

RURAL ECONOMY AND CONNECTIVITY COMMITTEE

DRAFT BUDGET 2017-18; BROADBAND

SUBMISSION FROM BALQUHIDDER COMMUNITY BROADBAND

PART 1 - YOU CAN'T GET THERE FROM HERE: RURAL BROADBAND FOR THE 2020S

PRESENTATION AT THE BROADBAND WORLD FORUM 2016

VERSION 1.5, 18 OCTOBER 2016, by RICHARD HARRIS

INTRODUCTION

The brief for this panel is to look forward to the 2020s. For rural communities, that's unfortunately a case of "You can't get there from here: you need to start from somewhere else". So I'll cover who we are, how we've ended up where we are and, most relevantly, what needs to be done, for ourselves and for the country as a whole.

In our case, this is not simply about the future of networks but about the very future of our community. We're in the familiar position of having been serially let down by ill-informed, ineffective and short-term government policies, public bodies that don't understand the concept of delivery – and an incumbent private monopoly that is the biggest single inhibitor of economic growth in the rural UK.

BALQUHIDDER

I'm from Balquhider, a rural highland glen in Loch Lomond and the Trossachs National Park. It's famous for being spectacularly beautiful and for being the burial place of Rob Roy McGregor, the insurgent local who made a successful career out of annoying government officials. There may just be a lesson there...

We've just under 200 properties, strung out across an area of about 18 by 8km. We have more than 95 businesses, including the #4 on Condé Nast's global list of best boutique hotels. We also have an active and cohesive community. Like many scenic rural areas, our economy is heavily biased to tourism and farming with a few tech and marketing businesses as well as a number of people who are forced to commute long distances rather than work remotely.

We also lack economic diversity and thus resilience. Our young people are forced to leave permanently through lack of opportunity, whilst people who actively want to move here can't: a dozen years ago, properties sold by word of mouth, now they can't sell because of lack of broadband. Companies which aren't geographically tied are forced to move out of the area – I run a technology incubator and have had to do this twice now. Other businesses are losing trade, incurring higher costs and losing out to competition from more connected areas. To quote from the owner of the boutique hotel I mentioned:

"Ten years ago, we could sell ourselves on the basis of "Come here and get away from being continually online". Now, people won't come if they can't connect and we can't get sponsorship for our festivals as people can't post live on social media. And there is no hell like a family holiday where the children can't get online."

So what do we actually have? Easy: very little: with line lengths of between 3 and 18km, we're marginal for 19th century telephony, let alone 21st century digitality. ADSL, even for those properties in range, gives us an average of less than 2Mb/s, about 2/3 of that of rural Uzbekistan. And it's unreliable. Very unreliable.

A conservative model of local economic uplift from broadband for various technologies suggests a first year benefit (Gross Value Add) ranging from £8M for Fibre to the Premise (FTTP). Of that, £6.9M is in asset value and £1.1M is trading uplift. We then drop to a £2M total, of which only £130,000 was trading uplift for even the most optimistic Fibre to the Cabinet (FTTC) or wireless scenarios. So the benefit is very real as is the differing impact of different technologies. But we're currently so far behind both national and global best practice that it is crippling our ability to function.

As a nation, we're also falling further behind: with the caveat that there are lies, damned lies and broadband statistics, the UK as a whole has dropped from 14th to around 17th on world ranking for delivered¹ (rather than claimed) broadband in the last two quarters. On average peak connectivity – a rather better measure of grade of service – we're 23rd, and falling. And most rural connectivity is much worse.

If you consider strategic measures of effective broadband to include equality of opportunity throughout a country and the ability of that country to play effectively with its peers and competitors, that's pretty damning. This is a country that's supposed to be the sixth largest economy in the world, although, by the time I've finished speaking, we may have dropped another couple of places.

So, what's happening, where are we and what do we do about it?

¹ As measured by Akamai, M-Lab and Ookla

KAFKA'S ROUNDABOUT

There have so many - and often contradictory - government statements about making Britain or Scotland world-class digital nations that, if political hot air were bandwidth, we'd have been sorted long ago.

However, the big issues for us and communities like us are neither political nor technical: they're bureaucratic: we suffer from multiple interacting bureaucracies who have turned the game of 'Passing the buck' into a process that blocks progress at every turn. I call this Kafka's Roundabout and, in this case, it goes around thusly:

- Telecoms policy is reserved to Westminster, which directly funds Broadband Delivery UK (BDUK), the body responsible for the rollout of rural broadband services. BDUK also manages our relationship with EU state aid rules.
- Additional funding from the Scottish government is delivered primarily through Digital Scotland Superfast Broadband (DSSB). BDUK and DSSB each spend most of their money with BT to provide predominantly FTTC-based services, possibly the single most inappropriate technology for rural areas and for future scalability anywhere: it's a range-limited, obsolete technology that should not have been deployed twenty years ago, let alone now.
- Community Broadband Scotland (CBS), was then created by the Scottish government to support communities that fall outside the scope of DSSB and BD. The failings of the DSSB programme however mean that CBS is now overwhelmed by demand from fragmented and disadvantaged communities across Scotland. CBS is in turn reliant on approval by every other party in the chain. You can see how the bureaucracy builds.
- Then there's a band of Consultants and Lawyers who are trying to tie it all together, but with a brief less on delivery than on compliance with nebulous, inflexible and continually moved goalposts (and, no, those aren't mutually exclusive, as we've discovered).

The elephant in the room is BT, the recipient of most public largesse and the de facto monopoly in many areas. BT demonstrates the short-term outlook of a corner store owner when it needs to behave as a long-term strategic player in society, something it consistently fails to acknowledge and live up to. When it does act, it's usually only in its immediate commercial interest, up to and including oft-related attempts to undermine other providers and initiatives.

BT's approach is also an inhibitor of future development of ultrafast services – G.Fast and XG.Fast are even more range-limited: they are “smoke and mirrors” technologies intended merely to bolster the illusion of a strategy. In a world where fibre reach at gigabit plus speeds is in the tens of kilometers, these are at best embarrassing irrelevances, at worst a cynical attempt to retain market share, lock out competition and ‘sweat’ century-old copper assets.

If BT is the elephant in the room, OFCOM is the mouse: it sits in the corner and squeaks, to little apparent effect. We occasionally dare to hope that it'll step up and frighten the elephant, but there's no sign of that happening.

Current deployments are then accounted by postcode, which allows the projects to claim 'success' for all properties in an area, despite many being out of range altogether. BT also works on a 20% uptake model, which leaves even properties within range of a cabinet unable to connect due to lack of capacity. The actual uptake in rural areas is typically 60-80%, something that's borne out by our own experience. BT also has the delightful habit of claiming us to be the European leader in fibre broadband, by counting the number of properties that fibre PASSES, despite the fact that there is no way for those properties to connect to that fibre. FTTC is NOT a fibre service.

MAKING IT HAPPEN

In our case, we lost two years just trying to get into the system, before undertaking an approved procurement exercise last year, with combined funding from CBS and the business broadband voucher scheme (BVS).

Having rejected wireless and satellite technologies, and with BT refusing to engage with us, we ended up in partnership with an ISP to provide a community-owned 1Gb/s plus FTTP network. The total delivered cost of that will be lower than the proposed Universal Service Obligation 'value' measure for a 10Mb/s service, with the design and most of the donkey work being done by the community. We expected to be in build by late 2015.

The voucher scheme was then withdrawn, at zero notice. So, we sought, and obtained, alternative funding to fill the gap and were then ready to go again, aiming to start in Spring 2016. Next we were told that we'd now need to go through a completely new procurement, repeating our original process. That was blamed on the EU. We fact-checked that with the European Commission and found that BDUK had in fact failed to maintain its EU state aid exemptions and was frantically scrabbling around to put in place a new umbrella scheme. By that point our start had slipped to August 2016. In September we were told that we are being forced to start again, under this week's rules, putting another six-to-eight months into our schedule. So, even if nothing else intervenes, we'll have lost at least four years from our project, due to nothing other than egregious and overwhelming bureaucracy.

THE EMPEROR'S NEW CLOTHES

In summary, the government's approach appears to be to pretend that the Emperor is in fact, fully clad, when it's obvious to everyone else that he's naked and shivering. With tacit collusion between government agencies and BT to the effect that all is well and that we're a leading digital nation, the UK lurches from one poorly framed initiative to another, each aimed at redressing the failings of its predecessor but doomed to forever repeat the same old mistakes.

Portents aren't good: the little information released by the new Scottish R100 programme suggests a continuing focus on headline download figures rather than on creating a future proof enabling infrastructure. These fragmented and contradictory policy initiatives and the determination to throw public money at BT has had the

unintended consequence of allowing them to cherry-pick areas, with the consequence of inhibiting local action and investment, making us more, not less, dependent on state support.

There's a huge irony here in that Broadband for the Rural North (B4RN), which provides community-driven connectivity in rural Lancashire and Yorkshire at 1-5Gb/s, was able to get started because the lack of government funding for BT in their area gave them a big enough catchment to get started, to the point where they're now out-competing BT throughout the region.²

GETTING THERE

So that's our – and many other communities' – tawdry story of bureaucracy and monopoly inhibiting initiative. But what of the future, for us and other communities like us? There's a lot here but, reduced to key actions:

- Coming back to where I started, you really can't get there from here: you do need to start from somewhere else. In this case, by reframing the problem, in each of strategy, market engagement and process.
- Public policy makers need to express goals in terms of enabling for the long-term, rather than the checkbox delivery of headline figures. The latter inevitably leads to the rollout of the cheapest infrastructure that allows those boxes to be ticked and which will lock us into mediocrity for decades to come.
- They need to get over the 'throw public money at BT' mentality - it's akin to the old industry aphorisms that 'no-one ever got fired for buying IBM/Microsoft', no matter how poor the product.
- They need to engage with communities, understand and support their diversity of need and capability in those communities and then be transparent in their approach and thinking, all of which appears to terrify them. This is vital - while it would be great to envisage a universal national FTTP infrastructure, I see no sign of the political will to fully fund it, even though it would be transformational to the entire country, at a cost probably 1/3 that of – for instance – HS2. But working with communities will enable the creation of cost-effective last-mile services at far lower cost to the exchequer than end-to-end commercial delivery.
- They need to define processes focused on delivery before compliance with arbitrary and continually reinterpreted goalposts.
- We absolutely need to separate network provision from service delivery: Openreach MUST be split off from BT.
- Making OFCOM do its job robustly and without fear or favour is a prerequisite. When you do start turning all of that into delivery, that should mean:

² The cartoon here has been repurposed from the wonderful original (after Gillray) by New York illustrator Jonah Kingstein.

- A redundant and resilient fibre infrastructure to the network edge, the edge being defined by LOCAL breakouts accessible to both community and private operators.
- An infrastructure genuinely accessible to all players, public, private, local and national, without the artificial barriers put in place by the Openreach/BT monopoly.
- A strategy for creating coherence and resilience in that infrastructure at multiple levels, ranging from improving Internet Exchange and CDN diversity to working with UK NCSC to provide an umbrella for secure, resilient and trustworthy services.

I'll finish now with a 2012 quote from Peter Cochrane:

“Britain is being frozen out of the next industrial revolution... ..In terms of broadband, the UK is at the back of the pack. We’re beaten by almost every other European country and Asia leaves us for dust.”

Peter, as many of you may know, was once the Chief Technology Officer of BT. Nothing has changed since he said that. We need to change this, for all our sakes.

THE AUTHOR

Richard Harris is a pioneer of the public internet. He has been an internet developer and researcher since 1984 and has been responsible for a wide range of innovations in online technologies and service models, across terrestrial, mobile, broadcast and satellite networks. He has provided technology, strategic and organisational consultancy to enterprises such as the BBC, Apple, Intel, AT&T Labs and SAS Institute. He is a co-founder and a director of Balquhiddy Community Broadband.

PART 2 - R100 Blog

OCTOBER 28, 2016 by RICHARD HARRIS

The original R100 was the most successful British airship of the 1930s, insofar as it never actually crashed and burned, unlike rather too many of its contemporaries. So let's hope that's a good omen, as the Scottish Government's new broadband programme has been given the same name. In this case though, it stands for "Reach 100%". By that, they mean provision of coverage of 100% of properties with "superfast" broadband by 2021.

To date, there's been no public pronouncement on R100, merely some slightly vague commentary by Fergus Ewing and a obscure Prior Information Notice aimed at soliciting input from potential suppliers of stuff to something that hasn't yet been defined. We're therefore currently left guessing somewhat and, even on the basis of what little HAS been said, rather concerned.

So far though, the commitment seems to be to 100% coverage at the OFCOM definition of superfast as being 30Mb/s. In 2021. So we have yet another government initiative – and I make no distinction between Holyrood and Westminster here – that hasn't historically and isn't currently demonstrating any understanding that broadband is a continually moving target: to enable communities and enterprises to survive and flourish, we need an infrastructure that can maintain parity with global best practice into the future, not one that aims to hit an arbitrary target up to five years in the future, at which point it will be massively out of date.

Why does that matter? Simple: If you set a target of a given bandwidth at too low a threshold, suppliers (and yes, I mean you, BT) will simply install the cheapest and most profitable (to them) technology that will meet that target, and stuff the future.

Then, in 3-5 years time, when we've once again fallen behind the level of performance that online services are designed for, we find that it's going to cost another fortune to rip it all out again and replace it with something else that provides incremental improvements to a few places for another small number of years. That's exactly how British (and Scottish) broadband policy has operated and why the current approach, of throwing largeish sums of public money at BT to install an obsolete technology that has no real route to the future, has crippled the UK and Scotland's ability to operate competitively and will continue to do so into the future.

And that's right where, if you consider the scenarios of a post-Brexit UK and/or a resultant independent Scotland, we're going to need all the competitive advantage we can get.

You may also have noticed the repeated use of 'policy' in the above. That seems to be the root of the problem: we have policies, lots of policies. Unfortunately, they don't seem to be attached in any way to anything resembling a strategy: an understanding of and vision for the future of connectivity in the UK or Scotland. And, without a coherent strategy, you're only ever going to end up with policies that are mutually

contradictory and which create short-term sticking plasters for problems whilst actually creating – as noted above – more issues for the future.

Then, for all the idiocracy we're repeatedly having to go through for CBS funding of our own project we, and other communities, are concerned that R100 will be used to yet again delay advanced community initiatives, possibly for several more years. In our own case, we're at a critical stage of the project, have already had huge costs dumped on us by government agencies making inappropriate decisions without regard to the consequences. As a result we are struggling to keep going through the latest round of delays and impositions.

We've been hoping that R100 would start with a proper public consultation so that these issues could be addressed openly and transparently, but that doesn't appear to have been the case. The member of the R100 team who attended the recent Scottish Rural Parliament meeting in Brechin made some optimistic noises, but when he was asked about the strategic framing of the project (ie setting out the national goals, reasons and players), his response was, "What's strategic framing?". Which didn't exactly fill us with confidence.

But, on the principle that it might just be better to shout into a black hole and await an echo, however faint, than do nothing at all, we did make a submission to the R100 Prior Information Notice. Beyond a cursory acknowledgement, we have – depressingly, as expected – had no further feedback from them.

Below then, is the text of that submission, itself based both on our experience with our local project and on several decades of experience designing networks, technology and process with companies as diverse as Apple, AT&T, the UK government and Police Scotland. It's written in more formal language than a blog post but, if you're another community with similar issues, you may find some helpful ammunition here.

I'll just note here that the original R100, whatever its theoretical merits, didn't last long: it was scrapped after the series of disasters that befell similar programmes in Britain and the rest of the world. Let's hope that its namesake proves more effective and useful.

PART 3 - RESPONSE TO RFI PIN SEP256710: SCOTTISH GOVERNMENT - REACHING 100% SUPERFAST BROADBAND PROGRAMME

VERSION 1.1, 1 OCTOBER 2016, RICHARD HARRIS

SUMMARY OF ISSUES

This document presents the response of Balquhiddy Community Broadband (BCB) to this RFI. Although BCB does not currently intend to tender against the R100 procurement, BCB's founders do have very significant experience of internet technologies, the market being addressed by R100, current processes and of the need for the effective framing of strategy, engagement and process. Our concern is to ensure that past and current mistakes are not repeated and that Scotland ends up with a robust, scalable and genuinely enabling network infrastructure. Our concerns are summarised below, starting with three key elements:

Strategic Considerations: The RFI and such public statements as have so far been made about R100 do not define the strategic goals and framing for the procurement. Such information as is given is limited and suggests an inadequate level of framing and objective-setting. Every other UK public intervention in broadband provision to date has been crippled by restrictive assumptions, poverty of ambition and lack of understanding: precedence therefore suggests that R100 may suffer likewise. For example, goals so far publicly stated³ still express objectives in terms of delivered bandwidth, when this is very much an arbitrary figure and makes no acknowledgement of the most important metric: the provision of a scalable, future proof infrastructure, where future service grade scaling is a contractual matter, driven by demand, not one requiring wholesale infrastructure replacement. The 'future proof' solicitation in the RFI does not define the term and this must be considered a significant shortcoming.

Market Engagement: Most (but by no means all) areas with poor broadband service provision are rural. They may also be remote. These also tend to be the more activist and self-motivated communities, many of which are either currently building or are prepared to deliver at least part of their local solution themselves, given even a modicum of support.

Engaging with this model will significantly extend the value reach of any solution in certain areas⁴. There is however no reference whatsoever in the RFI to engagement with communities or creating a hybrid "centre-out and edge-in" delivery model of the sort that has served other countries so well⁵. This must be considered a major and limiting omission from current public statements about R100.

Process: The definition of process for delivery of R100 projects is critical: the lack of a delivery focus in current processes and the inhibiting influence of inter-agency dependencies⁶ has crippled even the imperfect goals of extended broadband delivery under DSSB and CBS. It is essential that this be simplified, made focussed

³ Includes Clive Downing's presentation at the CBS supplier meeting of 28 September 2016.

⁴ cf. the current Balquhiddy CBS procurement.

⁵ An often quote example being Lithuania's Broadband development strategy pursued coherently and consistently since 2002.

⁶ Our attempt at saying "egregious and Kafesque bureaucracy" politely.

on delivery and be inclusive of engagement with the ultimate beneficiaries from the start. To date, we have seen no sign of this.

MAKING R100 EFFECTIVE

This is not intended to be a comprehensive list of issues for R100 to address, but addressing these robustly will help ensure that the outcome from the exercise is effective, maximises value from public investment, leverages commercial and community initiatives and reduces the need for yet more programmes in the future to address (or compound) the mistakes of the past. We apologise if this falls into the category of “teaching grandmother to suck eggs”, but assumptions of basic common sense and planning in previous initiatives have proven erroneous.

- Frame strategic objectives in terms of the long-term goals for an open national infrastructure, for the processes required to deliver it and for engagement with the communities who are the ultimate beneficiaries. Doing so will extend the reach of any given budget, will provide the level of agility required to meet the needs of a wide variety of end-user and will encourage the development of truly competitive alternatives to the monopoly incumbent.
- Model the economic uplift (not just cost/revenue of service) for any proposed development, subject to the final split of the procurement. Carrying this out at a local level has revealed very significant differences between technologies and service models in terms of delivered and sustained economic uplift⁷
- Adopt a demand model based on current multi-service, multi-device requirements, not on a demand model that was out of date two decades ago. The UK Broadband Stakeholder Group⁸ has done valuable work here, but their own model still appears to have significant gaps and underestimates emerging device and service ecosystems (not least being the impact of Cloud, AI, VR and IoT services).
- Define delivery not on the basis of average or peak Mb/s but on sustainable competitiveness at a high percentage of global best practice and against the fundamental requirement for continuous scalability without wholesale infrastructure replacement – the rest will then follow.
- Audit the current and planned fibre backbone infrastructure for end-to-end capability against anticipated real demand and uptake.
- Model network capacity and incipient bottlenecks in that infrastructure as demand scales and, in procurement and funding, seek to mitigate these issues before they arise.
- Promote and support the development of redundancy in Internet Exchange (IX) services in Scotland. With a single and currently underused IX in Edinburgh, Scotland currently has little resilience or flexibility in its network routing and interchange.

⁷ The BCB Uplift Model is available at: <http://balquhidder.net/whats-it-worth/#more-414>

⁸ Broadband Stakeholder Group: <http://www.broadbanduk.org>

- Co-ordinate with the UK NCSC⁹ to build a secure carrier-grade infrastructure within which wholesale services at every level can be provided.
- Define an architecture and geographical model for standardised open access edge points for network backhaul within effective and economic reach of every community in the country.
- Create genuinely open wholesale access to that network edge: the current model of engagement with Openreach and its infrastructure simply does not work.¹⁰
- Encourage and support commercial, community and hybrid 'last mile' programmes to link to network edge points and to each other.
- Integrate R100 with the expansion of 4G mobile services and the forthcoming development of 5G services: the availability of fibre networks in proximity to mobile sites will have a significant effect on deployment costs of 4 and 5G services.
- For those few properties that can't be addressed by terrestrial networks, lease a dedicated public service Ka-band satellite transponder or spot beam(s) to ensure that users aren't more disadvantaged by satellite than they absolutely have to be: current satellite services simply do not work reliably, largely due to commercial oversell.

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Richard Harris is a pioneer of the public internet. He has been an internet developer and researcher since 1984 and has been responsible for a wide range of innovations in online technologies and service models, across terrestrial, mobile, broadcast and satellite networks. He has provided technology, strategic and organisational consultancy to enterprises such as the BBC, Apple, Intel, AT&T Labs and SAS Institute. He has overseen major enterprise procurements in the public and private sectors, was Chief Knowledge Officer of a global organisation and process consultancy and is co-founder and a director of Balquhiddy Community Broadband.

Balquhiddy Community Broadband
November 2016

⁹ National Cyber Security Centre

¹⁰ The failure of Passive Infrastructure Access (PIA) arrangements is an excellent example here.