverage trend
2. Spectrum release is a negotiation between “Agency of the State” and the private sector..where the private sector mandate is to make a profit...the state mandate is to get the best terms for the spectrum...a unique opportunity that is only seized by *an ambitious “Ask”*. (*If we ask for very little... we are likely to get very little..eg look what happened with 3G coverage.*)
3. The urban “capacity” revolution (foreseen by experts using Femto Cells) will take 5-6 years to impact the market but when it does it will disrupt the mobile network operator business model...making the next 5 years critical for rolling out new base station sites... particularly in rural areas

*...so by then “what we have we hold” but we may thereafter have to live with any coverage shortcomings or blemishes for another 10 years*

## **We turn to the economic case for “Rural Digital Britain”- the current “last frontier” of poor/no broadband mobile coverage**

People tend to associate “rural” with entirely depopulated lost regions of the wild...but there are very extensive rural regions given over to farming, tourism and small communities...there is a real rural economy

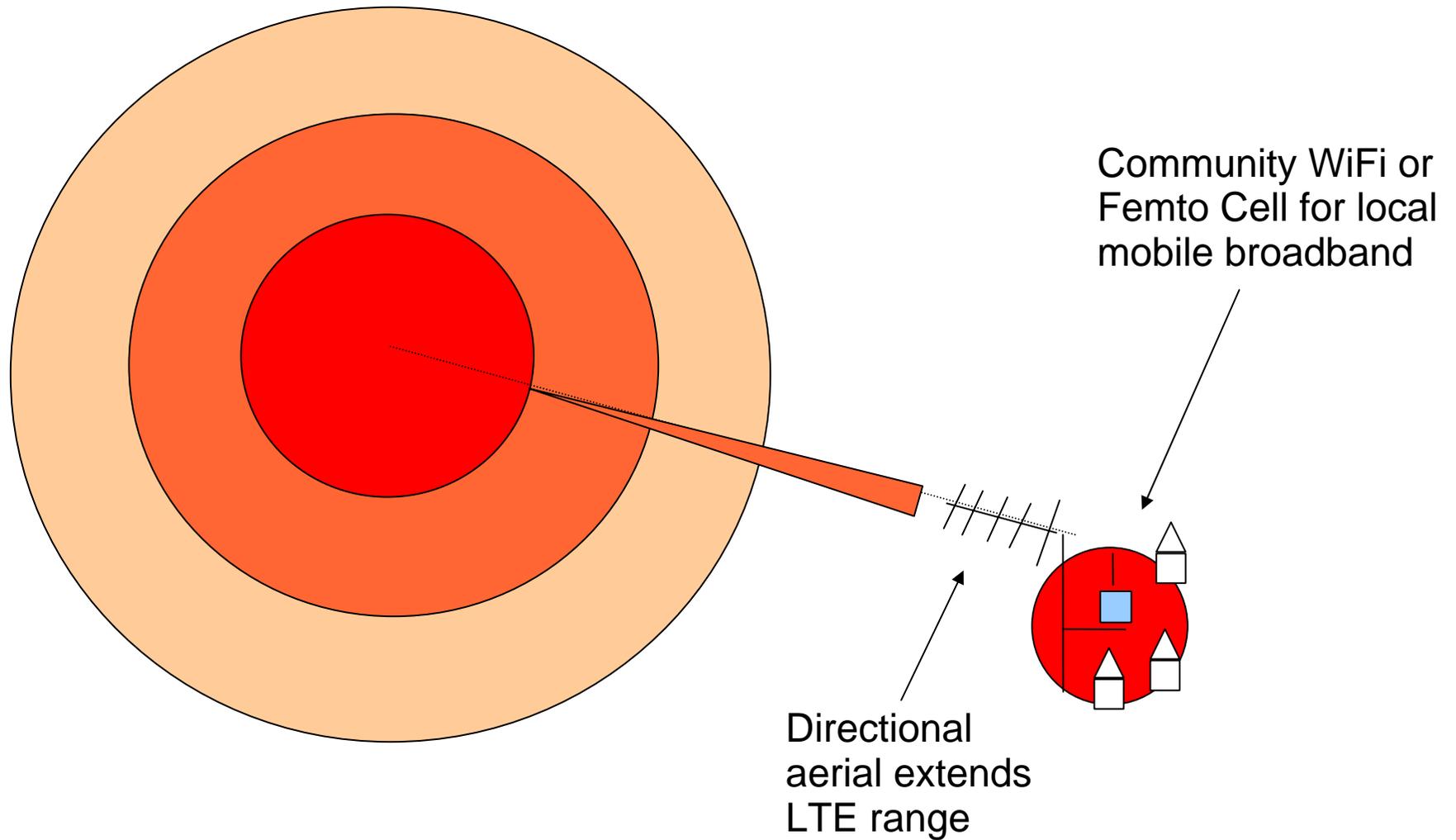
Whilst measured by” homes” these areas look to have a very low population but they all have bursts of much higher populations (from the rest of us & seasonal workers)

Studies have shown that “mobile coverage” can enhance economic growth (eg London Business School study of developing countries)

UK economic growth would benefit from firing on all cylinders and the rural economy has the potential to contribute to this growth

**A significant number of new rural base stations** would be an important driver for an exciting new “**Rural Digital Britain**”

The coverage definition must not exclude innovative ways of extending rural broadband mobile reach (eg Femto cells on the end of fixed LTE links)



But **new base stations** will be needed to allow wider deployment of this sort of solution

# Ofcom's Proposed New Coverage Definition – raises far more problems than it solves...

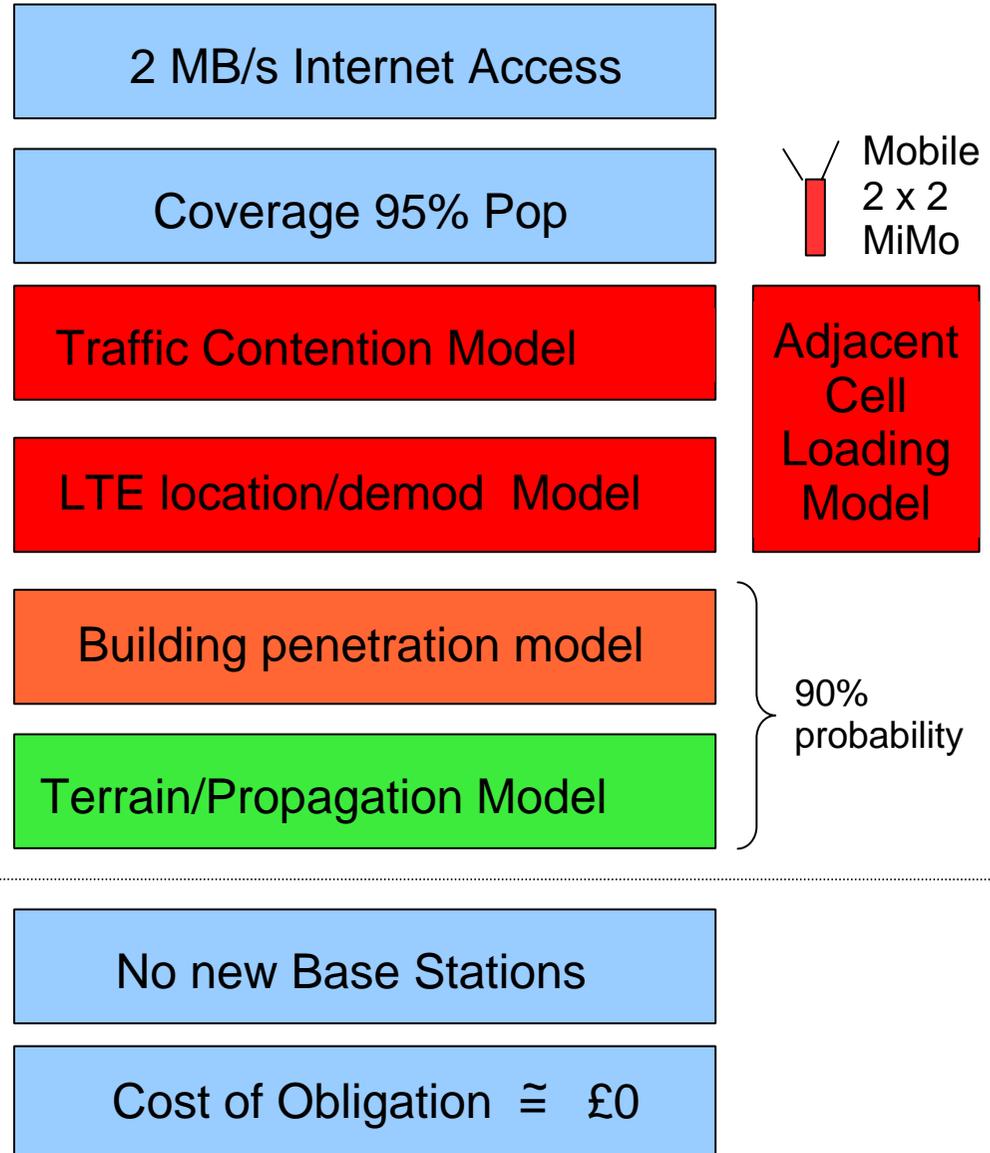
1. Hugely complex

2. What will get delivered for many will not be what it says on the tin

3. Due to all the necessary “simplifying” assumptions

4. Impossible to directly verify

5. Delivering a Minimal (Zero) Obligation

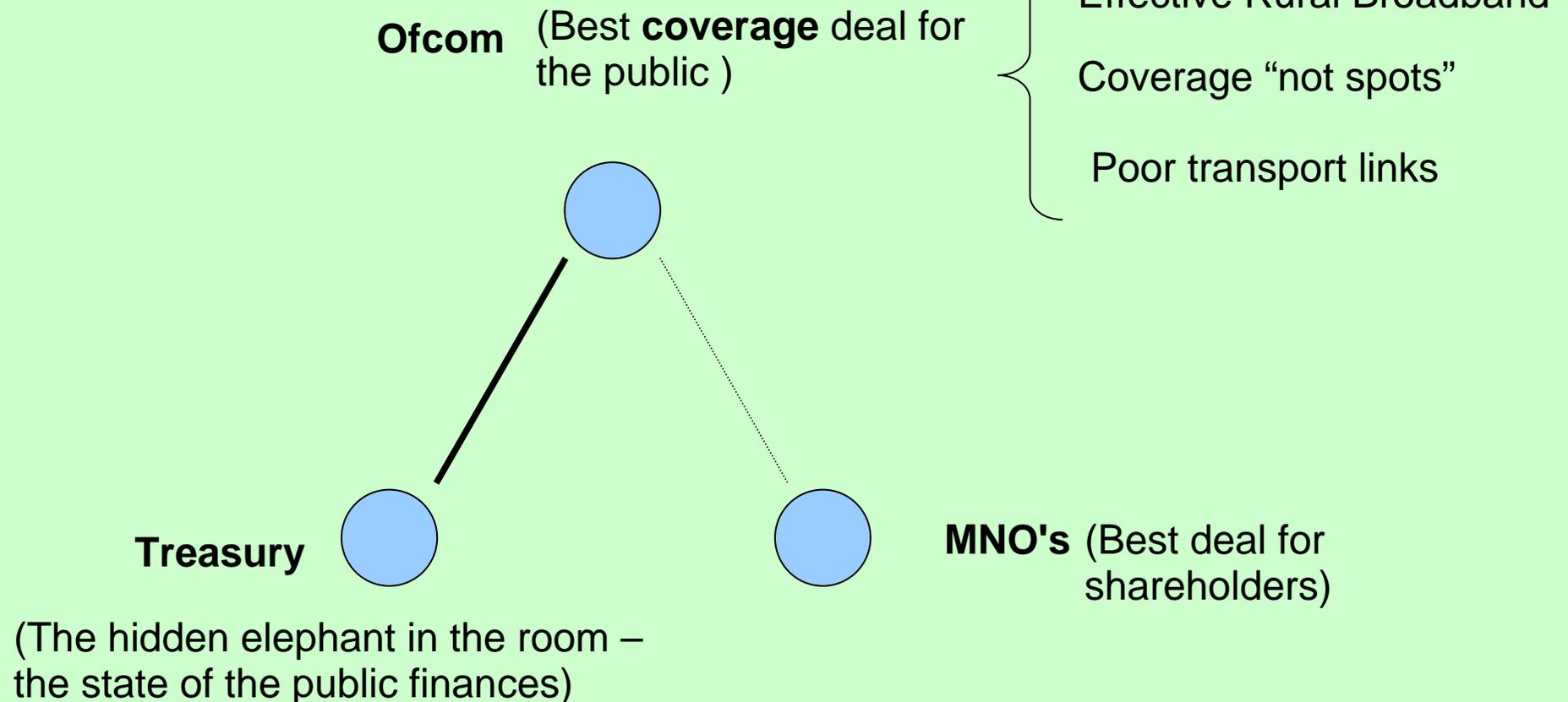


## There is a better way ...

**Since we can never have enough coverage... coverage decisions are always decided on “cost” which translates broadly into the number of new base station sites...so why not make this number central to the debate?**

Its simpler, everyone can understand it *and it is easy to verify compliance*

This fits well with the likely nature of the decision process:



What would be a reasonable “Ask” for a coverage obligation?

**Cost: £540m for 3600 new base stations** (@ £150k per base station)

**Revenue from one 800 MHz licence (10MHz channel) : £440-£760m**

(Based upon Ofcom's analysis of the Swedish and German auction results)

This seems to suggest that the perfect solution would be to take the auction proceeds from this one 800 MHz licence (10 MHz wide channel) and plough it back into new base stations...the mobile operators would be happy...users would be happy....but the Treasury...perhaps less so...

What may be a more realistic “Ask” in these difficult economic times might be **1400 new base stations to serve the last 5% of the population** at an approximate cost of £210m

Elsewhere Ofcom propose to deal with coverage “not spots” with a reduced licence fee incentive *using current spectrum and technology* ...but for a small incremental cost such new base stations could be required to be up-graded to LTE over the next 5-7 years...put this together with the BDUK project **and we would have a national plan with the resources to put into reverse the long term adverse mobile coverage trend outlined earlier**

## **Other relevant issues having a bearing on the “Coverage” issue**

### **Issue : “Use it or loose it” regulatory provision**

**Reason** : In rural areas a lot of spectrum will remain unused but MNO's will be reluctant to allows others to use it. This idle spectrum could significantly increase rural access speeds.

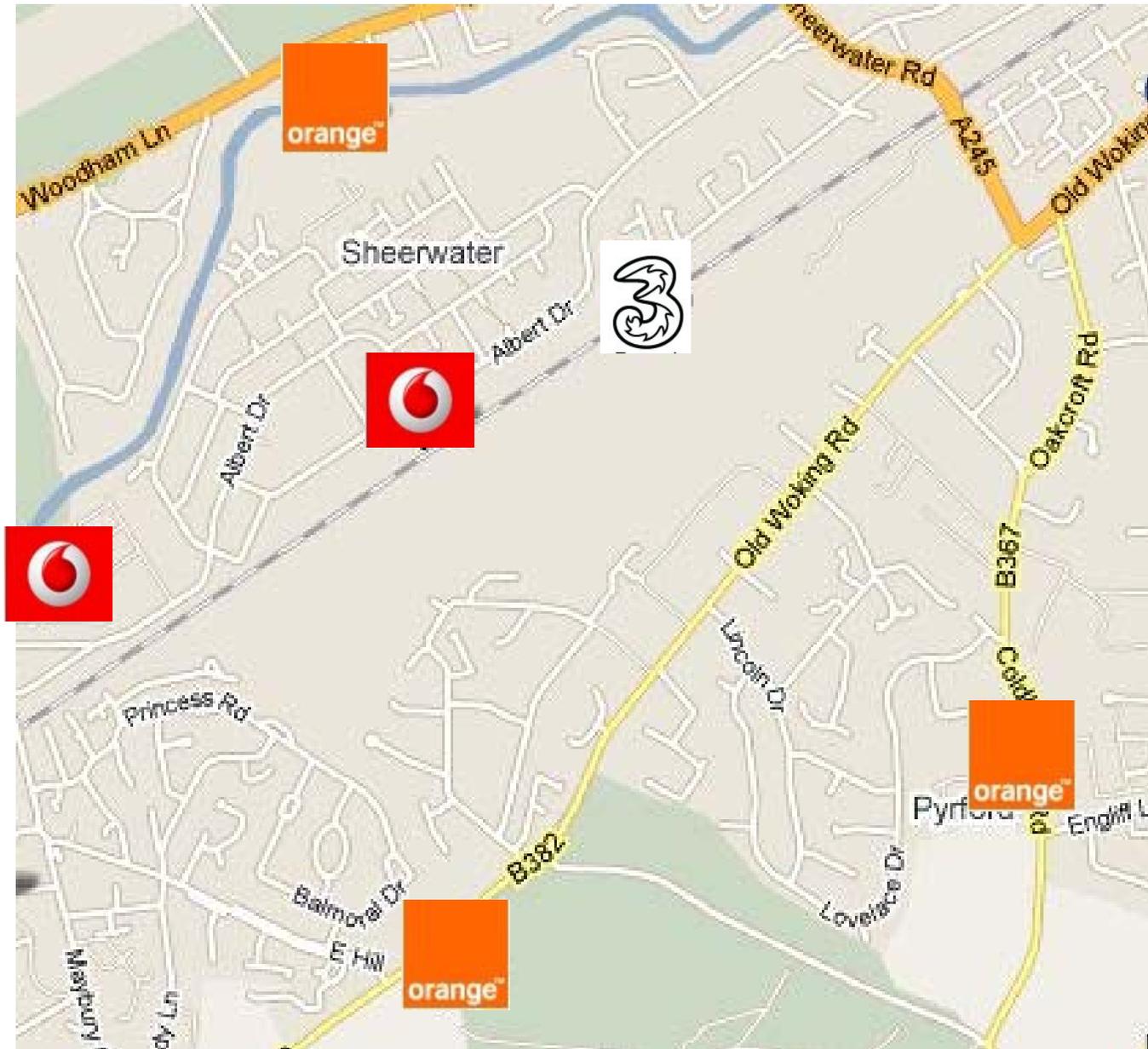
**Recommendation** : There should be a “use it or lease it to a subtenant commercially or Ofcom may enforce a subtenant at a regulated rent” provision (Using the model existing in the domestic housing market for vacant properties)

### **Issue : Dormant (Reserve) Powers to mandate “open access”**

**Reason** : If Ofcom is to deliver on its duties (not just today but over the investment cycle) it must have the powers to do the job. Mandating “open access” is one such power. This will inevitably be needed to sustain coverage of higher speed mobile access, stop coverage “balkanising” and maintaining a sustainable coverage enhancing competitive model. If this power is likely to be needed over the investment cycle, it is much fairer for this future possibility to be made clear from the outset. The risk that this will discourage investment or innovation is minimal against the backdrop of such huge traffic growth rates.

**Recommendation** : Ofcom should take *reserve* powers to mandate open access.

“Competition” affects the coverage issue as “*coverage competition*” can only work if consumers have reliable information upon which to make informed choices – that is set to become hugely complex for high-speed data access – re-enforcing the need for regulatory intervention



Example of just how complex things are likely to become in the future mobile data access world:

- Loading on the Vodafone sites in the illustration could be heavily affected by passing trains from Woking main line
- Performance for Orange customers close to masts is heavily dependent on how many more distant customers Orange have attracted
- The home, place of work and journey between is likely to present quite different “best operator” options

## Rural coverage is an issue being addressed in a number of countries

1. Germany mandated an “outside-in” requirement on their 800 MHz licences whereby rural coverage was given priority over urban coverage in the roll-out
2. France (with its huge rural challenge) allocated its 3G spectrum rather than auctioning it but put a very high coverage obligation that drove the industry to develop 3G at 900 MHz. France plans to impose concurrent roll out of rural and urban LTE coverage
3. The FCC’s “Ancillary Terrestrial Component” was an idea whereby an operator was given free urban use of spectrum for a mobile service if they provided a satellite component to address the US rural coverage issue – an approach hampered by the highly competitive urban mobile market
4. The Chinese Government is ensuring its mobile operators pay due attention to rural coverage – (the mobile signal strength in the foreground is -60 dbm – considerably better than many UK rural areas – the mobile mast is just discernable on the hill just behind the Ox pulling the plough)

