

White paper

**The realities of connecting the
'final 10%' of the UK with
superfast broadband**

11 September 2013

Contents

1	Who is this white paper for?	2
2	The motivations for this white paper	2
3	The commercial realities of deploying broadband in rural areas	3
4	Comparisons with utilities and the role of regulation in enabling customer choice	4
5	The additional challenges for the final 10%	5
6	What approaches might communities want to consider for the final 10%?	5
6.1	Approach 1: Support self-built community networks	6
6.2	Approach 2: Support local alternative network operators ('local altnets')	8
6.3	Approach 3: Support any rural broadband network with public funding	9
6.4	Approach 4: Partner with an established operator	9
7	Other important factors for communities to consider	10
8	What next for communities?	11
	About the author	12

1 Who is this white paper for?

This white paper has been written by Analysys Mason¹ to help communities understand what is involved in connecting the final 10% of premises in the most rural parts of the UK with superfast broadband. It is not intended to be prescriptive about solutions or make specific recommendations; rather it has been designed to inform and make communities aware of what is entailed, and highlight the risks to consider in the approaches that they could take, as well as dispel some of the myths that are prevalent in this debate. The focus of this paper is fixed (or wired) broadband rather than wireless (mobile, fixed wireless or satellite). This is because we understand fixed broadband to be of greatest interest to communities at present.

2 The motivations for this white paper

Communities in the final 10% of the UK are understandably becoming frustrated with not having access to superfast broadband. BT has been focused on its major commercial roll-out, and other telecoms operators have been investing in urban areas, while the Government's rural broadband programme to date has focused on extending coverage to around 90% of premises.

Many will have heard about, or seen, the National Audit Office's critical review of the Government's rural broadband programme, and the subsequent House of Commons Public Accounts Committee meeting on 17 July 2013, where Broadband Delivery UK (BDUK) and BT, in particular, were both under scrutiny. The anti-BT feeling was palpable, unjustifiably so in our view. And while superfast broadband for the final 10% is clearly an increasingly political issue, there seems to be a lack of awareness and understanding – from MP-level to grassroots-level and in the mainstream press² – of the issues associated with rural broadband, including how BT is structured and regulated, and what the alternatives to BT providing rural broadband might entail.

“As the recent failure of the South Yorkshire Digital Region project shows, it can be very difficult to make new networks financially sustainable.”

As the recent failure of the South Yorkshire Digital Region (SYDR) project shows, it can be very difficult to make new networks financially sustainable, and in the case of SYDR, tens of millions of pounds of tax payers' money was wasted. Similar sustainability issues were faced by small-scale networks that emerged during the first phase of broadband roll-out across the UK in the early 2000s. The financial risks associated with superfast broadband networks are, if anything, even greater. Great care is therefore needed when designing any scheme (privately or publicly funded) to solve the rural broadband problem, and this is all the more important for the final 10%, for reasons that this paper will explain.

¹ Analysys Mason is an independent telecoms consultancy and research company. This white paper was commissioned by BT but the views expressed within are Analysys Mason's own.

² See, for example, articles in the Telegraph, 'Superfast broadband is beaming us back to the days of state-backed monopolies', 6 August 2013; and in the Guardian, 'BT's great broadband scam', 12 August 2013.

3 The commercial realities of deploying broadband in rural areas

Deploying broadband in rural areas is more expensive than in urban areas, and in the so-called 'final third' of the UK the costs increase significantly.³ This was demonstrated in the fibre costing work Analysys Mason undertook for the Broadband Stakeholder Group (BSG), where we estimated the total costs of providing national coverage for fibre to the cabinet and fibre to the home (FTTH) to be GBP5.1 billion and GBP24.5–28.8 billion (depending on network architecture), respectively. Notably, the final 33% of premises (the final third) is expected to contribute to almost 60% of the total cost of deployment.⁴

“Notably, the final 33% of premises (the final third) is expected to contribute to almost 60% of the total cost of deployment.”

The costs of providing basic telephony in rural areas are also higher than in urban areas, yet while BT⁵ has a universal service obligation (USO) to provide a basic telephone service to any household in the UK,⁶ there is no 'broadband USO'. On this point, the European Commission (EC) concluded in 2011 that it would not mandate broadband to be part of the USO,⁷ leaving it to national governments to decide for themselves how to address the rural broadband issue.

The UK Government acknowledged the importance of broadband in 2011 by providing an initial GBP530 million for its rural broadband programme, with the aim of providing superfast broadband to at least 90% of the UK by 2015; this policy is being delivered by BDUK, with local authorities and devolved governments acting as the procuring bodies. BT will deliver most, if not all, of the planned projects to hit the 90% target, through a combination of using its existing network and upgrading its network where needed. The Government's programme has since been extended by a further GBP250 million with the aim of getting to 95% by 2017, but the mechanism for delivering this has not yet been defined.

³ This was a view we arrived at independently in 2008, in our work for the BSG, which was a key input to Lord Carter's *Digital Britain* report (see <http://www.broadbanduk.org/fibrecosts>). Prior to its publication, our report was critically reviewed by representatives from both industry and communities.

⁴ See <http://www.broadbanduk.org/fibrecosts>.

⁵ KCOM provides the USO in the Kingston-Upon-Hull area.

⁶ BT and Kingston are each required to provide access to basic telephone services upon reasonable request and at uniform prices, irrespective of location. Should the cost exceed £3400 then BT requires the user to pay the excess costs.

⁷ See 'Universal service in e-communications: report on the outcome of the public consultation and the third periodic review of the scope in accordance with Article 15 of the Directive 2002/22/EC', 23 November 2011.

4 Comparisons with utilities and the role of regulation in enabling customer choice

Gas, electricity, water and telecoms are all networked industries with high upfront costs, which, to varying degrees, exhibit the characteristics of a natural monopoly.⁸ The high upfront costs are driven by the need to build infrastructure; for example, underground pipes and ducts, pylons, telegraph poles

“The UK retail broadband market is considered to be one of the most competitive in the world.”

and buildings to house equipment. It is because of this that utilities and telecoms are very tightly regulated, with their respective infrastructures being ‘opened up’ to competition; the term ‘open access’ is often used. In utilities, this policy of regulating access to infrastructure has enabled high-street retailers, such as M&S and Sainsbury’s, and other companies, such as First Utility, to enter the energy market; in telecoms,

it has enabled Sky, TalkTalk and others to compete with BT. This policy has been very successful: the UK retail broadband market is considered to be one of the most competitive in the world, evidenced by the fact that BT Retail has the lowest market share of all similar companies in Europe, at around 29%,⁹ a fact that is not always acknowledged in this debate.

In utilities, competition has been enabled at the service level, as regulators regarded policies that would incentivise the deployment of duplicative pipes and cables to be wasteful. However, in telecoms, the picture is more complex, due in part to the presence of cable-TV networks (now consolidated into one, owned and operated by Virgin Media), and some commercial ‘over-build’ of networks where the business case is strong and where the service offering can be different (another difference from utilities).

Telecoms regulatory policy in first-generation broadband has been focused on ‘loop local unbundling’. Although there is an element of infrastructure investment in this, companies such as Sky and TalkTalk still use BT’s copper local loops to connect customers. However, the situation changes somewhat with superfast broadband, as regulation focuses more on service-level competition, due to the more challenging economics of ‘unbundling’ superfast-broadband networks compared to first-generation broadband networks. Ofcom, the telecoms regulator, came to this conclusion in its own analysis,¹⁰ and we have reached similar conclusions for regulators in other leading broadband markets, for example, the Netherlands.¹¹

⁸ More so in fixed telecoms than mobile telecoms; and in fixed telecoms, more so in rural areas than in urban areas.

⁹ Source: Analysys Mason Research, as of 3Q2012.

¹⁰ See Ofcom’s statement for ‘*Review of the wholesale local access market*’, 7 October 2010: <http://stakeholders.ofcom.org.uk/consultations/wla/statement>

¹¹ See our work for Opta, ‘*The business case for fibre-based access in the Netherlands*’, 2008, available at: <https://www.acm.nl/en/publications/publication/9702/The-business-case-for-fibre-based-access-in-the-Netherlands-additional-research-project-by-Analysys-Mason/>

It was the major telecoms sector review undertaken by Ofcom, which concluded in 2005, that led to BT being subject to new and far-reaching regulation, with Ofcom requiring BT to create a new and separate division, called Openreach. This division runs the local access network that connects homes and businesses to BT's telephone exchanges¹² with copper local loops. Significantly, Openreach is required, under a series of legal undertakings, to enable customer choice at the retail level by providing wholesale access to its network to any operator on the same basis as it sells to other parts of BT. This is important to bear in mind when some commentators and senior politicians talk of BT being a 'monopoly'; BT, and Openreach in particular, have controls placed upon them to prevent monopolistic behaviour, and it is one of Ofcom's primary duties to ensure that this remains the case. It is also important to note that the same regulation applies to BT when it delivers 'final third' projects, and access to Openreach's network is generally charged at wholesale rates that are 'cost-oriented', that is, they reflect the actual costs, meaning that BT cannot simply charge what it wants.

"BT, and Openreach in particular, have controls placed upon them to prevent monopolistic behaviour, and it is one of Ofcom's primary duties to ensure that this remains the case."

5 The additional challenges for the final 10%

For a number of technical reasons, it becomes more difficult for BT to use its existing network assets to provide superfast broadband to the final 10%, due to, for example, issues that arise relating to the length of copper lines, the size of cabinets and the more extensive use of aerial deployment in rural areas. Therefore, the costs of providing broadband to those premises can increase markedly as more expansive network upgrades are required, a characteristic that was also demonstrated in our fibre costing work for the BSG.

In this context, it would seem very unlikely that any other telecoms operator could deploy fixed networks for the final 10% at a cost that was significantly below that of BT. This is a view that was also shared by Dido Harding, the CEO of TalkTalk, at the July Public Accounts Committee meeting. Our own analysis suggests that there are benefits in having a single provider of infrastructure, at scale, in very rural areas, and provided tight regulation is in place (as it is), then competition can still be promoted at the service level.

6 What approaches might communities want to consider for the final 10%?

We do not intend this paper to detract from the ambitions or efforts of communities, or indeed highly-motivated individuals who might champion projects. Instead, we urge communities to be aware of the associated risks, as they are not always fully understood by communities, or straightforward to overcome.

¹² Openreach also operates other parts of the BT network connected to its telephone exchanges.

We see four potential approaches that communities might consider:

1. Support self-built community networks.
2. Support local alternative network operators (local altnets).
3. Support any rural broadband network with public funding.
4. Partner with an established operator.

We focus on Approach 1 in this paper, as we believe this to be of primary interest to communities at present. Approach 2 covers privately funded initiatives and is included as some communities are being approached by local altnets for support. Approach 3 carries additional obligations, because of public funding, under European state-aid rules. Approach 4 is less well understood by communities, and in some cases, effectively ruled out by those that are 'anti-telco' or 'anti-BT', often for reasons that are not clear; this paper, therefore, aims to present the fourth option in a more balanced and neutral way.

As recent evidence shows, it can be difficult, even for relatively large, new broadband projects, to reach critical mass to ensure financial sustainability: SYDR was around one hundred times larger than most community networks, but ran out of money – even though it was backed by the major French conglomerate, Thales, and the UK public sector.

6.1 Approach 1: Support self-built community networks

It is interesting to consider why a self-built approach might work in broadband but not in utilities. No one would really consider installing their own gas or water pipes, or electricity cables, and then connect them up to the main utility networks, so what makes telecoms different? This is one of the conundrums of self-built community networks: advocates of this approach often make the case that telecoms should be considered a 'must-have', or the 'fourth utility' (after gas, electricity and water); yet such networks are rarely, if ever, run on an equivalently professional, 'essential service' basis.

Self-built networks are occurring across a small number of very rural parts of the UK. They are normally FTTH networks, as communities believe that FTTH is the best solution. This contrasts with the telecoms operators, which believe that the costs of wide-scale FTTH deployment do not justify the

"While they can overcome one of the challenges of the final 10% (i.e. the build cost), these initiatives do not overcome a number of the other challenges that small-scale networks always face."

returns, at least at present – this commercial view is held by many of the larger European operators as well, not just those in the UK.

Communities who carry out the digging themselves can do it at lower cost than telecoms operators¹³ as they do not charge a normal commercial rate for the work involved; indeed, in some cases, they may be doing the work in return for equity in a new venture, or even pro bono. These initiatives tend to be much localised, covering hundreds of premises, or sometimes a few thousand, and while they can overcome one of the challenges of the final 10% (i.e. the build cost) they do not overcome a number of the other challenges that small-scale networks always face.

¹³ It is worth noting that following Ofcom's intervention, Openreach's regulated charges for installing ductwork fell significantly on 1 April 2013 by between 43% and 50% (depending on terrain).

Financial sustainability risks associated with running operations that are 'too lean'

Many self-built community networks are in effect run by volunteers. While this is undoubtedly a cost-effective way of staffing in the near term, the sustainability of such a model is questionable, and furthermore, it seems inconsistent with the concept of broadband as an essential service. Some self-built networks openly acknowledge that they will need to pay staff at some point in the future as the volunteer model is not sustainable – and we would agree with this view.

Even if self-built community networks plan for staff and their associated costs, total costs can easily be underestimated. For example, they may not make explicit provision for network maintenance costs, overlooking the fact that there are always operational issues with networks, however modern or well-built they might be. This is likely to become more problematic over time, as people's tolerance of not being connected diminishes as reliance on the Internet grows. Other ways in which costs could increase include staff retention issues due to people moving out of the area, illness or other personal reasons, and other general and administrative costs being higher than expected. In addition, should take-up fail to meet projections, there could be further costs, for instance, to fund advertising and promotions. Finally, capital expenditure could be higher if there are unforeseen issues when connecting customers, or if there is no provision for replacing equipment. In our experience, it is quite common for self-built networks to overlook these issues. Self-built networks are evidently planned to be run 'on a shoestring' and because of this their ability to generate cashflow is very finely balanced. Should costs increase above projections it could very quickly bring into question the financial sustainability of those networks, in the same way it did for SYDR and the small-scale, first generation broadband networks that preceded it in the early 2000s.

"Self-built networks are evidently planned to be run 'on a shoestring' and because of this their ability to generate cashflow is very finely balanced."

Potential risks associated with closed networks

A second potential issue relates to customer choice. Some self-built networks are not conceived to be open access, meaning that there is only one retail provider and no choice for consumers. This combination of the same organisation running both the infrastructure and services is often termed 'vertical integration'.

Our own research¹⁴ suggests that over 50% of consumers will take three or more services from the same provider by the end of 2016 and this is expected to increase further over time. If community networks are not attractive to major retail providers, then consumer concerns about choice and the benefits of bundling in terms of price could increase. However, for those networks that are planned to be open access, they can still find it difficult, because of their small scale, to attract the interests of the major telecoms operators like TalkTalk and Sky. This is because there are real costs involved for both parties in interconnecting networks.¹⁵ Self-built networks cannot easily bear these costs (due to their 'leanness', as discussed above), whereas for the telecoms operators, the associated costs often outweigh the benefits of the marginal increase in their addressable markets.

"Our own research suggests that over 50% of consumers will take three or more services from the same provider by the end of 2016."

¹⁴ Source: Analysys Mason Research, 2013.

¹⁵ We identified this issue in our report for Ofcom, 'UK local fibre access deployment study', 27 January 2011.

More generally, projects should always aim to minimise barriers to adoption; for example, using common technical specifications (based on standards) and wholesale products.¹⁶

6.2 Approach 2: Support local alternative network operators ('local altnets')

Communities could support a small-scale, privately funded operator to invest in its local area. Community support could be in the form of collecting and providing information to the operator about the level of expected demand (rather than through the provision of public funds, which is considered in Approach 3). Local altnets are likely to be more professional in their approach to operations and maintenance than that of a self-built network, yet there are still potential risks that communities need to be aware of.

Potential future-proofing risks and prospects for higher costs in the longer term

Local altnets face different incentives to self-built community networks, since the operator itself would normally bear the full costs of deployment.¹⁷ There can be a tendency for the operator to use 'low cost' and potentially lower quality, installation techniques that could result in higher costs over the longer term, for example, to cover remedial action needed to address accidental or malicious damage to poorly installed ducting or fibre. Anecdotal evidence suggests that such techniques are being used in practice. This also goes against operators' claims of deploying future-proofed infrastructure. This situation is not helped by the fact that there are no mandated standards for network installations, although BT and other more established operators have rules that have proven to be robust over time.

Similar-scale issues and risks associated with closed networks

In cases where local altnets are supportive of open access, there still remains a risk of lack of retail provider choice.¹⁸ Although local altnets may benefit from increased scale due to operating across multiple geographic areas when compared with self-built networks, the aggregation may not be sufficient to encourage Sky, TalkTalk and others to interconnect. The situation in Kingston-Upon-Hull is an interesting case in this respect: the local operator, KCOM, is regulated to offer access to competitors in a similar way to BT, yet there has been no significant competitor entry in Hull, despite a market of around 250 000 people. Nevertheless, for any communities wishing to support local altnet deployments, they should also insist on the use of common technical specifications (based on standards) and wholesale products.

"KCOM is regulated to offer access to competitors in a similar way to BT, yet there has been no significant competitor entry in Hull, despite a market of around 250 000 people."

Alternatively, some local altnets may remain vertically integrated. They might choose to do this because they see the greatest revenue potential at the retail level, or because they are not forced by regulation to provide open access to their networks. Either way, there is an inherent risk that customers will not have a choice of provider at the retail level.

¹⁶ This was one of the critical success factors for efficient and effective interventions we identified in 2008, see our report for the Broadband Stakeholder Group 'Models for efficient and effective public-sector interventions in next-generation broadband access networks', 9 June 2008; it was also highlighted in the guide we produced for the EC, 'Guide to broadband investment', September 2011.

¹⁷ We note a hybrid of Option 1 and Option 2 could be possible, with community self-build helping lower the costs of local altnet deployment.

¹⁸ Also see our report for Ofcom, 'UK local fibre access deployment study', 27 January 2011.

6.3 Approach 3: Support any rural broadband network with public funding

When public funding is involved in any broadband initiative, there is an obligation, under the EC's state-aid rules,¹⁹ to provide open access to that network. This would apply to any project using UK Government funds (e.g. BDUK or RCBF funding), or European funds.

The EC acknowledges that providing open access will incur new costs, and that this can influence how the open-access obligation is enabled technically; in rural areas specifically, they accept that access at the infrastructure level will be more difficult than at the service level.

"As soon as any public money is used, the open-access obligation applies, meaning that any other telecoms operator, including BT, must be granted access to the network if they request it."

The open-access obligation also holds for initiatives that started life as Approach 1 or Approach 2, but which later go on to seek public funding; for example, if they are experiencing cashflow issues, or if they need subsidies to fund the deployment in a particularly uneconomic area. As soon as any public money is used, the open-access obligation applies, meaning that any other telecoms operator, including BT, must be granted access to the network if they request it. Communities who do not comply with this could face an investigation by the EC and as a result their project could face delays or even closure. There are

a range of other obligations under the EC's state-aid rules that also need to be met – we do not cover these here in detail as they are provided in detail in the EC's Guidelines.²⁰

Public funding is unlikely to help address the financial sustainability risks of small-scale networks, irrespective of whether they are self-built or built by a local altnet, since the main risk relates to operating costs over the long term, and it is generally considered to be bad practice by policy makers to fund these costs on the grounds of both value for money and market distortion.

6.4 Approach 4: Partner with an established operator

It is possible to combine the benefits of Approach 1, notably the drive of community localism, with the scale economies of an established telecoms operator. This hybrid approach would help overcome the risks identified in the first two approaches, namely financial sustainability and/or lack of retail provider choice. It could work, for example, by BT providing ducting to local communities for them to install, but which is then 'adopted' into the BT network for operation. The communities would benefit from the purchasing power of BT in buying raw materials (ducting), but more importantly, the adoption into the national network, operated by Openreach, would ensure that communities have access to the same level of retail choice as the rest of the country, while also having the assurance that the network would be operated and maintained

"This hybrid approach would help overcome the risks identified in the first two approaches, namely financial sustainability and/or lack of retail provider choice."

¹⁹ See the EC's *Guidelines for the application of State aid rules in relation to the rapid deployment of broadband networks*, 2013/C 25/01; also see the EC's state aid approval for BDUK's rural programme, *National Broadband scheme for the UK – Broadband Delivery UK*, 20 November 2012.

²⁰ The EC defines a number of necessary conditions in its state-aid guidelines, including the need to undertake mapping and coverage analysis, and market research and consultation; the need to use a competitive tender process and select the most economically advantageous offer; maintaining technology neutrality; using existing infrastructures where possible; providing wholesale access, at prices based on regulatory pricing principles and on benchmarks; ensuring monitoring and a clawback mechanism; and providing transparency and reporting.

professionally. We understand that BT is trialling this kind of approach with a small number of communities at present.

It is true that established operators, including BT, are likely to find it difficult to respond to communities' requests as quickly as some communities might wish – this is due in part to the large size of established operators, their organisational structures, and their need to follow procedures and processes. However, established operators also have a greater ability to invest in R&D and deploy innovations at scale once the decision has been made to commercialise them.

Alternatively, it may be possible to extend existing county-level BDUK schemes to incorporate areas where the final 10% of premises can be found. There may be specific issues relating to the existing BDUK framework contract in this case, or procurement process and state-aid issues to address, which we do not attempt to cover in this paper.

7 Other important factors for communities to consider

Communities should also consider the broader product portfolio on offer, and how this might evolve over time; as already explained, customers are increasingly purchasing bundles of services. We expect this trend to continue, as 'cloud' services become increasingly common. These services require reliable and consistent broadband networks if they are to offer optimum performance and customer satisfaction – this is true for both consumer and business cloud services.

When comparing current and future services on a like-for-like basis, communities need to look beyond the headline monthly charges and consider the overall service offering. Often, there are 'hidden' costs relating to customer support, or a lack of explicit mention of commitments to detect and repair faults; more broadly, it is important to understand the service levels being offered to the end users and what resources end users have if those service levels are not maintained. As we stated earlier on, customer satisfaction will be increasingly impacted by these factors as their day-to-day reliance on the Internet continues to increase.

Some, but not all, rural broadband initiatives suggest that communities use the network for voice as well as broadband. On face value, this might be attractive, as it could lower monthly costs for consumers. However, communities also need to be aware of the implications of this. Voice-over-broadband evidently works (e.g. Skype), yet it can be difficult to ensure the same level of quality as the traditional voice network. Furthermore, consumers need to be aware of the wider impacts, like access to emergency services. In copper networks, power is provided down the line itself to the handset; this is not possible over fibre and a battery back-up system needs to be planned in order to support calls to the emergency services in the event of a power failure.²¹

²¹ Also see our report for Ofcom, 'UK local fibre access deployment study', 27 January 2011.

8 What next for communities?

We hope this paper has been informative for communities and helps make them aware of the realities of connecting the final 10% of the UK. We fully understand the frustration that communities in the final 10% can feel and their desire to take action themselves. There can be a temptation for communities to move fast, but we hope this paper gives pause for thought, and the right level of information, to make the right choices.

For communities planning to support self-built networks (Approach 1) or local altnets (Approach 2), it is important that they understand the risks we have identified, to ask the right questions and to plan accordingly. For communities looking to invest public funds (Approach 3), it is imperative that they understand the implications of open access, as well as the other obligations under the EC's state-aid rules. And finally, for Approach 4, we have indicated at least one way by which the power of local communities could be combined with the scale economies of an established operator like BT and which could mitigate the main risks facing small-scale networks.

Communities themselves need to decide which approach suits them best, taking careful account of their local situation. We suggest this is best done through a collaborative approach, working with the telecoms industry (large and small companies alike), central and local government, and Ofcom, to help ensure that the UK Government's broadband policy objectives are met in the most efficient and sustainable way.

About the author



Dr Matt Yardley (Partner): Matt has directed numerous strategy projects for operators on the commercial case for investment in next-generation networks (fixed and mobile), and for regulators on competitive issues associated with the roll-out of new networks. He led the UK fibre costing project for the BSG, which effectively defined ‘the final third’ in Lord Carter’s *Digital Britain* report; he also directed the subsequent BSG project on the costs and capabilities of wireless and satellite. He has advised the EC on the Digital Agenda for Europe and the European Investment Bank broadband market development. Matt also leads Analysys Mason’s broadband public policy and intervention work for central, regional and local government organisations. He has advised governments around the world on broadband development and stimulus activities including in Brunei, Ireland, Qatar, Malta, Morocco, Singapore, Thailand and the UK.

Contact details

Dr Matt Yardley (Partner)
matt.yardley@analysismason.com
07766 058 242

Published by Analysys Mason Limited • Bush House • North West Wing • Aldwych • London • WC2B 4PJ • UK
Tel: +44 (0)20 7395 9000 • Fax: +44 (0)20 7395 9001 • Email: research@analysismason.com • www.analysismason.com/research

Registered in England No. 5177472

© Analysys Mason Limited 2013

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means – electronic, mechanical, photocopying, recording or otherwise – without the prior written permission of the publisher.

Figures and projections contained in this report are based on publicly available information only and are produced by the Research Division of Analysys Mason Limited independently of any client-specific work within Analysys Mason Limited. The opinions expressed are those of the stated authors only.

Analysys Mason Limited recognises that many terms appearing in this report are proprietary; all such trademarks are acknowledged and every effort has been made to indicate them by the normal UK publishing practice of capitalisation. However, the presence of a term, in whatever form, does not affect its legal status as a trademark.

Analysys Mason Limited maintains that all reasonable care and skill have been used in the compilation of this publication. However, Analysys Mason Limited shall not be under any liability for loss or damage (including consequential loss) whatsoever or howsoever arising as a result of the use of this publication by the customer, his servants, agents or any third party.