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An Comhchoiste um Chumarsáid,

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Tuarascáil ón gComhchoiste

maidir le

himscrúdú chun scrúdú a dhéanamh ar phróiseas an Phlean
Leathanbhanda Náisiúnta go dtí seo agus ar an tslí is fearr chun dul ar
aghaidh agus ar an modh is fearr chun an leathanbhanda a leathnú
amach faoin tuath

A leagadh faoi bhráid dhá Theach an Oireachtais 27 Lúnasa 2019

Houses of the Oireachtas

Joint Committee on Communications,

Climate Action and Environment

Report of the Joint Committee

on

an investigation to examine the National Broadband Plan process thus far
and how best to proceed and the best means to roll out rural broadband

Laid before both Houses of the Oireachtas 27 August 2019

32CCAE013



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Appendix 1: Orders of Reference – Joint Committee on Communications, Climate Action and Environment

Functions of the Committee – derived from Standing Orders [DSO 84A; SSO 70A]

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Dáil Select Committee on Communications, Climate Action and Environment

Seanad Select Committee on Communications, Climate Action and Environment

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FOREWORD

The National Broadband Plan (NBP) is the Government's plan to deliver high speed broadband services to all businesses, farms and households in Ireland. It aims ensure that everyone in Ireland will have equal access to a high speed broadband service.

In May 2019, Government approved the appointment of a "Preferred Bidder". This is the final step in the NBP procurement process before a Contract is awarded and deployment begins in the State intervention area. It means that the Bidder has passed the evaluation process carried out by the Department of Communications, Climate Action and Environment.

Some Members of the Joint Committee expressed concerns at the fact that the cost of the National Broadband plan subsidy had increased from approximately €800 million to almost €3 billion and agreed to conduct an investigation to examine the National Broadband Plan process thus far and how best to proceed and the best means to roll out rural broadband.

The Committee agreed that this investigation should be concluded before the Government awards the contract in September 2019. The Joint Committee undertook hearings with the relevant stakeholders throughout May, June, July and August and this report sets out a factual account of the discussions that took place.

I would like to thank all the individuals and groups who assisted and contributed to our consideration of this subject, including those who made submissions as well as those who appeared before the Joint Committee.

Finally, I would like to thank the members of the Joint Committee and the Committee's Secretariat for their assistance in compiling this report.

Hildegarde Naughton

Hildegarde Naughton
Cathaoirleach (*Chairman*)
27 August 2019



PREFACE

In August 2012 the then Minister announced the NBP. On the 15th July 2015 DCCAE published a draft strategy and map of the proposed intervention area, which included a promise of a 2020 timeline for delivery. In December of 2015 the DCCAE published an intervention map and announced a shortlist of five bidders for the project which included eir, Siro, Enet, Imagine and Gigabit Fibre.

In July 2016 three bidders, namely eir, Enet and Siro, proceeded to the next stage of the procurement process. In April 2017 the Minister announced a Government deal with eir to remove 300,000 homes from the NBP leaving 540,000 for the State-subsidised scheme.

In September 2017 – SIRO withdrew from the process stating that there was no longer a business case for its continued participation.

The DCCAE received detailed solutions from the two remaining bidders, namely Enet and eir, in September 2017. In their detailed solution submissions, both of the bidders that remained in the procurement process projected significantly higher levels of subsidy than the DCCAE's budget model. The DCCAE, therefore, made the decision to reappraise the project in accordance with the public spending code and asked KPMG to assist. The reappraisal identified a long list of eight options.

In January 2018 eir withdrew from the process citing growing uncertainty about regulatory and pricing issues. The sole remaining bidder Enet was joined in its bid by Airtricity owner SSE. In July 2018 SSE withdrew from the lead bidding consortium which was now led by Granahan McCourt.

Following eir's withdrawal from the process, the DCCAE requested that KPMG undertake a review of the available procurement options. The review concluded that the current process should continue.

In September 2018 the Granahan McCourt Consortium submitted its final tender document to the DCCAE.

In May of 2019, despite a memo from DPER strongly recommending against approving the appointment of the preferred bidder, the Government announced that Granahan McCourt had been approved as the “preferred bidder” with the value of the contract to be capped at just under €3 billion and requiring the company to build and operate the network for 25 years, with an option for the State to extend for a further 10 years. The network will not be owned by the State after the conclusion of the contract.

The Joint Committee expressed concerns that (a) the cost of subsidising the plan had risen from approx. €800 million to almost €3 billion since its original announcement and (b) DPER had made a strong recommendation against approving the appointment of the preferred bidder on the grounds of:

Cost and affordability;

Impact on the NDP and on projects forgone as a result;

Value for money and specifically, uncertain benefits;

Unprecedented risk for the Exchequer; and

Compatibility with the spatial objectives of Project Ireland 2040.

The Joint Committee felt it had no option but to investigate these issues before the final contract is awarded stating that it was vital that it get this process right and at the same time not delay the process unduly.

This report sets out an accurate reflection of what transpired at a series of hearings held by the Joint Committee with a number of relevant stakeholders.

Glossary of Terms

NBP	National Broadband Plan
DCCAE	Department of Communications, Climate Action and Environment
DPER	Department of Public Expenditure and Reform
Joint Committee	Joint Committee on Communications, Climate Action and Environment
FTTH	Fibre to the Home
ComReg	Commission for Communications Regulation
NBI	National Broadband Ireland
Minister	Minister for Communications, Climate Action and Environment
CBA	Cost Benefit Analysis
PPP	Public Private Partnership
VFM	Value for Money
SLA	Service Level Agreement
USO	Universal Service Obligation

[The references at the end of the paragraphs signify the date of the Joint Committee hearing and the page number of the official transcript]

1. TECHNOLOGY

1. The Joint Committee raised concerns that had been voiced in the wider discourse that other technologies might be more suitable than an extensive and expensive project of bringing fibre to the home broadband (FTTH) to every home in the intervention area. For example, some commentators had questioned the wisdom of this approach when developing 5G technology could make wireless internet more attractive.
2. DCCAE's response to this was that all bidders who bid in the procurement process, which did not specify a particular technology, identified 100% FTTH as the most efficient and economical method. They stated that full 5G coverage would require thousands of new masts to be built around the country. [22/05 p.33]
3. ComReg also informed the Joint Committee that they did not believe 4G or 5G mobile networks can meet the objectives of the NBP (which include 100% of the country receiving data transfer speeds of 30 Mbps). They said that fixed wireless broadband could form part of a solution but only selectively. [05/06 p. 4, 5]
4. The Regional Internet Service Providers Association outlined to the Joint Committee an alternative approach that would achieve the NBP's aim in two years instead of seven and for a net cost to the State of €402m compared to €2.97b. RISPA stated that the approach of using a mix of broadband radio technology and fibre optic technology is well suited to Ireland's geography. They also stated that broadband radio technology that is used in a hybrid broadband approach can wirelessly connect multiple properties over long distances with speeds of 150+ Mbits. Full details of the proposal are contained in Appendix 4.
5. RISPA were questioned by the Committee as to why they did not enter the procurement process in 2015. They stated that bidders could propose to meet the tender obligations by either installing a fibre optic cable to each property in the intervention area or by way of mobile communications technology that utilised licensed spectrum, excluding all wireless technologies other than licenced spectrum. This meant that approximately 40 ISPs who have been successfully providing internet access throughout rural regions for almost 20 years could not bid.

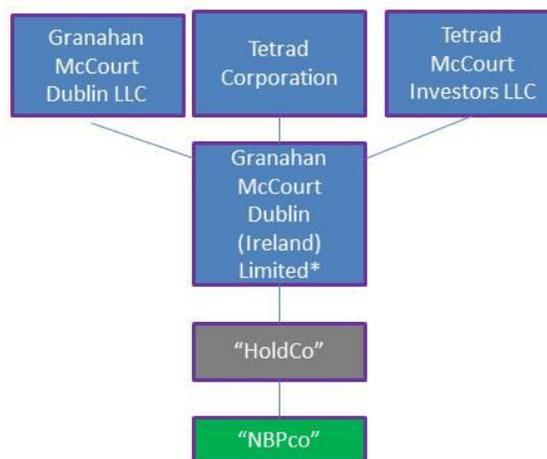
2. TECHNICAL EXPERTISE OF “PREFERRED BIDDER” AND GOVERNANCE

6. The Joint Committee questioned whether the successful bidder consortium, led by Granahan McCourt, had the technical experience necessary to deliver the project, especially as compared to the experience of telecommunications found in the other consortia who had earlier withdrew from the procurement process. Questions were raised about the value which will be added by the successful bidder since much of the work will be done by sub-contractors, and whether DCCAE could perform that co-ordinating role themselves.
7. DCCAE stated that they are not best-placed to deliver this co-ordinating role and that the new NBI company being established by Granahan McCourt for this project contains “depth of expertise”. They emphasised the scale of the contract and stated that the NBI is employing experienced people to oversee sub-contractors. [22/05 p.24]
8. University of Limerick academics questioned how realistic it is that DCCAE would be able to ensure the appropriate level of governance and oversight of such a complex contract, with a budget of up to €10 million per annum for up to ten permanent civil servants and support from external advisers. [19/06 p. 5] They also pointed to examples in PPPs where management is not sufficient and penalties for poor performance were not imposed, highlighting the importance of governance. [19/06 p. 8]
9. University of Limerick academics also pointed out that there may be institutional reluctance to change tack and stated that good practice would see different agencies managing different aspects of the procurement, such as splitting the agency that sponsors the project and the one who conducts the appraisal. [19/06 p. 12] They stated that the National Development Financial Agency (NDFA) should have had greater involvement in the procurement process and found the level of utilisation of this State Agency “hard to fathom.” [19/06 p. 12]

3. STATE PROTECTIONS

10. The Joint Committee expressed concern that there might not be sufficient protections to tie investors to the project if NBI did not perform adequately or the investors no longer wished to continue to make the necessary investment. The Joint Committee identified that Tetrad Corporation is the company providing investment capital yet structurally it is at a remove from the operations of NBI.
11. DCCAIE assured the Joint Committee that input from lawyers assured them that there were sufficient contractual protections to retain obligations on every entity involved. They also stated that “they have a charge over all the assets that are built until the full contract is honoured for 25 years.” They also stated that if the contract is not honoured, entities could be sued by the State. They stated that everything will be “[contractualised] to the nth degree, all the way from NBI, Holdco and up to Tetrad Corporation and Granahan McCourt.” [22/05 p.35]

Ownership of Granahan McCourt Dublin (Ireland) Limited as submitted at Final Tender September 2018



- In addition to the three companies listed above, approximately 1.5% shareholding is held by current and former employees
- This diagram sets out the ownership structure as submitted at Final Tender in September 2018. Any modifications to shareholdings that may be made after Final Tender, will be reviewed by the Department in advance of Contract Award
- Tetrad Corporation, Granahan McCourt Dublin LLC, Tetrad McCourt investors LLC. are companies owned by David McCourt and the Scott Family
- NBPco is the term used to describe the new Company that was required to be established. This company is National Broadband Ireland

12. DCCAIE also stated that in the scenario that the project is not successful, if there is failure during design, build or operation phases, the State can step in to take the asset if it chooses to do so. [22/05 p.13]
13. KPMG said that each change to the winning consortium has been assessed against the original criteria to ensure it still has the capability to undertake the project. [05/06 p. 27]
14. University of Limerick academics told the Committee they were concerned that the degree of equity investment from the successful bidder is so low that it could undermine the mechanisms which are meant to drive the advantages of a public private partnership, as the investor does not have enough skin in the game. [19/06 p. 9]

4. SUBSIDY

15. Concern was expressed about the level of subsidy which is to be provided to the successful bidder for the delivery of the project and whether this would be measured against performance.
16. DCCAIE stated the granting of the subsidy, which is to be done over the next ten years with some further customer connection subsidy payments for the following fifteen, will only be done on the basis of performance and reaching milestones. There are “strict criteria set out in detail in the contract” and areas of performance measurement include network design, homes passed, customers connected and network operation. [22/05 p.14, 32]
17. The Joint Committee questioned the cost elements which added up to the full State maximum subsidy of €2.9 billion, and the reasons the costs had increased so much from previous expectations.
DCCAIE verbally provided the following cost breakdown to the Committee:
€2.9 billion total subsidy:
€355 million VAT.
€2.6 billion net subsidy

18. Within the €2.6 billion there is €480 million contingency fund, divided across 14 separate activities which may incur additional cost depending on conditions.
19. Costs of the remaining €2.1 billion are (a) the cost of passing 540,000 premises in the intervention area (b) the cost of connecting homes and (c) the cost of renting infrastructure. The cost of passing homes is expected to be approximately €1 billion, including the cost of purchasing materials. The cost of connecting homes is expected to be between €400 million and €700 million but the subsidy is capped at €700 million. The cost of renting poles from eir over 25 years is expected to be €900 million, but prices may change depending on ComReg decisions. [22/05 p.4]
20. KPMG stated that In September 2017 the DCCAE received detailed solutions from the two remaining bidders, *“which projected significantly higher levels of subsidy than the Department’s budget model”*. KPMG stated that this difference was in the order of €1 billion. Subsequently, the sole remaining bidder’s final tender pricing was higher than expected in some areas. [05/06 p. 22, 25]
21. To explain the rise in subsidy in the order of €1 billion in September 2017 from the DCCAE’s model, KPMG said:
- “A key element related to the costing of the technical solution that was going to be used. Additional information came to light on the design of the network required to deliver broadband and the extent to which the network was going to be able to rely on the existing infrastructure, the coverage that would provide and the cost to implement the project. That information would have come to light over the course of the competitive dialogue process.”* [05/06 p. 25]
22. The Joint Committee also expressed concern that, as the subsidy estimate increased substantially at two points, an earlier perception that an insufficient subsidy would be available could have encouraged bidders to abandon the process. [05/06 p. 25]
23. When questioned whether it was fair to assume that when ESB withdrew as it did not feel that that level of subvention was available, ESB stated that this is a fair comment. [26/06 p.8]

24. KPMG also confirmed that removing the 300,000 homes from the intervention area, which eir were able to provide service to, contributed to the change in cost. They said “the cost impact might have been dependent on who the winning bidder was [but] one way or another, removing the 300,000 premises would have removed revenue from the project.” [05/06 p. 32]
25. Analysys Mason, who advised on technical costs but not on the demand-side, stated that the bidder’s final tender had Capex and Opex costs that were similar to the costs they had modelled, with variances in expected take-up being the main difference. [12/06 p.5, 9]
26. Analysys Mason also stated that, in their view, there are three main reasons why the overall subsidy (initially expected to be €800 million) increased, two of them related to increased costs. The “most important” cost change in the process was the bidder’s decision to build parallel cabling through the 300,000 homes which had been removed from the intervention area because of eir providing broadband to them, rather than using eir’s cable as well as its poles and ducts. “That is more expensive because it involves deploying new infrastructure across that area.” [12/06 p.5]
27. Analysys Mason further stated that parallel fibre construction also constitutes a “double whammy” as the bidder will not be able to generate any revenue inside that area, as it would constitute a breach of state aid rules. [12/06 p.6]
28. Analysys Mason stated the parallel fibre built through eir’s 300,000 area is necessary, as these premises are mostly located between premises in the intervention area and exchanges that need to be reached to connect them to the network. They said that “the 300,000 is basically the 300,000 premises near the exchanges.” [12/06 p.17]
29. Analysys Mason said eir made an offer to the successful bidder to use their infrastructure to traverse through the 300,000 area, which would have cost less for the State, but that due to technical concerns the bidder rejected the offer. [12/06 p.21]
30. As outlined above, Analysys Mason had told the Committee that one of the reasons for the cost increase was the decision not to rent eir’s fibre. However, in follow-up

correspondence to the Committee sent on 3 July they said that the two non-eir bidders in the process had done modelling which showed that using eir's fibre product would be significantly more expensive than just renting poles and ducts from eir. Though Analysys Mason's cost assessment had estimated that deploying additional fibre would cost more than using eir's fibre, the bidders' own models had different findings. The differences in findings were based mainly on (a) a different network topology used by the bidders resulting in a lower network length in the area to be traversed through and (b) a lower poles and ducts rental price due to the project scale.

31. The result is that the bidder felt that there was no cost advantage to using eir's fibre in the 300,000 premises area (*"Bidder A did not feel at a cost disadvantage for using the Pole and Duct Rental option compared to the FVI option."*).
32. This follow up correspondence also stated that using one's own fibre allows more flexibility and that the product eir made available had practical limitations including risk of mismatch between roll-out commitments, risk of mismatch on Product Technology Roadmap, lack of guarantees on product location, and mismatch on minimum service levels. [Follow-up correspondence at Appendix 3]
33. DCCAE corroborated the Analysis Mason follow-up correspondence to the Committee, saying that because the preferred bidder's design starts at the metropolitan area networks, it will not get the same cost saving that eir would have from reusing the fibre and it was actually cheaper for them to build their own network. [03/07 p. 34]
34. The second reason for the increase in cost from the original cost model was an incorrect estimate on Analysys Mason's part about the mix of overhead and underground infrastructure in the intervention area. Underground deployment is more costly and they underestimated how much would be needed. [12/06 p.19]
35. The loss of revenue from the 300,000 homes served by eir and taken out of the intervention area, was not a "cost" but caused the subsidy to increase, and this and other revenue/demand factors are the third element implicated in the subsidy increase. [12/06 p.7, 19,20]

36. The Joint Committee asked Analysys Mason how much of the subsidy change related to technical costs and how much to changes in expected revenue, but they would not reveal that information due to reasons of commercial sensitivity. [12/06 p.10]
37. University of Limerick academics pointed out that, from their reading of the DPER memo, the operator will have made all its money back within 7 or 8 years, with everything after that being additional. [19/06 p. 17]
38. University of Limerick academics stated that the original estimated subsidy budget was between 500 million euro and 1 billion euro. eir signed the commitment deal to remove 300,000 premises from the intervention area in April 2017. In September 2017, when both eir and Granahan McCourt submitted detailed submissions, both bids included significantly higher levels of subsidy. Since eir withdrew from the competition it appears the cost of subsidy to the Exchequer has increased further. [19/06 p. 5]
39. University of Limerick academics stated that it seemed DCCAЕ’s budget model had assumed that the successful bidder would rent eir’s fibre in the 300,000 premises area and “there are still serious questions regarding exactly how much additional cost is being incurred as a result of the decision to roll out a parallel fibre network in the 300,000 premises area and why Granahan McCourt is being allowed to do so.” [19/06 p. 5, 23, 25]
40. Another potential driver of increased subsidy cost, according to University of Limerick academics, is that “it is using next generation technology for optical equipment, which is different from what the DCCAЕ had assumed would be the case, whereby the current technology would be refreshed in five to seven years as the industry evolves.” Therefore, more advanced technology is being put in earlier than had been expected, which will mean more exchequer subsidy for capital costs than if it was refreshed later, which could be coming out of revenues. [19/06 p. 7, 25, 34]
41. While the University of Limerick academics agreed that signing the commitment deal with eir for 300,000 premises had an impact on the cost of the subsidy, they stated that under State aid rules, the Government had no choice but to allow it. [19/06 p. 13]

42. eir disputed claims that its commitment to provide 300,000 premises with fibre helped to drive the subsidy cost increase. They point to a KPMG report from April 2017, after the premises had been removed from NBP, which predicted a budget model of €787 million subsidy. They said that the removal of the 3000,000 premises should have led to an overall reduction in the subsidy cost. [25/06 p.3, 17]
43. eir said they specifically decided to terminate the 3000,000 ribbon with a more expensive unit to facilitate the NBP, as it would allow any successful bidder to connect and fully utilise the asset. [25/06 p.3]

5. STATE INVESTMENT RISK VERSUS PRIVATE INVESTOR RISK

44. The Joint Committee queried whether the investors in the NBI company could make large profits, if the project is very successful, and whether this would be fair given the large State subsidy which will frontload the project.
45. DCCAE stated that a 60% clawback for excess profits has been secured, and that if there is significant value in the business in year 25, a percentage of that will go as clawback to the State. [22/05 p.6, 32]
46. KPMG stated that the bidder would experience risk around deployment, level of demand and maintaining the network. [05/06 p. 26]
47. University of Limerick academics identified optimal risk transfer as one of two main drivers of value for money in public private partnership contracts and said that *“it is typical in privately financed PPPs for financial risk to be assumed by investors that contribute equity and loans to the PPP”* but that the private investment in this case was a very low percentage of total costs. They also said that it appears that the special purpose vehicle will not borrow significant amounts from banks or capital markets and instead will operate on a cash flow basis and rely on payments from the Exchequer. Therefore, unlike other privately financed PPPs, it will not have the benefit of close monitoring by experience lending. [19/06 p. 3]

6. NBI GOVERNANCE STRUCTURE

48. The Joint Committee questioned the reason that only one member of the Board of the NBI company will be appointed by the Minister, while eight will be appointed by the investors, especially considering that the State are providing much more initial capital investment than the investors. Concern was expressed that one out of nine Board members will not be sufficient to protect the taxpayer's interest in the entity, especially where it comes down to important decisions.
49. DCCAE stated in response that the sole responsibility of the board is to deliver the NBI contract and that it will report to DCCAE regularly. [22/05 p.16]
50. The Joint Committee is unclear as to how that responsibility will safeguard against the board being more concerned with the interests of the consortium (who appoints the bulk of the members) above the State's interest.

7. OWNERSHIP OF THE NETWORK

51. The Joint Committee is concerned that, given the amount of the State subsidy for the project is much greater than the initial outlay from the investor, it appears unfair that the resulting network will be owned by the investor rather than the State. This could create the impression that the State is largely paying for the construction of an asset which will be owned by private interests.
52. DCCAE stated that due to the need which will arise to maintain the fibre-optic network and the costs which this will incur, the private operator should be incentivised to invest in it by its ownership of the network. [22/05 p.26]
53. The ownership of the network is defined by the gap-funding model of procurement, which was used for the tendering process. A procurement model with a different ownership relationship such as a concession model could have been used, but DCCAE have stated

that if a change in ownership structure were to be looked at now, a new procurement process would have to begin. [22/05 p.3]

54. The Joint Committee questioned how significant a challenge maintaining the network would be, given the perceived durability of fibre. ComReg stated that fibre does degrade over time and needs to be replaced. [05/06 p. 18,19]

55. KPMG stated that their 2015 report on ownership recommended that the private sector design, build, operate and own the infrastructure (“the gap-funding model”), because this option was seen as the least expensive monetarily and ranked highest on deliverability of objectives. [05/06 p. 21]

56. KPMG stated that in Year 25 of the project, a calculation will be done of the value of the network and 40% of that value will return to the State, the asset then being in private ownership. [05/06 p. 37] They said that the calculation of this value is explicit in the contract as being ten times the last three years’ average of earnings before tax, interest, depreciation and amortisation (EBITDA). There is an estimate detailing what this will be but this estimate cannot be revealed due to commercial sensitivity. [05/06 p. 40,41]

57. KPMG further stated that legal advice had been received which stated that switching from a private to public ownership model would require starting procurement again from the beginning. They stated that to begin the process again, five years “would not be an unreasonable assumption” for the time required. [05/06 p. 37, 39]

58. University of Limerick academics identified that the ownership of the infrastructure remaining with the private contractor at the end of the contract period as the essential difference between a gap-funded project and other PPPs. [19/06 p. 2]

59. University of Limerick academics referenced the DPER’s “Plan Z” proposal for a “budget led” State-led approach as potentially being a realistic option for beginning a roll-out of rural broadband, though the Joint Committee understands that this plan would not commit from the outset to passing every premises in the intervention area. [19/06 p. 10]

60. They also said that due to the strategic interests of the country, the Government should be extremely careful about ceding ownership of vital network infrastructure [19/06 p. 15], and that *“ideally, the State should lever the network infrastructure of the companies it owns, such as the ESB, Ervia and so on. I wish it were possible to turn back the clock and that the Government had run with the original option to build a national broadband company as stated in the NewERA plan published in the run-up to the 2011 general election. However, that ship has sailed.”* [19/06 p. 13] As well as these considerations, they stated that a PPP approach is often more complicated than first anticipated, that a State-owned model would have better protected the State and that choice should have been made earlier in the process. [19/06 p. 27]
61. They also stated that State-owned enterprises in infrastructure projects, given the inherent unknowns and complexities, are more flexible and safer, because private actors will stick rigidly to contractual provisions if it is to their advantage. They also stated that KPMG assumed a lack of competition as a disadvantage to a State-owned enterprise but that competition is lacking under the current model anyway. [19/06 p. 28,29]

8. GAP-FUNDING MODEL

62. The gap-funding model of procurement is designed for a competitive process, but since January 2018, the consortium led by Granahan McCourt has been the sole bidder. The Joint Committee questioned whether the benefits of using this model had been removed once it was no longer a competitive process.
63. In response, DCCAE stated that the model drives efficiency because it gives an incentive to private sector operators to be efficient to maximise profits. [22/05 p.12]
64. KPMG stated that they had recommended the gap funded model for this reason (a commercial imperative is a strong incentive to continue to invest in infrastructure). [05/06 p. 21]
65. KPMG stated that in September 2017 DCCAE received detailed solutions from the two remaining bidders, “which projected significantly higher levels of subsidy than the DCCAE’s budget model”. DCCAE decided to reappraise the model and asked KPMG to

assist. KPMG made an assessment and ultimately recommended a continuation of the gap funded model. [05/06 p. 22]

66. KPMG said they accepted there was a lack of competitive tension at the end of the process but that the competitive tension at the detailed solution stage helped them to understand costs. [05/06 p. 26]
67. The Joint Committee asked KPMG to see the details underpinning their 2018 reappraisal which confirmed the gap funding model as the best model from a financial and non-financial perspective, but KPMG said this information could not be revealed as it is commercially sensitive. [05/06 p. 33]
68. The Joint Committee questioned whether a different method of procurement should have been pursued after the other bidders pulled out of the process, including looking at a State-run option.
69. DCCAE stated that a change of approach would have taken a lot of time. In particular, for a State run option, establishing and building capacity for a State telecommunications body would take time. [22/05 p.18]
70. University of Limerick academics stated that the principal economic justification for adopting PPPs is that it can help to achieve value for money (VFM). This depends on VFM drivers and they identified the two main drivers as being (i) competition for contracts and (ii) risk transfer. They stated that potential negative consequences for continuing with an uncompetitive procurement processes are opportunistic behaviour by the bidder during negotiations, leading to price increases, and renegotiations after the contract is signed. They said that the decision to duplicate fibre rather than use the “passive product” made available by eir raises suspicions around whether lack of competition has enabled the increase in project costs. [19/06 p. 3]
71. University of Limerick academics emphasised that the financial appraisals underpinning the choice of the gap funding model are not publicly available and recommended that they should be published to improve accountability. They also stated that the lack of such transparency leaves room for suspicion that assumptions were made specifically to

engineer a gap funding recommendation, especially if there was a belief that this could be funded off balance sheet. [19/06 p. 3, 5]

72. University of Limerick academics stated that a fundamental economic weakness was the decision to continue with the gap funding model with one bidder. They stated that the KPMG 2015 ownership report which underpinned the decision to use the gap funding model assumed that eventual ownership of the asset and the incentive for the private owner to invest was particularly beneficial because it should drive down the subsidy requirement during the tender process, due to competitive bidders placing a strategic value on the asset. [19/06 p. 4, 19]

73. In response to KPMG and DCCAE's point that competitive tension was a factor for a sufficient duration in the process, if not towards the end when there was only one bidder, University of Limerick academics said that a crucial element of competitive tension was lost for the final price bid, and that *"one must also take into account that while the DCCAE appears to have a good handle on the costs, the other side of the equation is the revenues. It was in the mix between the cost and the revenues that the competitive tension would play out. That is where one would expect to get the advantages that underpin the gap funding model. Unfortunately, that did not happen."* They pointed out that Analysis Mason had stated that Granahan McCourt was more conservative than DCCAE in estimating its future demand, which allowed it to lower its projected revenues. [19/06 p.

74. eir stated that the gap-funding model failed to deliver a competitive outcome but that different models, such as a USO, could have delivered high speed broadband faster and cheaper than the current process. They stated that the difference between the €3 billion subsidy which eir would require under the NBP as it stands and the €1 billion they claim they could do it for is caused by the requirements of the gap-funding model. [25/06 p.5]

75. eir told the Committee that, as opposed to the gap-funding model driving competitive tension to leverage their existing infrastructure, decisions which were made to create a "level playing field" negated their infrastructural advantages and drove extra costs. [25/06 p.8,9, 23]

76. DCCAIE also stated that to devise a new strategy which met State aid requirements and run a new procurement process together would take at least 37 months. [03/07 p. 42]

9. RENTAL OF INFRASTRUCTURE

77. The Joint Committee noted that a large element of the overall cost of the project is the rent projected to be paid to eir for the use of its poles and ducts – an estimated €900 million over 25 years. Concern was expressed that a major element of the subsidy was a public reinvestment in eir's private pole and duct network.

78. DCCAIE stated that over 90% of the rental cost is needed for maintaining the pole network. [22/05 p.3]

79. The Joint Committee questioned whether it would be more cost effective to use ESB's pole network. DCCAIE stated that the option to use ESB infrastructure as part of the project is still open where this is the most suitable option. [22/05 p.7]

80. ComReg told the Committee that, as the regulator who sets prices for pole and duct rental, they allow eir to charge no more than efficiently incurred costs. A review of the pricing has been initiated by ComReg and NBP pricing will be included in it. [05/06 p. 8]

81. Analysys Mason told the Committee that the use of ESB infrastructure is complex and involves significant health and safety issues, as well as wayleaves considerations. [12/06 p.8]

82. eir said that the rental revenue is replacement revenue to fund the cost of maintaining poles and ducts, and that the figure accounts for only 20% of total project costs, with the other costs "to be paid to privately owned and unregulated project subcontractors" have not attracted the same level of scrutiny. [25/06 p.4] They said that when current copper customers migrate to NBI fibre, they will be making no money in the intervention area to maintain the poles and ducts there. [25/06 p.17]

83. When questioned regarding the challenges in placing fibre along electricity wires and its impact, the ESB stated that they have a nationwide infrastructure and fibre can be run on the ESB electricity infrastructure. They stated that they are confident about the ability of the electricity infrastructure to hold the fibre network if the standards are applied without any risk to the key purpose of the infrastructure. [26/06 p.6]

10. ROLLOUT TIME

84. The Joint Committee is concerned that the eventual roll-out time for the whole intervention area is a long time for people to wait for broadband, and questioned whether a mixed model of partial fibre could deliver full broadband coverage faster.

85. DCCAIE stated that the bidder's final tender submission estimated that it could achieve the roll-out in seven years, and this timeframe is justified by the detailed geographical designing which will be required, preparing eir for the use of its poles, preparatory work, local authority applications for road closures and the actual laying of fibre. [22/05 p.33]

86. DCCAIE stated that mixing wireless with fibre would not drive efficiency as it would necessitate duplication in building infrastructure and would result in overlaying two networks. This is because the range of fixed-wireless cannot be guaranteed to comprehensively encapsulate an area, which means that even where fixed-wireless is applied, more fibre may have to be built. In the case of full fixed-wireless deployment, 4,500 new masts would have to be built, taking more than ten years. [22/05 p.37, 38]

87. ComReg emphasised that the Government has a service standard that is required in the tender process, and that fixed wireless has both potential and difficulties for use in rural areas because of variance in topography and geography, i.e. it is not a comprehensive solution for the hardest to reach households. Fixed wireless can also have overloading problems and is more difficult to future-proof than fibre. [05/06 p. 9, 16]

88. Analysys Mason stated that there is no guarantee mobile or fixed wireless infrastructure could be done faster than laying new fibre on poles and ducts which already exist. They

also stated that the ribbon pattern of development in rural Ireland means that wireless deployment in isolated areas is difficult. [12/06 p.14]

89. On the length of time of the rollout, University of Limerick academics identified that as well as adding cost, Granahan McCourt's decision to duplicate fibre instead of using eir's network to get to the intervention area will increase the timeframe.. [19/06 p. 7]

11. COST BENEFIT ANALYSIS

90. PwC were commissioned to complete a CBA on behalf of the DCCA. The objective of the CBA is to assess the extent to which a State intervention to support the attainment of the primary NBP objective of universal next generation access will yield a positive return to Irish society. The CBA was prepared as part of a wider-NBP project, which included (1) a technical, design and planning work-stream carried out by Analysys Mason (2) a financial appraisal and procurement work-stream including VFM carried out by KPMG and (3) an ownership and cost model and an NBP strategy work-stream which includes the CBA carried out by PwC. [13/06 p.2]

91. Though the CBA was compiled by PwC, KPMG provided its cost inputs. PwC stated that changes to costs did not influence changes to benefits as the different teams operated independently. They stated that benefits were updated due to "new data points including, for example, changes to demographics, reduction of households in the intervention area and change in economic parameters" [13/06 p.2]

92. PwC stated that, in compliance with the Public Spending Code, only benefits which have empirical evidence available were included. The benefits included were:

Residential – total €2.2 billion in the central scenario (of three scenarios run), including:

- bundled communications - realised savings available by purchasing communication bundles
- service waiting - reduced time required for value-adding online activity to be completed (e.g. applying for a passport online using broadband instead of having a face-to-face meeting). This was tempered by a benefit haircut of 12% to reflect that people could do this on an existing service such as 4G. The 12% was arrived at as a technical calculation by the PwC Netherlands team. [13/06 p. 5, 17]

remote working - time and cost savings for white collar workers being able to work remotely

transaction savings - time and cost savings from online shopping. A displacement factor haircut of 12% (to reflect lost traditional retail sales) was applied to this benefit. According to PwC, this 12% is also the result of a researched technical calculation, as with the service waiting haircut. [13/06 p. 19]

Enterprise - €1.5 billion in the central scenario, including farm and non-farm enterprises, including job creation and employment benefits.

93. A separate, qualitative piece of work was done on non-quantifiable benefits including e-health, e-education, social inclusion, rural development, tourism and climate change.

[13/06 p.3, 4]

94. PwC stated that the result of their modelling was a benefit-cost ratio is 1.3:1, which means that the benefits are 1.3 times the costs. [13/06 p.4] PwC further stated that the cost element of the CBA ratio only reflects the investment in the national broadband plan infrastructure and does not include “other ancillary costs” such as the investment to be made in DCCAE for its governance of the contract. [13/06 p. 18]

95. PwC stated that DPER/ Irish Government Economic and Evaluation Service challenged them on some aspects of the CBA including the gross value added and displacement factors they applied to the CBA. PwC said that they “accepted some of the challenge but had aligned on specific numbers that would be included in the CBA, which ultimately reduced the net benefits.” PwC also stated that the costs and benefits were separated workstreams which did not impact each other, and that “the benefits would have been adjusted in February 2019 and the costs would have been changed in March 2019 once the final bidder costs were through.” [13/06 p.8]

96. While PwC told the Committee they were surprised by the level of criticism by DPER in its internal Government communications, they stated that they stand over their work in the CBA. [13/06 p.16]

97. University of Limerick academics stated that there is very limited information about the CBA for the project in the public domain as so much of the data used is redacted, and that this is worrying as accountability and transparency are critical to good governance.

While they stated that it is reassuring that the DPER scrutinised it, its conclusion that it is not credible is concerning. [19/06 p. 3]

98. University of Limerick academics also stated that after the DPER consultation when benefits were reduced in the region of one billion euro, an error in the costs was suddenly found which reduced them too. [19/06 p. 12]

12. EIR'S STATEMENT THAT IT COULD COMPLETE THE NBP FOR LESS THAN €1 BILLION

99. There was much attention paid to eir's statement that they could achieve full rural broadband coverage for a subsidy of under €1 billion. eir maintained that it could achieve this in the intervention area if it was done under the same conditions as the 300,000 premises rollout. [25/06 p.4]

100. The subsidy cost savings which eir said would be realised by a different process and structure are as follows: (1) not overbuilding the 300,000 premises area as NBI plans to do, but using the fibre eir has already installed there (2) using their own access team and contractors to build and plan the network (3) using their pre-existing wholesale team to sell it (4) applying the same connection charge in the intervention area as the rest of the country (€170 instead of the €100 NBI will charge) (5) a SLA with a goal to repair 85% instead of 90% of all faults within two days (6) not charging the Exchequer to rent its poles and ducts, but rather using revenue accrued from the project to maintain the ducts and poles. [25/06 p.6, 7, 8, 30]

101. They said that the procurement model in place, which requires higher SLAs, lower connection costs and lower pricing, and the creation of a new wholesale team (including hiring another 80 people), drives cost and complexity – leading to a subsidy requirement of closer to €3 billion than €1 billion. [25/06 p.7, 8, 23]

102. eir stated that the €1 billion figure comes from applying the same criteria used in the 300,000 build to the NBP intervention area. This means that they will build overhead but if a customer prefers underground, they will have to pay for their own duct. [25/06 p.22]

103. eir stated that the previous higher costing by them in the ISDS detailed solution were due to specific requirements from the DCCAE, and it included a separate wholesale division, cheaper pricing, cheaper connection cost and did not include the ducts and poles eir already has which it could use. [25/06 p.22]
104. eir stated that they do not understand some of the conditions in the NBP process which are adding to costs – including a better repair SLA for the intervention area than the national SLA, which they say will be inefficient; the lower connection charge in the intervention area than in the rest of the country; and the decision not to use eir’s passive product to traverse the 300,000 area to the intervention area. They stated decent savings could be made on these issues without significantly damaging the service. [25/06 p.32]
105. eir stated that claims that the €1 billion figure does not include connecting homes or maintenance costs are not true. They said that the figure includes passing and connecting homes, and that revenue generated would be used to maintain the network. [25/06 p.34]
106. eir stated that another option would be a USO model which would also have regulatory oversight and there are examples of it being used to deliver broadband in other countries. [25/06 p.31, 36]
107. When questioned whether the ESB or SIRO could deliver the NBP with a subsidy of €1 billion ESB replied it would not have been able to deliver the project for a €1 billion subsidy [26/06 p.5]
108. Responding to claims that the current process was overly complex and cumbersome DCCAE countered that the inherent scale of the project engendered complexities. [03/07 p. 3]
109. DCCAE warned that if a new procurement process was initiated, there would be no guarantee around how much it would cost or even if it would attract bidders. They stated that eir’s suggestion is not a formal proposal. [03/07 p. 4]

110. DCCAE further stated that what eir refers to as constraints are actually sound governance mandated by State aid rules and contract law. The presence of State funding requires a high level of oversight to ensure that public money is protected. A regulatory environment without State funding functions differs to one where a contract is required due to State aid. [03/07 p. 5, 7]
111. They stated that “everything in the obligations package regarding service quality, future proofing and capacity, service level agreements, clawbacks and the other provisions in the contract cannot... be done through regulation or the commitment agreement” and it requires a contractual relationship. [03/07 p. 21]
112. DCCAE stated that many of the NBP provisions were dictated by State aid guidelines, including the requirement for a wholesale open access company and that companies which own infrastructure who are bidding must allow all bidders equal access to their infrastructure. DCCAE stated that they did not share eir’s view that if they offered bidders a discount on a pole price in the intervention area that ComReg might make them offer the same price in the rest of the country. DCCAE stated that ComReg subsequently published advice agreeing with their interpretation, but this was after eir had withdrawn from the process. [03/07 p. 6, 7]
113. DCCAE stated that EU rules and contract law aim to provide a “level playing field” and that the aim is to rebalance against the natural advantages market incumbents have. [03/07 p. 8,9]
114. DCCAE stated that it did not require that eir to establish a separate wholesale team. They did however want a clear line of sight for state money to be channelled into a specific entity, but this did not necessitate duplication of systems or staff. [03/07 p. 10]
115. They stated that they wanted the NBP company to have its own CFO, CEO and CTO and that, while eir could sell under the open eir brand, they wanted a clear distinction of revenues to manage clawback. [03/07 p. 11]
116. DCCAE did state however that they wanted a team of 80 in the NBP company, but that this could have been amended once things were going according to plan. [03/07 p. 11]

117. The Joint Committee questioned whether the additional cost burden, which the protections are creating, is a wise use of public money and whether a USO model could be used instead, since it was used previously to bring copper wire to every home. [03/07 p. 14, 15]
118. DCCAIE re-iterated that public money must come with a minimum level of controls. [03/07 p. 15] DCCAIE also stated that P&T built the copper wire network. [03/07 p. 21]
119. DCCAIE also stated that the new European electronic communication code, due to come into force in December, allows for the provision of broadband through a USO but that it also states a clear hierarchy of how broadband should be provided – most preferably by commercial operators, then through public policy instruments like the NBP, and only as a last resort through USO. [03/07 p. 16]
120. They stated that if a USO were introduced they could not simply designate a provider, but would have to allow operators to come forward to offer themselves as provider. [03/07 p. 16]
121. DCCAIE defended the €100 euro connection charge in the intervention area on the grounds that raising the charge would not lower the subsidy cost, as a cheaper connection cost drives demand and therefore will create more revenue in the intervention area. [03/07 p. 20] They stated that they will subsidise connections up to €5,000 because “there are a lot of homes with broken ducts that cannot get an overhead connection or that need an extra four or five poles to get the connection. As Ms Lennon [*CEO of eir*] stated, a pole costs €600.” [03/07 p. 21]
122. DCCAIE also stated that eir were incorrect in claiming that the SLA figure of next day repairs was 90% for the intervention area, as it has been 85% since the start of the process. [03/07 p. 24]
123. DCCAIE warned that, if the procurement process was halted, there would be a risk that this action would have a deterrent effect on bidders and that there may not be any bidders for a new process. [03/07 p. 43]

124. The Joint Committee held a follow-up meeting with ComReg specifically to discuss whether broadband could be provided through USO. They stated that, while there is currently no legislative framework to provide broadband through USO, an EU framework due to be transposed into Irish law by the end of 2020 will provide for the use of USO to ensure that adequate broadband is available to all end-users. Member states will define “adequate broadband” themselves based on local conditions. [11/07 p.3]
125. They further said that the framework only allows for USO use where both the market and policy interventions have been unable to provide broadband. If a USO were to be used, there would be a need for an open process to select the provider. [11/07 p.3]
126. ComReg gave the example of a USO being used for a final 2% of people in the UK who did not have broadband speeds of at least 10Mbps, which 98% of people had. Committee members questioned whether the definition was arbitrary and why the intervention area, in whole or part, could not be covered by a USO which would reflect that the people in it are a minority in Ireland in not having access to broadband. ComReg stated that serving a large minority through USO “would not be in keeping with experiences elsewhere” but that “ultimately, decisions about where exactly the threshold between a policy intervention and a USO should lie will be matters for consideration in the transposition process.” [11/07 p.5]

13. CONCLUSIONS

Conclusion 1: The original terms of the tender were too narrow, excluding other viable options.

Conclusion 2: The decision by DCCA to outsource almost all aspects of the project - from analysis, planning and oversight, to delivery of the project itself - was flawed, and many of the policy failures can be traced back to it.

Conclusion 3: When other potential bidders withdrew from the process a Dáil motion calling for a review was passed. Despite this motion and the fact that the Minister for Public Expenditure raised issues with the tendering process before the sole bid was received the Government ignored this call. Such a review would have been extremely beneficial in determining next steps.

Conclusion 4: The interactions between the former Minister for Communications, David McCourt and Frank McCourt in New York have taken on new significance following the hearings of the Oireachtas Committee on Communications, particularly in view of Granahan McCourt's use of the assets of Frank McCourt to meet certain financial requirements during the tender process. It appears that this information was not available to Mr Peter Smyth, process auditor of the National Broadband Plan during his review. The Peter Smyth review did not examine actions of the former Minister for Communications, Frank McCourt and David McCourt in the context of Frank McCourt as a financial participant in the National Broadband Plan.

Conclusion 5: Lack of research and analysis into the actual cost of the final project proved to be a structural flaw in the tender as well as in the tendering process itself, leading to bidders withdrawing when faced with an inadequate subsidy that was subsequently increased for the last remaining bidder. Cost increases included not only the removal of 300,000 homes from the intervention area, but also the decision to construct parallel fibre infrastructure to that of Eir, as well as an incorrect estimate from Analysys Mason about the mix of overhead and underground infrastructure in the intervention area.

Conclusion 6: The Committee found a number of areas where costs were underestimated by external consultants for the delivery of the NBP and despite additional costs being identified before funds were committed there was no mechanism for scrutinising the increased costs and their ramifications. Public funding will subsidise the development of a fibre network in areas where commercial fibre is already in place. This will increase the length of time required to complete the fibre rollout and also allow NBI to potentially sell commercial products using this fibre. This may have implications in the context of state aid rules.

Conclusion 7: The failure to adjust the tendering process in line with external developments contributed to increased costs, the departure of some bidders and an underestimation of the potential costs of the project.

Conclusion 8: The private sector risk in this project is practically non-existent, undermining the rationale for the design of the tender.

Conclusion 9: The level of equity provided by the bidder is unusual compared with that invested by the state and outside of the norms of a PPP process. The subvention provided by the State

has been frontloaded alongside the risk. It is a cause for concern that the operator will recoup its money within 7 to 8 years, will carry very little risk thereafter and retain full ownership while at the same time the State will have invested almost €3 billion with no ownership rights.

Conclusion 10: The taxpayers' interests will not be served by having only one member of a board of eight. It needs to be at the very least 60:40 ministerial appointees.

Conclusion 11: The Committee notes that, notwithstanding timeline complications, the broadband network infrastructure should be under the ownership of the state as it is strategically important to the state. There is no justification for the resulting network to be owned by the minority investor instead of the majority investor, which is the state.

Conclusion 12: Questions must be asked of the quality of the work by KPMG and its 2015 report, which recommended that the private sector design, build, operate and own the infrastructure ("the gap-funding model"), It stated that this would be the least expensive and ranked highest on deliverability of objectives. It has utterly failed in that regard. The Committee notes the opinion of DPER that a budget-led, State-led approach is a realistic option for beginning the roll-out of rural broadband were the present process to be scrapped.

Conclusion 13: The sale of National Broadband Ireland or a parent company to speculators remains a serious concern.

Conclusion 14: Neither DCCAIE nor KPMG have shown to this Committee that the gap-funding model drove efficiency as was assumed it would do for the broadband plan. In reality, costs have tripled with only a single bidder lacking in direct skills and experience still left in the present process. Every other bidder that has direct experience of building networks and providing broadband services has walked away.

Conclusion 15: The Committee does not accept KPMG's assertion that the details underpinning their 2018 reappraisal are commercially sensitive given the market failure of the process itself, with only one bidder remaining that is now the preferred bidder and agrees with the UL academics that the financial appraisals underpinning the choice of the gap funding model should be published to improve accountability. The Committee further agrees with the UL academics

that a fundamental weakness in the process was the decision to continue with the gap funding model with one bidder. (See paragraph 72).

Conclusion 16: The procurement process undertaken by DCCAIE, while initially well intentioned, has proven to be overly complex, restrictive, redundant and unfit for purpose in delivering high speed broadband at an affordable price and as a result has failed to capture the benefits of the gap funded model. This should have become clear when SIRO and Eir withdrew from the process and the remaining enet consortium lost key members including John Laing and SSE.

Conclusion 17: The government has shown a reluctance to recognise that elements of the tender were no longer suitable and as a result have exacerbated the existing issues and the Committee believes that there should be greater willingness to recognise failures in the tendering processes for major projects at earlier stages.

Conclusion 18: The Department has argued that this Gap funding model will insure the most efficient management of the asset but given the extensive regulatory and contractual provisions that are being put in place, it should be possible to insure the quality of the network while retaining ownership by the State. There is a risk under the current model that the regulated asset will become a target for acquisition and disposal, as has happened with other regulated Telecommunications assets, to the detriment of proper long-term investment and planning of the asset. A private monopoly asset is being created which would work just as well, if not better, under public ownership.

Conclusion 19: A major element of the state subsidy is the rent projected to be paid to Eir for the use of its poles and ducts. This amounts to a €900m public reinvestment in Eir's private pole and duct network with no gain in public assets. The use of ESB infrastructure remains a credible option for the delivery of the NBP.

Conclusion 20: DCCAIE displayed an inconsistency in its evidence to the Committee in saying that mixing wireless with fibre would not drive efficiency as it would lead to building infrastructure that would result in overlaying two networks, while at the same time agreeing to fund Granahan McCourt's decision to duplicate fibre instead of using Eir's network to get to the intervention area which will also increase the timeframe.

Conclusion 21: The Government has argued that any change in the bid process would lead to a long delay in the roll out of services to the public. The Joint Committee accepts that changing the final bid so that ownership of the network is retained by the State may require a slight delay to the signing of contracts but the Joint Committee sees no reason why this could not be achieved in a much shorter period than that suggested by the advisers to the existing bid process. The remainder of the complex contractual and regulatory arrangements would be retained

Conclusion 22: It is concerning that the cost benefit analysis undertaken by PwC was deemed not to be credible by DPER. In the interests of accountability and transparency the data used should be made public.

Conclusion 23: The Committee finds Eir's statement that it could deliver the NBP for less than €1 billion to be unproven but notes that neither ESB or SIRO believe it would be possible to deliver the NBP with a subsidy of €1 billion or less.

Conclusion 24: The overemphasis on forcing existing telecoms operators to establish new structures and preclude leveraging existing infrastructure whilst helpful in creating a level playing pitch, appears to have caused delays and increased the ultimate cost of the project to the taxpayer with no added benefits.

Conclusion 25: The higher than expected cost of the deployment of this service is a reflection of the dispersed housing settlement pattern that is a unique characteristic of the Irish landscape. The Joint Committee shares the concerns raised by the DPER that the provision for 60,000 connections to new houses within the NBP will provide an incentive for further unsustainable development patterns, which runs counter to the agreed strategy set out in the National Planning Framework. The provision for paying for the telecommunications services connections to these new homes is all the more problematic when one considers that some 25% of the existing housing stock within the NBP area is currently lying vacant, which is undermining the social fabric and cohesion of rural community life.

14. RECOMMENDATIONS

Recommendation 1: High speed broadband is a vital piece of infrastructure for rural Ireland. The Joint Committee recommends that high speed broadband is provided to the intervention area:

- i) As quickly as possible;
- ii) To the same standard as it is available commercially to other parts of the country;
- iii) At the same cost to consumers as elsewhere, and;
- iv) At best value to the taxpayer.

Recommendation 2: The Government should commission an external, independent review on whether its proposals (and the costs) are the only viable option. The Joint Committee recommends the appointment of an independent expert with international experience to establish within 3 months whether there is a legal pathway to achieving the objectives of the NBP through a USO or a direct award to the ESB or to allow for another model of delivery that could be delivered within a similar time frame without the necessity to open up a new tender process. Such an approach could provide considerable savings in both time and money.

Recommendation 3: The CBA justifying the NBP was the subject of disagreement between DPER and the DCCA. Similar issues arose surrounding the National Children's Hospital. The Public Accounts Committee has called for a new cost-benefit analysis to be carried out before the final National Broadband contract is signed.

- a) The Joint Committee believe that this would be appropriate.
- b) The CBA should be commissioned by and developed independently of Government Departments.

Recommendation 4: Mr. Peter Smyth should be consulted on the evidence which emerged linking Frank McCourt with the Granahan McCourt bid. He should be tasked with updating the Smyth Review. This update should be published within one month.

Recommendation 5: The Joint Committee believe that the Comptroller and Auditor General should have a role identifying cost overruns in large infrastructure projects.

Recommendation 6: The Joint Committee supports the strategic intent of providing high speed broadband access to those areas in rural Ireland where the market is not currently delivering such a service. Universal access to such high speed communications infrastructure is required to support the roll out of new digital services to the public and to insure the balanced development of our country and economy.

Recommendation 7: The Joint Committee recommends that the Plan be revised so that the full cost of providing a connection for every new house to the NBP network is provided for in the planning conditions for the construction of such a home. Such a provision should see a reduction of the overall cost of the project to the state and also encourage more new housing development closer to existing villages and towns which will support the more efficient use of other state services, reduce commuting patterns and support the survival of rural businesses and services.

Recommendation 8: The Joint Committee recommends that the ownership of the network asset should be retained by the state at the end of the intervention period. Given average EBITDA margins of 35% in the telecommunications industry and the expected annual revenue of €130 million at the end of the intervention period and the fact that the Department intends applying a ten times multiple to estimate the terminal asset value, we assume that the final value of the asset to the bidder will be around €455 million. As the State will be providing the vast majority of the capital to pay for the development of this asset it is hard to justify why the ownership should not in the end revert to the State.

Recommendation 9: The Joint Committee recommends that the government should re-engage with the ESB to examine the best model for delivery of a new National Broadband Plan through the ESB.

Recommendation 10: The Joint Committee recommends that all infrastructure developed through the National Broadband Plan should remain in public ownership.

APPENDIX 1: ORDERS OF REFERENCE – JOINT COMMITTEE ON COMMUNICATIONS, CLIMATE ACTION AND ENVIRONMENT

FUNCTIONS OF THE COMMITTEE – DERIVED FROM STANDING ORDERS [DSO 84A; SSO 70A]

- 1) The Select Committee shall consider and report to the Dáil on—
 - a) such aspects of the expenditure, administration and policy of a Government Department or Departments and associated public bodies as the Committee may select, and
 - b) European Union matters within the remit of the relevant Department or Departments.
- 2) The Select Committee appointed pursuant to this Standing Order may be joined with a Select Committee appointed by Seanad Éireann for the purposes of the functions set out in this Standing Order, other than at paragraph (3), and to report thereon to both Houses of the Oireachtas.

Without prejudice to the generality of paragraph (1), the Select Committee appointed pursuant to this Standing Order shall consider, in respect of the relevant Department or Departments, such—
Bills,

proposals contained in any motion, including any motion within the meaning of Standing Order 187,

Estimates for Public Services, and

other matters as shall be referred to the Select Committee by the Dáil, and

Annual Output Statements including performance, efficiency and effectiveness in the use of public monies, and

such Value for Money and Policy Reviews as the Select Committee may select.

- 4) The Joint Committee may consider the following matters in respect of the relevant Department or Departments and associated public bodies:
 - a) matters of policy and governance for which the Minister is officially responsible,
 - b) public affairs administered by the Department,
 - c) policy issues arising from Value for Money and Policy Reviews conducted or commissioned by the Department,
 - d) Government policy and governance in respect of bodies under the aegis of the Department,
 - e) policy and governance issues concerning bodies which are partly or wholly funded by the State or which are established or appointed by a member of the Government or the Oireachtas,
 - f) the general scheme or draft heads of any Bill,

- g) any post-enactment report laid before either House or both Houses by a member of the Government or Minister of State on any Bill enacted by the Houses of the Oireachtas,
 - h) statutory instruments, including those laid or laid in draft before either House or both Houses and those made under the European Communities Acts 1972 to 2009,
 - i) strategy statements laid before either or both Houses of the Oireachtas pursuant to the Public Service Management Act 1997,
 - j) annual reports or annual reports and accounts, required by law, and laid before either or both Houses of the Oireachtas, of the Department or bodies referred to in subparagraphs (d) and (e) and the overall performance and operational results, statements of strategy and corporate plans of such bodies, and
 - k) such other matters as may be referred to it by the Dáil from time to time.
- 5) Without prejudice to the generality of paragraph (1), the Joint Committee appointed pursuant to this Standing Order shall consider, in respect of the relevant Department or Departments—
- a) EU draft legislative acts standing referred to the Select Committee under Standing Order 114, including the compliance of such acts with the principle of subsidiarity,
 - b) other proposals for EU legislation and related policy issues, including programmes and guidelines prepared by the European Commission as a basis of possible legislative action,
 - c) non-legislative documents published by any EU institution in relation to EU policy matters, and
 - d) matters listed for consideration on the agenda for meetings of the relevant EU Council of Ministers and the outcome of such meetings.
- 6) The Chairman of the Joint Committee appointed pursuant to this Standing Order, who shall be a member of Dáil Éireann, shall also be the Chairman of the Select Committee.
- 7) The following may attend meetings of the Select or Joint Committee appointed pursuant to this Standing Order, for the purposes of the functions set out in paragraph (5) and may take part in proceedings without having a right to vote or to move motions and amendments:
- a) Members of the European Parliament elected from constituencies in Ireland, including Northern Ireland,
 - b) Members of the Irish delegation to the Parliamentary Assembly of the Council of Europe, and
 - c) at the invitation of the Committee, other Members of the European Parliament.

APPENDIX 2: MEMBERSHIP OF THE JOINT COMMITTEE ON COMMUNICATIONS, CLIMATE ACTION AND ENVIRONMENT

Member	Party
Deputies:	
David Cullinane	<i>Sinn Féin</i>
Timmy Dooley	<i>Fianna Fáil</i>
James Lawless [Vice Chairman]	<i>Fianna Fáil</i>
Michael Lowry	<i>Rural Independent Group</i>
Hildegarde Naughton [Chairman]	<i>Fine Gael</i>
Eamon Ryan	<i>Social Democrats - Green Party Group</i>
Bríd Smith	<i>Solidarity - People Before Profit</i>
Senators:	
Terry Leyden	<i>Fianna Fáil</i>
Tim Lombard	<i>Fine Gael</i>
Michael McDowell	<i>Independent Group</i>
Senator Joe O'Reilly	<i>Fine Gael</i>

The Dáil Committee of Selection nominated the members of the Dáil Select committee on 15 June 2016 and the report nominating Deputy Hildegarde Naughton to be chairman of the committee was agreed by the Dáil on Thursday 16 June 2016.

The Seanad Committee of Selection report on membership of the Seanad select committee was agreed by the Seanad on 21 July 2016.

This committee's name was changed from the Joint Committee on Communications, Climate Change and Natural Resources on Thursday 29 September 2016.

Deputy James Lawless was elected vice chairman of the joint committee on Tuesday 28 February 2017.

Deputy Brian Stanley was discharged from the Committee and Deputy David Cullinane was appointed in substitution by Order of the Dáil on 11 July 2019.

**DÁIL SELECT COMMITTEE ON COMMUNICATIONS, CLIMATE ACTION
AND ENVIRONMENT**



[Deputy David Cullinane](#)
Sinn Féin



[Deputy Timmy Dooley](#)
Fianna Fáil



[Deputy James Lawless](#)
Fianna Fáil
[Vice Chairman]



[Deputy Michael Lowry](#)
*Rural Independent
Group*



[Deputy Hildegard Naughton](#)
Fine Gael
[Chairman]



[Deputy Eamon Ryan](#)
*Social Democrats
- Green Party Group*



[Deputy Bríd Smith](#)
*Solidarity
- People Before Profit*

**SEANAD SELECT COMMITTEE ON COMMUNICATIONS, CLIMATE
ACTION AND ENVIRONMENT**



[Senator Terry Leydon](#)

Fianna Fáil



[Senator Tim Lombard](#)

Fine Gael



[Senator Michael McDowell](#)

Independent Group



[Senator Joe O'Reilly](#)

Fine Gael

Options for traversing the 300k Area

3 July 2019

Introduction

Open eir is currently in the process of deploying a commercial FTTH network in sub-urban/rural areas which will serve around 300 000 rural premises. As a result, these areas – constituting what is known as the ‘300k Area’ – were removed from the NBP Intervention Area in April 2017.

Local exchanges (where active equipment is hosted) are often located in the more densely populated areas and are areas which are excluded from the NBP. NBP Bidders therefore had to deploy a network which ‘traversed’ the 300k Area to connect exchanges in the commercial area to end-user premises located in the Intervention Area.

This note provides commentary on the options that were available to the Bidders for traversing the 300k Area and describes the implications.

Options for traversing the 300k Area

There were two main options for Bidders to consider for traversing the eir 300k Area:

Active wholesale product rental option: rent an active wholesale fibre-based product from eir

Pole and duct rental option: rent eir poles and ducts and deploy new fibre cables in the 300k Area using these existing poles and ducts.

For both options, the network infrastructure is shared. In the **active wholesale product rental option**, poles, ducts, fibres and active equipment are shared from eir. In the **pole and duct rental option**, poles and ducts are shared and the Bidder has to procure and install its own fibre cable and active equipment.

Description of FVI option

FVI introduction by open eir

On 12 May 2017, open eir proposed a set of wholesale products, referred to as FTTH VUA Integrant (FVI) products, for Bidders to use as part of their solution. This product is the ‘active wholesale product rental option’ above. We refer to it as the ‘FVI option’ in the rest of this note.

The FVI products allow Bidders to utilise the open eir network deployed in the 300k Area, by renting an active wholesale product from open eir which takes the Bidder from a set of ‘meet-me points’

(near the edge of the 300k Area) to one of open eir's central aggregation nodes where it can interconnect to its own network. Open eir proposed three different variants of FVI, each with a different degree of sharing.

FVI pricing

The FVI pricing structure proposed by open eir in May 2017 was based around two components:

An upfront cost for the right to use the product for a period of 25 years and;

A rental cost (monthly payment per line) which was based on variant of FVI product as well as its speed.

We also understand that the FVI products were submitted by eir to ComReg as required under the relevant regulatory obligations. However, we also understand that the FVI product was withdrawn by open eir before the ComReg review was completed.

Analysys Mason view

The FVI product was offered by open eir in February 2017.

The three Bidders took different approaches to crossing the 300k Area:

Open eir decided to use the FVI option

Bidder A decided to use the pole and duct rental option

Bidder B indicated it would not use the FVI option.

Strategy from alternative Bidders

Network operators regularly face 'build or buy' decisions when they are deploying a network, be it a new one, or the expansion of an existing one. The decision is influenced by financial, operational and other factors. The total cost of ownership is an important element of this decision: there is typically a trade-off between incurring upfront capital costs when investing ('building') versus incurring ongoing costs when renting ('buying'). In general, taking a shorter-term view tends to favour rental, whereas taking a longer-term view can result in either rent or build (depending on the nature of the rental offer).

In an analogy with the property market, a homeowner has much more autonomy over what they can do with regard to upgrading their property than a tenant does. Such considerations become even more important in the context of a long-term contract as is the case for the NBP. From that perspective, Bidders other than open eir may well prefer to have 'control over their own destiny' and greater flexibility deploying their own fibre and active equipment using a pole and duct rental option compared to the FVI option assuming everything else remained the same. This is because, if using the FVI option, the Bidder would be fully dependent on open eir in terms of roll-out plan, product availability, product roadmap and evolution, and service levels.

It is therefore understandable that even if the FVI option were practicable and had a similar total cost to the duct and pole rental option, then bidders might prefer the duct and pole rental option.

Costs assessment

We modelled the cost associated with both the FVI option and the Pole and Duct Rental option using the following assumptions:

Network architecture based on eir network

Regulated prices for poles and ducts

It is important to note that throughout the process our cost model was based solely on the re-use of eir infrastructure, with no other third-party infrastructure being used. This was because eir network's is the most extensive in Ireland, and due to its regulatory obligations, the charges for access to its infrastructure are in the public domain which help inform some unit cost assumptions. Our assumption to use the regulated prices for poles and ducts rental in the 300k Area reflected the best information at the time and these were published prices.

Based on the above assumption, our model estimated that to deploy an additional fibre cable on open eir's poles and ducts would include additional costs for cable and equipment, electronics and other maintenance activities, at an additional cost compared to the FVI option.

However, during dialogue, Bidder A estimated that the FVI option was significantly more expensive than the Pole and Duct Rental option which were different from our own findings. The main difference between the Bidders' estimates and our cost model were as follows:

a different network topology used by the Bidders resulting in a lower network length in the 300k Area, and therefore in a lower number of poles and ducts to rent in the 300k Area¹

a lower Pole and Ducts Rental price which was a result of lower prices that reflect the scale of the project

Taking these two differences into account meant the Pole and Duct Rental option proposed by Bidder A resulted in materially lower costs compared to the FVI option. A similar analysis carried out by Bidder B also concluded that the FVI Option was more expensive for their network. Therefore, Bidder A did not feel at a cost disadvantage for using the Pole and Duct Rental option compared to the FVI option.

Analysys Mason view on practicality of using FVI

Analysys Mason produced a report² for DCCAIE on the limitations of the FVI product. Our conclusions were that we believed that the FVI product as proposed by open eir was not practical to be used for the following reasons:

¹ Despite having a similar overall network length.

² FVI product operational limitations for the NBP, Analysys Mason, 23 May 2018

Roll-out: there was a significant risk of mismatch between the roll-out commitment required to be made by NBPco and open eir roll-out plans for FVIs.

Product availability and reservation process: the location at which open eir was to provide its FVI products and the availability of the product at these locations could not be guaranteed either at the design stage or at the deployment stage.

Product roadmap, technology roadmap and future proofing: there was a risk that open eir's Product and Technology Roadmap in relation to the FVI product would not align with the Product and Technology Roadmap NBPco is required to provide in the context of the NBP.

Service levels: As part of the NBP contract, NBPco has to commit to certain minimum service levels. However, the service levels proposed by open eir for their FVI product did not meet the NBPco requirements. This means that if NBPco were to use the FVI product with the proposed SLAs, it would not have been able to meet its contract obligations in terms of service levels.

Meet-me location and engineering requirements: it was challenging for Bidders to perform a low-level design of the network using the FVI product because potential meet-me FVI locations were not known to them. Furthermore, the link budget (which determines the maximum distance between the exchange and the customer active equipment) available at each FVI location was not known.

Based on the above observations, we did not believe that the FVI product offered by open eir was operationally viable for any Bidders at Bid time for addressing the majority of premises in the Intervention Area. This conclusion is supported by discussions between the non-open-eir Bidders and the DCCAE during the dialogue period.

Association



July 2019

Executive Summary

The National Broadband Plan (NBP) aims to solve a connectivity gap that has prevented isolated parts of rural Ireland from having access to broadband services comparable with those available in towns and cities. These rural areas that cannot get broadband have resulted in a perception of a general connectivity gap. The NBP seeks to address the rural connectivity gap by developing a fibre optic network that will connect 542,000 premises within a defined Intervention Area that the Department of Communications, Climate Action and Environment (the Department) has stated will not be commercially served by Internet Service Providers (ISP's) operating in the private sector. When the project was originally announced in 2012, it was anticipated that it would cost approximately €500 million. Over the course of the intervening seven-year period, the projected cost of the initiative has spiralled to €2.97bn. Consequently, if the NBP goes ahead, it will be the largest public contract that the Irish State has ever awarded. This fact has created a public demand that the NBP be intensely scrutinized, to which the Committee of Communications, Climate Action and Environment (the Committee) has risen to the challenge and examined serious problems with both the procurement process and chosen intervention model. RISPA applauds the effort of the Committee in leading this investigation despite extensive redactions to the NBP's procurement documentation on the grounds of commercial sensitivity, which inhibit an accurate and transparent evaluation of the project's value for money.

The NBP's problems can be traced to the fundamental design parameters of the project, which set clear restrictions on the technical solutions that could be used to meet the tender requirements. Specifically, bidders could propose to meet the tender obligations by either installing a fibre optic cable to each property in the Intervention Area, or by way of mobile communications technology that utilized licensed spectrum. While the former restriction regarding fibre was a logical consequence of a fibre only option, the specificity of the restrictions relating to any wireless-based proposal meant that the procurement process would never consider technologies in different technical configurations that might represent a more efficient proposition to Ireland's economy. For instance, the exclusion of all wireless technologies other than licensed spectrum communications technology meant that the approximately 40 ISP's who have been successfully providing internet access throughout rural regions for the better part of 20 years could not bid, since the technology they used was predominately license-exempt broadband radio. This constraint made less sense due to the reality that many of these ISP's had already begun to roll out next generation broadband services to rural Ireland. Furthermore, the reality that operators of licensed spectrum communications technology had failed in the previous years to meaningfully address Ireland's rural connectivity gap, in spite of both the considerable amount of licensed spectrum allocated and public subsidies provided to them, made the decision to restrict wireless proposals to licensed spectrum communications technology less justifiable.

Ultimately, whether by accident or by design, the NBP's restrictions meant that the procurement process became almost immediately focused on evaluating a single option as a means of fulfilling the tender's technical objectives. This singular focus would in turn contribute to the weaknesses of the Cost-Benefit Analysis (CBA) and its failure to properly evaluate the potential economic value of regional ISP's and their ability to be part of the NBP solution. Furthermore, the narrow scope of the NBP also excluded the possibility of more cost-effective policy interventions, such as the implementation of practical measures to assist regional ISP's whose core business has been the addressing of Ireland's rural connectivity gap. Examples of such interventions would include the subsidization fibre to masts in rural areas, the creation of an affordable finance initiative for regional ISP's, the payment of grants to regional ISP's who supply broadband services to premises that are not commercially viable to connect, as well as the allocation of suitable radio frequency spectrum to regional ISP's who are currently operating in rural Ireland. These types of interventions would have the benefit of encouraging more regional ISP's to invest and compete in rural Ireland, as opposed to the NBP intervention which will disincentivize independent private connectivity investments in rural Ireland if it is implemented.

The shortcomings of the NBP's approach were better articulated in late 2015, when respected economists such as Colm McCarthy raised serious concerns regarding the project's failure to meet the stress tests of the Public Spending Code. Key flaws that were highlighted at the time included the fact that the procurement process failed to quantify the purported benefits of the project, the fact that it had not fully examined alternative approaches, and the fact that it had not prepared a counterfactual to extrapolate how access to broadband services would have progressed within the Intervention Area in the absence of the NBP. While the first two flaws were largely ignored, the implications regarding the failure to prepare a counterfactual became clear and proven when 300,000 premises had to be removed from the Intervention Area because Eir concluded that they were commercially viable for the provision of its fibre optic broadband services. As the problems of the NBP's cost-benefit analysis were being scrutinized, other significant questions began to emerge regarding the decision to utilize a 100% fibre optic approach. Such scrutiny centred on the fact that Fixed Wireless Access (FWA) technologies had rapidly developed over the preceding four-year period to the point that they were now capable of delivering in excess of the 100 Mbit/s performance target defined by the EU.ⁱ

Unfortunately, the economic and technological issues raised in 2015 were enough for the Department to give pause to the procurement process. By early 2018, all but one bidder remained, which subsequently proceeded to receive preferred bidder status in April 2019. The announcement that the procurement process had entered its final stage despite the litany of failures drew broad criticism and was quickly followed by the Committee on Communications, Climate Action and Environment instigating a thorough examination of the project. Key issues that have been repeatedly highlighted include the flawed cost-benefit analysis input; the very complex tendering process that has resulted in only one remaining bidder; the extremely high cost of the project and the lengthy seven-year period that it will take to build the network; as well as the fact that the State will not own the resulting infrastructure.

These serious problems have caused many to ask if there are alternative approaches to the NBP that could more cost effectively deliver the project's aim in a shorter period of time. While suggestions have been forthcoming and companies like Eir have claimed that they could roll out broadband services for less than €1bn, there has been little consideration given to the development of an alternative that is based on the intervention approaches taken by other countries with similar connectivity gaps. Consequently, RISPA decided to research several successful interventions and collate the policies that it believed could be successfully implemented by the Irish Government and which could be supported by a methodology that would provide a qualified high-level cost estimate.

The results of RISPA's research are the recommendations outlined in this document, which draw on a number of case studies to broadly explain a potential intervention that proposes both a less complex technological solution and market approach. Collectively, these recommendations amount to an alternative for the NBP and the proposal provides a basic methodology that allows a high-level cost estimate to be calculated. Therein, the document does not seek to address topics beyond its scope, such as implementation decisions and other matters that would require extensive cost-benefit analyses to be performed.

Ultimately, this alternative summarizes the key policy actions that the Irish Government could take to develop a hybrid broadband network over a 24-month period, which would be capable of supplying 150+ Mbit/s broadband services to the premises that have been identified in the Intervention Area of the NBP as not commercially viable for fibre optic broadband. In doing so, the alternative also outlines a model for the development of state owned backhaul fibre and the regulation of wholesale prices for backhaul fibre connectivity. By applying a series of very broad assumptions and high-level estimates, it is calculated that RISPA's alternative could be delivered for a net cost to the State of approximately €402 million.¹ RISPA notes that considerable redundancy is built into its alternative, which would remain viable should only two of its key recommendations be implemented: a license-protected spectrum model and an affordable state backed finance scheme. The NBP puts other capital projects at risk of cancellation, which RISPA's significantly faster and lower cost alternative does not, therefore warranting serious consideration.

¹ This is the cost of the proposed consumer subvention minus the interest from the proposed affordable loan scheme.

The NBP in Context

A major concern with the NBP is its value for money; however, in order to assess the cost effectiveness of the NBP it is necessary to consider it in the context of comparable interventions. Scotland is a country that has very similar geography to Ireland and has an equivalent connectivity gap. To address this gap, the Scottish Government launched the 'Digital Scotland Superfast Broadband' (DSSB) programme in April 2014,ⁱⁱ which cost approximately £442m.ⁱⁱⁱ The aim of this initiative was to enable 95% of Scottish premises with fibre optic broadband access by the end of 2017.^{iv} So successful were the initial stages of the initial DSSB programme, which saw stronger than expected take up, additional premises were added and the project deadline was extended until 2019.^v The original target of 750,000 homes was met by March 2018,^{vi} with the programme having connected approximately 920,000 premises to date.^{vii} Subsequent to the DSSB programme, the Scottish Government announced its commitment to connect the approximately 147,000 properties^{viii} not covered by the DSSB and to deliver broadband to 100% of Scottish premises by the end of 2021, by way of a new programme entitled 'Reaching 100%' (R100).^{ix}

As part of the evaluation work undertaken prior to the launch of the R100 initiative, it was determined that the programme may fall short of its target due to the logistical challenges of fibre optically connecting rural communities, including the realization that it may cost several thousand pounds to individually connect some of the properties therein. As a result, the Scottish Government has been developing a subsidization initiative to operate alongside the R100 programme and match its three to four-year delivery timeline, thus ensuring that the 100% broadband coverage target is met. The parameters of the possible subsidy are not yet defined but the general format will be one of a technology agnostic voucher scheme for individual premises. Property owners will be able to avail of these vouchers and group them together with other local owners, whereupon they can create contracts with ISP's who agree to provide broadband services according to defined quality and speed specifications.

Subject matter experts anticipate that a large number of the remaining rural communities will end up being connected via the latest generation of fixed wireless technologies. Despite this prediction, the Scottish Government has remained committed to any potential vouchers being technology agnostic, allowing their evaluation process to instead focus its attention on the vital task of defining the quality of service parameters that regional ISP's would need to meet should they wish to claim the vouchers.

The approach being explored by the Scottish Government demonstrates the importance of value for money, comprehensive planning, meaningful timescales for delivering rural connectivity, as well as the need to focus on the quality of installed broadband connections irrespective of the technology deployed.

Fixed Wireless Access Technologies

Fixed Wireless Access (FWA) is a category of communications technologies that consists of any technology that can support a wireless data network between two or more fixed locations. The FWA category of technology includes laser links and broadband radio links. The FWA category has in recent years also included some traditionally nomadic wireless access technologies when they are used as part of a fixed wireless network, such as when 5G mobile communications technology is adapted to provide broadband only services to fixed premises.

Despite the expansion of the FWA category, both the open standard and proprietary broadband radio specifications remain the most ubiquitous FWA technology in use globally, in part because of the technology's proven ability to connect multiple premises over long distances (10+ kilometres). In this respect, broadband radio technology has steadily developed over the past two decades and has experienced several technology shifts beginning in 2012, when units became available for ISP's to commercially deliver 30 Mbit/s broadband services to their customers. A major jump occurred in 2015, when broadband radios supporting speeds of 100 Mbit/s were developed. The latest generation of broadband radio technology, which came to market in the first quarter of 2019, supports speeds of up

to 200 Mbit/s. Research testing of potential specifications for the next generation of broadband radio is underway and it is anticipated that by 2025, speeds of 500 Mbit/s will be commercially deployable to multiple premises over long distances. Proof of broadband radios' development trajectory in this regard is evidenced by the fact that a new category of extremely high-speed (1 Gbit/s), short range broadband radios have been brought to market and commercially deployed by ISP's. Multigigabit versions of these new products will enter commercial service in the second quarter of 2020 and will provide 3+ Gbit/s broadband services to premises that are within 300 metres of an already connected premise. This low-cost technology is therefore very well suited to the roll out of multigigabit broadband services to premises. Appendix A provides further details on the evolution of maximum throughputs for selected wireless, copper and fibre optic specifications.

The development pace of broadband radio has been driven by the global need to deliver broadband beyond clustered population centres and the inability of fibre optic technology to achieve this aim with the same financial efficiency. Consequently, research and development investment into broadband radio technology remains strong. This is understandable considering the performance increases that broadband radio technology has consistently achieved compared to other communications technology specifications like copper and fibre optic. Since the first wireless specification was introduced in 1999, the downstream capacity of broadband radio has grown by over 90,000%. This is a staggering pace of development and debunks the myth that wireless cannot scale like other technologies. See Appendix B for an illustration of the growth of wireless specifications compared to development pace of copper and fibre optic.

Ultimately, broadband radio is an extremely flexible technology that can cost-effectively provide broadband services to large numbers of premises in geographical settings where it is not cost effective to do so via fibre optic technology. It is for this reason that broadband radio is typically used to develop last mile broadband networks in combination with fibre optic technology, which is used to supply the backhaul connectivity to the sites where broadband radio base stations are located. This hybrid broadband solution is a proven approach in many countries globally, such as the USA, Germany, France and Australia.

Hybrid Broadband

As a rural connectivity solution, the way that hybrid broadband combines fibre optic technology and broadband radio technology is well suited to Ireland's geography. This is because the broadband radio technology that is used in a hybrid broadband approach can wirelessly connect multiple properties over long distances and speeds of 150+ Mbit/s.² Furthermore, broadband radio does not require that thousands of tower masts be built to provide the necessary coverage, as is the case with 5G mobile communications technology. From a reliability standpoint, the broadband radio technology that is used to deliver hybrid broadband is as reliable as traditional FM radio and capable of operating in extreme weather scenarios without issue. Ultimately, hybrid broadband can be delivered to rural premises in one of two ways.

For premises that are dispersed over a large area, fibre optic broadband will be brought to a centrally located site that is suitable for each premise to be wirelessly connected to a broadband radio base station, which is a small box approximately 35cm (W), 35cm (H), 10cm (D). The premises will then be connected with broadband radio antennas that are discreetly installed on the exterior of the property and are usually unnoticeable due to their colour and size.

Hybrid broadband also works in reverse for premises that are clustered in a small area like a rural housing estate of several homes. In such a scenario, a fibre optic cable will connect each home and link back to a suitably located

² The relationship between multiple premises connected to a single broadband radio base station at varying distances and the

throughput performance that each premise receives is explained in the section entitled "Achieving Broadband Radio Coverage".

broadband radio base station. The broadband radio base station will then communicate wirelessly with identical broadband radio that is located and connected to the nearest access point to Ireland's fibre optic backhaul infrastructure. Irrespective of the way hybrid broadband is deployed, the quality of the broadband received by the customer would be equal or better than the level of service being proposed by the NBP.

Radio Spectrum

The performance ability of broadband radio technology is largely determined by the technology's access to suitable radio spectrum, which are the airwaves that are used to carry information such as digital television, radio broadcasts and cellular traffic like mobile phone calls. The delivery of 150+ Mbit/s wireless broadband would require the Irish Government to set aside approximately 200 MHz of spectrum that is suited to high speed broadband radio.³ To ensure that Irish homes would receive the best possible broadband service, an equal combination of both low-band (<1.5 GHz) and middle-band (>1.5 GHz) spectrum would need to be made available in contiguous blocks of 100 MHz: e.g. 700 MHz to 800 MHz and 2,500 MHz to 2,600 MHz. Suitable low-band spectrum would be helpful because it supports non-line of sight connections between base stations and homes. By using low-band spectrum, regional ISP's could provide broadband to homes who are in mountainous areas or surrounded by forests. Middle-band spectrum, which can support more internet traffic compared to lower bands, could be used to connect the majority of homes, which typically have light of sight to the nearest base station.

Spectrum Case Study

France has successfully implemented a model that set aside two 20 MHz channels in the 3410-3460 MHz spectrum band for ISP's delivering rural broadband.^x Instead of a license model that auctioned the spectrum to the highest bidder, the French Government developed a license-protected model that allows ISP's to apply to the local government authority for access to the spectrum, which can only be granted for the provision of rural broadband.^{xi} While 40 MHz is a very small chunk of spectrum, it allows French ISP's to deliver quality 30 Mbit/s broadband services, which they were previously unable to do when using the heavily congested license-exempt spectrum bands. The result of the license-protected model is that ISP's can now roll out broadband services to approximately two million rural premises that are not viable for the provision of broadband via fibre optic technology.

Spectrum Options for Ireland

The Commission for Communications Regulation (ComReg) has identified several middle-bands for the provision of wireless broadband: 1.4 GHz, 2.1 GHz, 2.3 GHz, 2.6 GHz.^{xii} While any one of these middle-bands would be suitable for broadband radio, only the 2.1 GHz, 2.3 GHz and 2.6 GHz bands could realistically support the contiguous spectrum allocation of 100 MHz to broadband radio. In contrast to the several options for middle-band allocation, most of the lower spectrum bands have already been auctioned and as such, there are few options from which to choose.

The best low-band spectrum choice for Ireland is the 694 MHz to 790 MHz (700 MHz) band that is due to become available for allocation in March 2020. Broadband radio equipment that is compliant with the 700 MHz band is scheduled for commercial release in the first quarter of 2020. Based on the latest pre-market trials that have achieved 17 Mbit/s per 8 MHz channel, the 96 MHz of spectrum that will become available in the 700 MHz band will be able to support broadband radio speeds at least 150 Mbit/s. Given the rural connectivity potential of the 700 MHz band, the European Union has determined that it should be repurposed for ISP's to provide high speed broadband to rural homes and communities.^{xiii} ComReg has not yet decided the license model for how the 700 MHz band should be reallocated

³ While it is acknowledged that the spectrum efficiency of different broadband radio manufacturers is different, it has been consistently noted by regional ISP's that broadband radio equipment which incorporates frequency reuse protocols is capable of

delivering high-speed broadband services to dense customer areas without exhausting the amount of spectrum available.

but if previous recommendations are any indication, it is likely that the spectrum will be auctioned to the highest bidder: most likely to the existing Mobile Network Operators. If auctioned, rural Ireland will lose yet another technology opportunity to aid the swift delivery of high-speed broadband.

Allocation of Suitable Spectrum

Subsection 13 of the Communications Act (2002) allows the Minister for Communications (with consent from the Minister for Finance) to direct the Commission for Communications Regulation to allocate any spectrum band for any justified purpose.^{xiv} This means that the Irish Government could decide to implement a centrally administered license-protected model for both the 700 MHz low-band and one of the aforementioned middle-band. Such a decision would require no capital expenditure and would allow regional ISP's to start immediately providing broadband services to rural Ireland.

Backhaul Networks

Backhaul networks are the vital component in any telecommunications network because they link the last mile networks that connect premises with the core networks of ISP's, which in turn allow for up linking to exchanges that facilitate international data transit across the internet. To be effective, backhaul networks must have enough capacity to carry the demands of all the last mile networks that connect to them. If the total installed bandwidth of a last mile network greatly exceeds the total bandwidth of the backhaul network that serves it, then the homes connected to the last mile network will not be able to maximize the speed of their internet connections. For example, if 32 homes with individual 1 Gbit/s fibre broadband subscriptions are connected to an exchange that is backhaul enabled for 10 Gbit/s, then each home would receive a maximum of 312.5 Mbit/s should all download at the same time. While it is highly unusual for all homes to be surfing the web at the same time, a backhaul network should have sufficient capacity to carry 120% of the combined peak demand of the last mile networks that it connects.

Backhaul Fibre to Rural Areas

High-speed broadband radio requires that the sites where the base stations are located be provided with enough backhaul capacity. Approximately 80% of sites in Ireland have no fibre optic backhaul connection and instead rely on specially designed backhaul broadband radios that can transmit up to 10 Gbit/s, which are used to link the sites to the nearest fibre optic point of Ireland's backhaul network. These backhaul broadband radios are extremely flexible and can be deployed quickly; nevertheless, when the peak demands of connected last mile networks are sufficient, it is practical and economical to deploy fibre optic technology into central areas where multiple broadband radio sites are located. The benefit of this policy is that a single strand of fibre can be extended from a provincial town, such that it can serve and improve the broadband performance of many hundreds of customers: i.e. using respective technologies to their strengths. It is therefore crucial that Ireland invest in the development of backhaul fibre optic networks that connect the broadband radio sites of rural Ireland to the country's backhaul networks.

State Controlled Backhaul Networks

A fundamental concern with the proposed NBP is the fact that the Irish State will not own the infrastructure that it pays to develop. The obvious solution is to establish a state-controlled company to manage any backhaul fibre network that is built using taxpayer money. Ireland has already implemented this model for its wholesale electricity supply, when it formed the public limited company Eirgrid to serve as the Independent Service Operator (ISO) of Ireland's wholesale electricity market. The creation of Eirgrid has been a great success for Ireland as the Company has both managed the operation of the national electricity grid and the development of high voltage transmission networks.

The Irish Government could replicate the same ISO model for Ireland's wholesale connectivity market, which would benefit from the pre-existing knowledge that has been built up from the establishment and operation of Eirgrid. A state-controlled connectivity ISO for backhaul fibre networks would ensure that Ireland retains direct control over the critical national infrastructure that it pays to develop. This would mean that the wholesale backhaul fibre network would be managed separately from private commercial interests, which have not been aligned for many years with Ireland's wish to bridge the connectivity gap faced by rural communities. If like Eirgrid, a state-controlled connectivity ISO were to be given a simple and clear mandate for the development of fibre backhaul to all sites and the management of the resulting network, then the issue of wholesale backhaul connectivity would cease to be a problem for the delivery of rural connectivity.

Regulation of Backhaul Fibre Networks

The establishment of a state-controlled connectivity ISO would need very tight regulation to ensure that previous mistakes are not repeated, as happened when Ireland failed to put in place effective pricing controls for the Metropolitan Area Networks (MAN's). In this respect, Ireland's wholesale backhaul market is unusual in that there are no effective regulations for the prices that backhaul network providers charge ISP's to use their networks. This uncommon regulatory gap has hampered rural Ireland greatly by allowing backhaul providers to maintain uncompetitive prices for many years. As an example, the cost for international data transit to Dublin is typically <10% of what some backhaul network operators charge ISP's to provide connectivity for villages back to regional population centre: e.g. Dublin, Cork, Galway. As a result, regional ISP's wishing to roll out broadband to rural communities have been forced to pay these high fees and add unnecessary costs to their businesses. This directly affects the regional ISPs ability to re-invest or pass on cost savings to their customers. The overly high pricing practices of Ireland's backhaul providers, who can charge as much as €8 per metre of fibre annually, stand in direct contrast to regulated backhaul markets in other EU countries, where the prices for the same backhaul services are typically ≤€0.30 per metre of fibre annually.

Any proposed connectivity solution for rural Ireland, be it the NBP, this alternative or another, must include provisions for the regulation of backhaul network pricing practices. Increased regulatory oversight should be progressed as soon as practically possible and start with all backhaul providers that the Irish Government has influence over. As a point of urgency, the Irish Government should implement a policy over the coming three years that progressively decreases the prices that these companies in receipt of state subsidies charge. If the Irish Government simultaneously made a capital investment into the same companies on the basis that they would expand their coverage, then existing ISP's would be able to immediately serve more rural communities with high-speed broadband services. In parallel, the Department of Communications should request that ComReg improve and expand regulated pricing structures for private backhaul network operators, which would further reduce the cost of backhaul connectivity for ISP's. Access to more affordable backhaul connectivity is a critical factor that if addressed would allow regional ISP's to extend the coverage of their broadband services throughout rural Ireland. Consequently, the State would not have to develop the vast backhaul network proposed in the NBP and thus avoid paying to unnecessarily overbuild Ireland's backhaul fibre network.

Financial Supports for ISP's

The development of telecommunications networks is expensive and return on investment periods for the industry are long, typically around 5 years. These realities combined with the cost of debt finance, result in many regional ISP's opting to grow their businesses organically and choosing to expand their networks when cashflow allows. This is cashflow driven expansion results in regional ISP's expanding broadband services to more rural communities at a slower pace than their ambition or technical ability would allow. Access to affordable credit and state subsidies to all ISPs on equivalent terms would allow regional ISP's increase economies of scale to bulk purchase the latest broadband radio equipment and rapidly build out their networks, which would in-turn allow them to roll out broadband services to rural Ireland within a 24-month period.

Affordable Finance

The Strategic Banking Corporation of Ireland (SBCI) is a state development bank that was set up in 2014 to ensure that Irish businesses have access to long-term finance at affordable lending rates.^{xv} The bank can create lending schemes for designated industries to target specific problems. For example, the Agriculture Cashflow Support loan scheme was launched in 2016 to support farmers experiencing short-term financial pressure due to price and income volatility.^{xvi} The €150 million scheme allowed Irish farmers to borrow up to €150,000 over 6 years, at a low-cost interest rate of 2.95% for the term of the unsecured loan, and use the funds to either make capital purchases or as a working capital alternative to short-term credit facilities.

A similar SBCI scheme with higher borrowing thresholds could be developed and coupled with an independently-designed compliance programme for regional ISP's wishing to access the finance. Such an initiative would ensure that only those regional ISP's who delivered broadband services that met the loan scheme's target quality of service criteria could access the finance. This would in turn de-risk the State's investment and maximize its financial return.

Consumer Subvention Model

The way that rural Ireland has developed over the decades, with homes being built at random throughout the countryside, means that a number of premises in the very isolated regions in the NBP Intervention are not commercially viable for the provision of broadband. For these properties, a state subsidy will be required for private operators to provide broadband services. The eminent economist Colm McCarthy noted in his 2015 report, *The National Broadband Plan: State Aid, Competition and Market Structure*,^{xvii} that a consumer subvention model should have been considered as a method of market intervention for addressing Ireland's rural connectivity gap where it exists. McCarthy justified this recommendation on the basis that a consumer subvention model is an efficient and proven economic approach to solving market failures where it is not commercially viable for private companies to provide a utility service like electricity. Such an approach solves a market failure where it exists by way of the state providing a maximum payment to each premise who wants service, with the payment being made in the form of a grant that is paid directly to any private company who is willing to provide the service.

If the consumer subvention model was used for rural broadband connectivity, it would function in a similar way as the electricity grants model for the Farm Electrification Grant Scheme (FEGS), which Ireland implemented with great success to ensure that farmers could be connected to the electrical grid. Under the FEGS programme, the state paid a predetermined maximum amount of money towards the provision of electricity for each premise that applied: €508 for a single-phase connection and €1,016 for a three-phase supply.^{xviii} Given the successful experience and knowledge that the Irish Government gained through the FEGS, a similar model for broadband connectivity could be established to ensure that rural homes which are not adequately served are quickly connected with high-speed broadband at a minimum cost to the tax payer.

Connection Grants Case Study

Scotland is currently developing a connection grants scheme as an ‘aligned intervention’ to its Reaching 100% programme. The aligned intervention scheme and the R100 programme are both taking place after Scotland attempted to deliver fibre optic broadband to all premises in Scotland via the £442m DSSB initiative. At less than one-sixth the cost of the cost of the €2.97bn subsidy that is being proposed by the NBP, Scotland’s DSSB was excellent value for money, since it achieved a per property connection cost for just £480 (€544). Even if the NBP were to achieve its 100% connection target, the cost to the Irish State per connected property would be a staggering €5,480: approximately ten times more expensive compared to Scotland’s DSSB.

Given that the separation between rural premises in Ireland is much greater compared to Scotland, it is likely that the NBP will enable far less than 95% of premises in the Intervention Area for fibre broadband. It would be beneficial if the Irish Government would examine Scotland’s intervention approach and develop a connectivity proposal that subsidizes the cost of fibre broadband to communities and clusters of homes where it makes financial sense, while delivering the same quality of broadband services to remote premises via high-speed broadband radio technology. To develop such a hybrid proposal, it would be necessary to re-evaluate the entire Intervention Area to determine which premises are commercially viable for broadband and which require a State subsidy.

Evaluation of the Intervention Area

The measuring and pinpointing of premises affected by the digital divide is essential to cost efficiently solving Ireland’s rural connectivity gap. Accurate measurement is also necessary to minimize the unnecessary spending of public and private investment on the overbuilding of infrastructure and maximize taxpayer’s value for money. The Intervention Area that has been defined by the Department is representative of the 2012 Irish connectivity market. There have been a small number of updates to this view since then, with the most notably being the 2015 announcement of the Eir 300k fiber rollout initiative. Despite these updates, the Intervention Area has failed to reflect the overall expansion of the broadband market that has occurred in the intervening 7 years since the mapping exercise was undertaken. Consequently, RISPA does not have confidence that the NBP is based on accurate mapping data that is a true reflection of the current connectivity market in Ireland. RISPA would advocate that a real-time market monitoring system should be implemented and maintained by ComReg, and that such a system would be designed to allow ISP’s to demarcate the areas that they serve and provide a facility for citizens to appeal such information. If such a system were to be established, it would mean that decision makers would have fair and accurate data that they could use to minimize overbuild and waste of taxpayers’ money.

Commercial Viability of Fibre

On the 14th of February 2019, Eir presented evidence to the Public Accounts Committee (PAC), a portion of which focused on Eir’s efforts to meet its self-selected deadline extension for connecting the 300,000 properties that it requested be removed from the NBP. Evidence given on that date stated that Eir had assembled a specialized team to evaluate the remaining properties in the NBP’s Intervention Area and determine whether any of them were commercially viable for their own fibre-to-the-home (FtH) broadband service. It was stated that the team concluded that some 150,000 properties were commercially viable for Eir to pass. This means that as many as 392,000 out of the 542,000 premises identified in the NBP’s Intervention Area are not commercially viable for the delivery of broadband via fibre optic technology.

Commercial Viability of Broadband Radio

The fact that 392,000 premises are not commercially viable for fibre optic broadband does not mean that they are not commercially viable for broadband radio technology. Approximately 40 regional ISP’s throughout rural Ireland have been delivering internet access to rural communities and remote premises for the better part of 20 years. At present,

these regional ISP's provide internet access to approximately 125,000 premises in the Intervention Area.^{xix} If the Irish owned and operated companies that supply internet to these premises had access to affordable finance and suitable spectrum, they could immediately begin rolling out 150+ Mbit/s broadband to these homes and businesses.

That said, it is fair to say that some of the 125,000 premises that receive broadband services from regional ISP's would be enabled for Eir's FttH broadband service if it passed the 150,000 premises that it said were commercially viable. Nevertheless, it is also the case that regional ISP's have maintained their customer numbers throughout Eir's 300k roll out, which is evidence that they are continually extending their network coverage into areas that are not commercially viable for fibre optic technology. This would imply that the 125,000 premises, (out of the 392,000) that are currently served by regional ISP's will continue to be commercially viable for the delivery of broadband services via broadband radio technology. Therefore, it would be reasonable to assume that the balance of 267,000 premises may require a state subsidy in the form of a connection grant, so that a regional ISP can provide them with broadband services. Consequently, there would appear to be a strong argument for the completion of an updated and improved mapping exercise, which could achieve significant cost savings to the Irish State.

Achieving Broadband Radio Coverage

The physical and economic geography of Ireland makes the delivery of broadband difficult, whether it be via fibre optic or broadband radio technology. The 542,000 premises in the Intervention Area are scattered across all parts of Ireland and it is likely that the 267,000 premises discussed above would represent those homes and businesses that are amongst the most isolated. In this respect, it would be useful if the Department of Communications released Intervention Area data in an accessible format so that regional ISP's could accurately determine where base stations could be best located to maximize the number of premises eligible for broadband services. In the absence of this information, it can only be assumed that the entire country must be provided with broadband radio coverage.

Broadband radio technology is a flexible technology that can supply broadband services to premises that are located at very long distances from a connecting base station. Nevertheless, as the distance from a base station is increased towards the technology's maximum distance capability, the number of premises connected for high speed broadband must be decreased. Consequently, broadband radio technology is typically deployed by regional ISP's at distances of no more than 12 kilometres. To guarantee the delivery of 150+ Mbit/s broadband services under a licensed-protected model, a conservative distance limit of approximately six kilometres between base stations and connected premises would need to be implemented.⁴ Such a conservative coverage radius would mean that homes and businesses would be guaranteed to experience a quality of service that exceeds the NBP's maximum specification of 100 Mbit/s. The distance limitation would also ensure that no broadband radio site is overloaded, which would be an important futureproofing measure that would allow for evolving broadband connectivity requirements.

Number of Broadband Radio Sites

The Republic of Ireland has a total land area of 68,883 square kilometres that includes uninhabited areas, national parks, forests and bogs.^{xx} To accurately calculate the number of broadband radio sites that would be required to provide 100% broadband coverage, it would be necessary to undertake a national mapping exercise that would require the involvement of regional ISP's working together with ComReg and the Department over several weeks. In the absence of up to date Intervention Areas maps it is only possible to provide a high-level estimate based on a simple area calculation that presumes all land would require coverage.

⁴ RISPA's coverage model assumes a distance limit for connections between base stations and premises of 5.773 km.

Appendix C explains how the coverage area of a site has been calculated and how theoretical coverage overlaps between sites would be minimized. The coverage model assumes that sites would be located 10 kilometres apart and that the coverage area of each site would be 86.59 square kilometres. This means that it would theoretically take 795 sites to cover the entire landmass of Ireland and provide 100% access to high speed broadband services. In practical terms however, a broadband radio network would be built in a way that matches Ireland's ribbon development; therefore, the number of sites required would be fewer because the uninhabited areas would not need to be covered.

Cost Estimations of Alternative

This proposal details a series of recommendations, three of which would require significant financial support from the Irish State. These recommendations are as follows:

- the establishment of a state backed affordable credit scheme for regional ISP's;
- the creation of a state-controlled connectivity ISO to build and manage Ireland's backhaul fibre optic network;
- the design of a consumer subvention programme to provide connection grants to regional ISP's who deliver broadband services to premises that are not commercially viable.

To accurately determine a cost estimate for these three recommendations, it would be necessary to complete a detailed evaluation, similar in methodology to the assessments that several UK agencies have undertaken for their broadband interventions. This fact notwithstanding, high-level estimations can be made for two of these three recommendations.

Affordable Finance Scheme

The ability for regional ISP's to access affordable credit is critical to the success of any alternative state intervention scheme. Affordable finance would allow regional ISP's to increase their scale of operations and meet the demands of accelerating the roll out of broadband to thousands of premises. In addition to purchasing expensive equipment on an ongoing basis, regional ISP's would need to expand their workforces by hiring highly skilled engineers, managers, and operations personnel. Other expenditures would include the associated costs of operating large numbers of broadband radio sites, such as the maintenance of redundancy systems, the payment of fees to backhaul network operators, license fees, insurances, et cetera. Additional to these costs would be the initial expense of hiring specialist contractors to prepare and develop broadband radio sites. Lastly, the amount of finance potentially allocated to such a scheme should anticipate that it could take up to five years to fully develop a national backhaul fibre network. Consequently, to ensure that rural Ireland is not left waiting for 150+ Mbit/s broadband services, many regional ISP's will have to expand their backhaul broadband radio networks during the intervening period that Ireland's fibre backhaul network is extended.

Given the above expenses and the fact that it can take up to 24 months before a broadband radio site breaks-even, regional ISP's would in reality need access to significant financial capital to successfully deliver 150+ Mbit/s broadband to rural Ireland over a two-year period. For this reason, it is not inconceivable that an affordable credit scheme would require a fund of approximately €500m, with loan periods of up to five years and term interest rates of 2.5%.

To minimise risk to the taxpayer, sensible borrowing thresholds would need to be established to ensure that regional ISP's have the ability to rapidly grow without overextend themselves. Additionally, qualifying criteria would have to be developed and correlated to different scales of operation and intended activities. Collectively, such measures would greatly reduce the risk to the State and maximize its return on investment by way of the €12.5m surplus interest that would render the initiative cost-negative to the taxpayer.

State Controlled Backhaul Fibre Company

To accurately calculate the cost of developing a backhaul fibre optic network that is controlled by the Irish State, it would be necessary to finalize the number of broadband radio sites and evaluate the upper and lower cost range of their development. Furthermore, it would also be necessary to define the responsibilities of a state-controlled connectivity ISO and the number of employees that would be required.

In light of the above, the precise determination of the most cost-effective structure for a state-controlled connectivity ISO would necessitate a detailed cost-benefit analysis to be calculated by the Department with updated information supplied by the Industry. In the absence of such an evaluation, it is not possible for RISPA to estimate the cost of developing and operating a national backhaul fibre optic network.

Consumer Subvention Scheme

The purpose of a consumer subvention scheme is to lower the cost of providing a service to a premise to the point that it becomes commercially viable for a private company to install and deliver the service. The commercial viability of a given premise for broadband radio will normally be determined by its remoteness to other premises. As the distance between premises increases, the number of potential customers that can be served from a potential broadband radio site decreases. As a result, there is less opportunity for regional ISP's to spread the costs of expanding their networks and rolling out broadband services. Some sites and their connected premises will therefore be more expensive to provision than others, which makes it difficult to determine a one size fits all estimate for a potential broadband connection grant scheme. That said, it is possible to examine the known equipment costs and apply approximate margins for other related site costs to develop a broad estimate for the average connection grant value.

A high-speed broadband radio base station costs €5,300 and based on the estimated 267,000 premises that would need to be covered, an average of eight base stations would be required for each of the 795 sites. This means that 6,360 base stations would be needed to provide national broadband radio coverage at a projected cost of €33,708,000. The next equipment cost is the small antenna that must be mounted on each premise so that it can receive a 150+ Mbit/s broadband service. Each high-speed antenna costs €495, which means that for 267,000 premises, it would cost €132,165,000. Collectively, the combined costs for the initial broadband radio equipment would be €165,873,000.

Additional cost categories would be those associated with the development, maintenance and continued operation of the broadband radio sites. The list of expenditure headings that make up these categories is diverse, which means that it is only possible to broadly estimate their cost. From information that was supplied by several ISP's about some of their sites that they randomly selected, a loading of 150% of the combined costs of both the base station units and the associated antennas would appear to cover the average integrated costs of a site to its break-even point.

Based on the initial equipment calculations above, this means that the associated costs would be €248,809,500. Therefore, a rough estimate of the total integrated costs for developing a network of 795 sites and delivering 150+ Mbit/s broadband to the 267,000 premises, for which it is not currently commercially viable to do so, would be €414,682,500. Consequently, if this estimate were to be averaged out over the number of premises that are not commercially viable, then the value of each connection grant would be approximately €1,550.

Conclusion

The Irish Government's justification for the NBP relies on the premise that it will generate economic activity throughout rural Ireland. The Irish Government maintains that the tax revenues which arise from this economic activity over the NBP's lifecycle will exceed the financial costs of the project. In contrast to the Irish Government's position, economists have argued that the proposed NBP failed most of the Public Spending Code's stress tests and thus doubt that many of the purported benefits of the project will materialize. Arguably, the economist Colm McCarthy best articulated these doubts when he determined that *"the quantification of project benefits is, along with the articulation of the counterfactual and the quantification of project costs, an essential critical ingredient in any CBA."*

It was the Irish Government's failure to quantify benefits of the NBP that drew the most scrutiny in McCarthy's 2015 assessment, wherein he argued that *"benefits need to be measured rather than asserted."* What he observed was that the task of estimating the NBP's claimed benefits had either not been undertaken, or that the task was completed but that the findings were subsequently overtaken by the reduction in the Intervention Area. Such obvious failures of the NBP caused McCarthy to conclude at the time that the NBP project was not *"subjected to a rigorous cost/benefit analysis as required under the Public Spending Code,"* which he determined was *"a serious concern given the scale of the project as proposed."*

McCarthy's clear concerns appear to be shared by the secretary general of the Department of Public Expenditure Reform, Robert Watt, who argued that the NBP's cost meant that the project represented an unprecedented risk to the Irish State.^{xxi} The opinions of these experienced economists emphasise how the success of any public procurement process depends on properly designed and executed cost-benefit analyses that utilize realistic input data and assumptions.

Ultimately, the proposals outlined in this alternative represent an entirely different approach to the NBP and would necessitate the completion of a new cost-benefit analysis with more realistic inputs to validate their economic merits before decisions could be made regarding their implementation. As part of such work, it would be necessary to gather information from all ISP's and to augment the outdated economic models that ComReg and the Department of Communications use to make decisions regarding the value of the industry. For example, the economic multiplier that ComReg uses to judge the value of the regional ISP industry was developed by the economists Anthony Leddin and Brendan Walsh for their 1990 book, *The Macro-economy of Ireland*.^{xxii} Such outdated information continues to be utilized by ComReg when conducting economic value assessments regarding the prospective allocation of spectrum to a particular industry segment, in spite of its admission that the economic contributions and number of people employed by small wireless companies is likely substantial.^{xxiii}

Given the failures of the NBP's cost-benefit analysis and ComReg's use of dated models to measure the worth of the regional ISP industry, it would seem prudent that any assessment of the proposals outlined in this alternative should be undertaken in close collaboration between the Government and the Industry. The regional ISP industry would welcome the opportunity to engage with such a process and provide information regarding the value that their businesses creates and the job-rich industries that they are cultivating throughout rural Ireland.

In summary, it is the position of RISPA that the NBP is a flawed proposal that will fail to achieve its primary objective and squander an unprecedented amount of taxpayer's money. The market intervention approach proposed by the NBP is based on the assumption that the only way to futureproof Ireland's digital future is via the roll out of fibre optic technology to every premise in Ireland. However, the policy options and case studies presented in this document prove that there are other approaches that if implemented would be more time effective and cost efficient, delivering the same result five years sooner and with a saving of over €2.7bn.

Related to the NBP's failure to not comprehensively consider solutions other than the chosen fibre model is the fact that economists such as McCarthy and Watt questioned the credibility of the cost-benefit analysis and compliance with the Public Spending Code.^{xxiv} Similarly, the fact that the NBP proposal is based on an evaluation process that failed to consider major developments of broadband radio and other FWA technologies is an obvious deficiency that at the very least warrants a comprehensive re-examination of the entire NBP proposal prior to the conclusion of its procurement process.

Finally, it is worth noting that EU guidelines for the development of broadband networks to correct market gaps establishes Member States should limit the scale of their interventions as much as possible.^{xxv} The spirit of these guidelines are furthered by the European Electronic Communications Code (the Code).^{xxvi} The Code stipulates that only after the private sector has failed to deliver services commercially should a Member State intervene; however, the EU has determined that such intervention must begin with the least intrusive policy instruments, such as those described in this alternative. Only after such policy measures have failed does the EU recommend that Governments consider more intrusive State interventions like the NBP. In short, the guiding principle of the EU rules is that "*envisaged broadband deployment activity should be targeted at market failures*"^{xxvii} and that any intervention should not crowd- out existing market operators from areas that they plan to invest in or have already made network investments.^{xxviii}

Based on the EU guidelines, as well as the other reasons presented throughout this document, RISPA believes that the Irish Government should at a minimum halt the current procurement process so that it can comprehensively evaluate the recommendations that the organization has outlined before deciding whether to proceed with the NBP proposal. A failure to properly explore RISPA's recommendations will likely result in the Irish State spending far more money than it needs to in its attempt to solve the Country's connectivity gap, which Watt argued will divert public funding away from a significant number of important capital projects. In conclusion, the Irish Government has a fiduciary duty to its citizens to evaluate credible NBP alternatives like RISPA's, which would allow the Irish State to achieve its aim of 100% access to broadband services without jeopardizing the development of 18 schools, 10 primary care centres and 2,000 local authority homes.^{xxix}

Appendix A: Evolution of Maximum Throughputs for Selected Specifications

Copper

The speeds listed for copper represent the fastest recorded configurations that were achieved for each specification, which in many instances were greater than the speeds quoted when each specification was first published.

Year	Specification	Name(s)	Downstream	Upstream
1999	ITU-T G.992.1	ADSL	8 Mbit/s	1.3 Mbit/s ^{xxx}
2002	ITU G.992.3	ADSL2	12 Mbit/s	3.5 Mbit/s ^{xxxi}
2003	ITU-T G.992.5	ADSL2+	24 Mbit/s	3.3 Mbit/s ^{xxxii}
2001	ITU G.993.1	VDSL	55 Mbit/s	3 Mbit/s ^{xxxiii}
2006	ITU G.993.2	VDSL2	200 Mbit/s	100 Mbit/s ^{xxxiv}
2015	ITU G.993.2.Amendment 1	VDSL2+	300 Mbit/s	100 Mbit/s ^{xxxv}

Fibre

The development pace of fibre-optic technologies has been relatively consistent over the years. As a technology, it supports real-world speeds that are the same as the maximum rated capacity of the relevant specification. The downside of fibre optic technology is the time that it takes from when a specification is published to when manufacturers develop equipment that can support the requirements of a specification. For instance, despite being published approximately 15 years ago, GPON is the specification that most fibre optic systems under development (globally) utilize because the network technology has been practically proven. By contrast, the TWDM-PON specification is experimental and it will probably take another seven years before many manufacturers produce equipment for large scale commercial deployment.

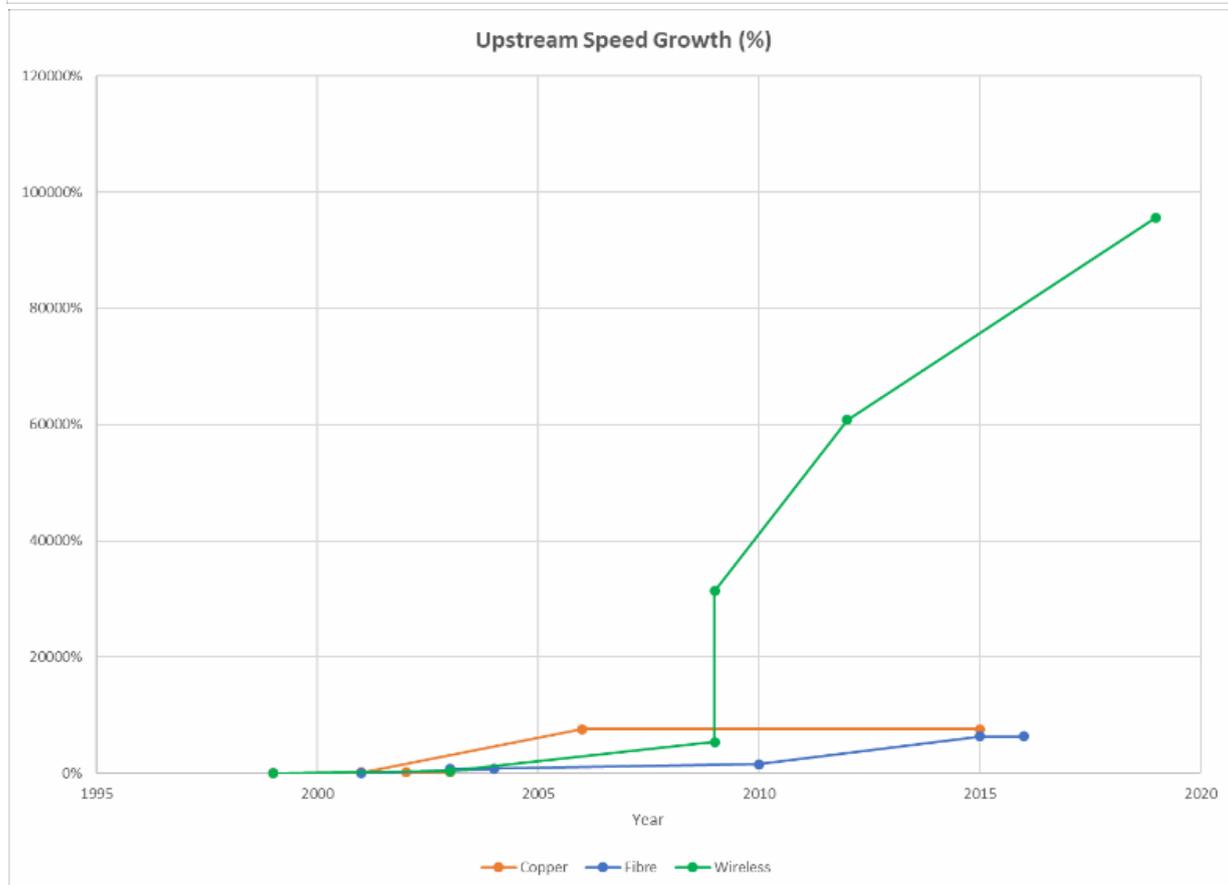
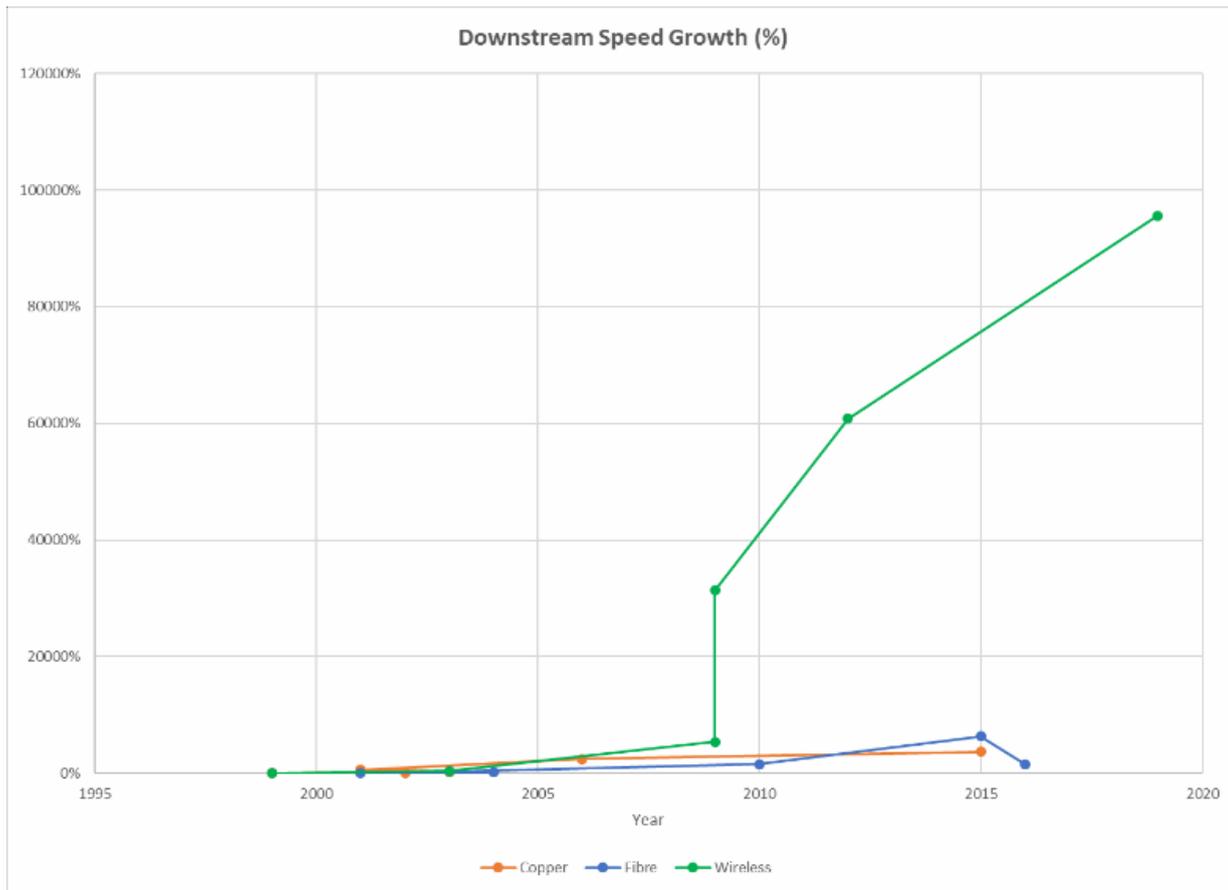
Year	Specification	Name(s)	Downstream	Upstream
2001	ITU-T G.983.3	Broadband PON	622 Mbit/s	155 Mbit/s ^{xxxvi}
2004	IEEE 802.3	Ethernet PON	1.244 Gbit/s	1.244 Gbit/s ^{xxxvii}
2003	ITU-T G.984	Gigabit PON	2.488 Gbit/s	1.244 Gbit/s ^{xxxviii}
2010	ITU-T G.987	XG-PON	9.95 Gbit/s	2.488 Gbit/s ^{xxxix}
2015	ITU-T G.989	TWDM-PON	39.8 Gbit/s	9.95 Gbit/s ^{xl}
2016	ITU-T G.9807.1	XGS-PON	9.95 Gbit/s	9.95 Gbit/s ^{xli}

Wireless

The speeds listed below are the maximum speeds that have been achieved for each specification.

Year	Specification	Name(s)	Downstream	Upstream
1999	IEEE 802.11b	Wi-Fi protocol second release	11 Mbit/s	11 Mbit/s ^{xlii}
2003	IEEE 802.11g	Improved Wi-Fi protocol	54 Mbit/s	54 Mbit/s ^{xliii}
2009	IEEE 802.11n	Wi-Fi 4 protocol	600 Mbit/s	600 Mbit/s ^{xliv}
2009	IEEE 802.11ac	Wi-Fi 5 protocol	3.46 Gbit/s	3.46 Gbit/s ^{xlv}
2012	IEEE 802.11ad	mmWave wireless communication	6.7 Gbit/s	6.7 Gbit/s ^{xlvi}
Dec. 2019	802.11ax	Wi-Fi 6 next Generation protocol	10.53 Gbit/s	10.53 Gbit/s ^{xlvii}

Appendix B: Throughput Growth Trend of Selected Specifications



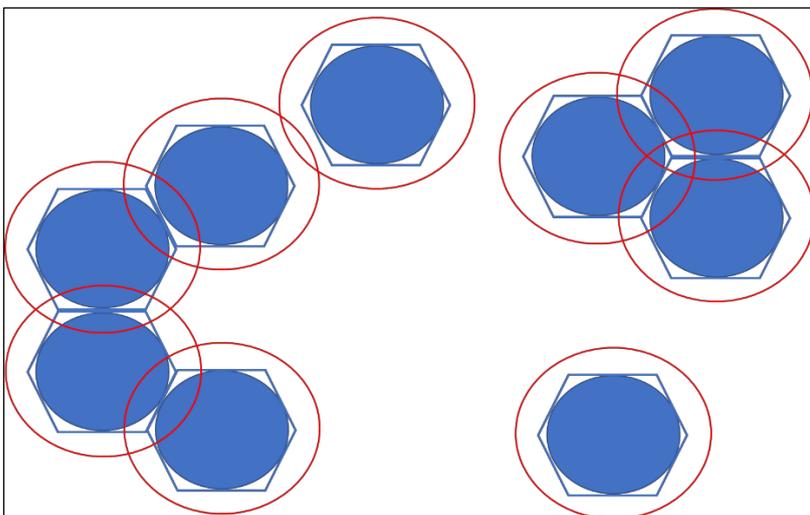
Appendix C: Technical Explanation of Coverage Model

A broadband radio base station is typically designed to provide service to premises within a 90-degree coverage arc. Therefore, if premises are spread around a site across 360 degrees, four base stations are required. When deployed in a 360-degree configuration, a site has a circular coverage area that is determined by the ISP. One of the most important factors when determining a suitable location for a site is whether it can 'see' another site; i.e. whether the base stations of a potential broadband radio site might cause radio interference to the base stations of an existing site. Because unmanaged radio interference can cause the performance of broadband radio to decrease, it is important that the deployment of base stations is properly planned to ensure that they cannot see substantial interferences from other operational base stations on other broadband radio sites.

Aside from ensuring that base stations cannot see signals from each other each other, it is best practice to minimize intersecting areas of overlapping coverage between base stations. In practical terms, this is not always possible, which is why most manufacturers have designed their antennas to be unaffected by signals being broadcast from directions other than which they are pointing: i.e. a north facing antenna mounted on a premise will not be affected by a south broadcasting base stations.

Taking the above technicalities into consideration, RISPA has designed a coverage model to minimize interference issues and maximize performance. The model assumes that each broadband radio site will be located at a minimum distance of 10 kilometres apart and that base stations will be physically tilted towards the ground so as to limit their absolute coverage range to no more than 6 kilometres, thus ensuring that no base station can see another base station. Finally, the model uses a hexagonal deployment pattern to address the coverage gaps that would exist if a deployment pattern of 5-kilometre circles was utilized. The hexagonal approach means that a premise would never be more than 5.773 kilometres from a broadband radio site. The hexagonal layout also minimizes potential interference overlaps from hypothetical scenarios where three broadband radio sites are located at a minimum 10-kilometre distance from each other; thus, ensuring that a premise antenna does not suffer radio interference from base stations that broadcasting from adjacent broadband radio sites.

The below pictograph is representation of how broadband radio sites would be hypothetically deployed under RISPA's coverage model to provide broadband services for premises that are dispersed according to a ribbon pattern. As a general rule under RISPA's coverage model, no premise would be located outside the perimeter of a hexagon; however, in practice, there would be little technical reason as to why a premise located at the absolute maximum coverage distance of 6 kilometres could not be connected.



End Notes

- i <https://ec.europa.eu/digital-single-market/en/connecting-europe-facility>
- ii https://www.scotlandsuperfast.com/media/1356/dssb_info_sheet_the_partnership.pdf
- iii https://www.audit-scotland.gov.uk/uploads/docs/report/2018/nr_180920_broadband.pdf
- iv <https://www.scotlandsuperfast.com/the-dssb-programme/about-the-programme/>
- v <https://www.scotlandsuperfast.com/>
- vi https://www.scotlandsuperfast.com/media/1356/dssb_info_sheet_the_partnership.pdf
- vii <https://www.dgwgo.com/business/superfast-broadband-celebrates-latest-fibre-broadband/>
- viii https://www.audit-scotland.gov.uk/uploads/docs/report/2018/nr_180920_broadband.pdf
- ix <https://www.scotlandsuperfast.com/how-can-i-get-it/reaching-100-superfast-coverage/>
- x <https://en.arcep.fr/news/press-releases/p/n/superfast-wireless-window-arcep-issues-its-first-superfast-wireless-licence-in-the-seine-et-marne-d.html>
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APPENDIX 5: GRANAHAN MCCOURT RESPONSES TO QUESTIONS RAISED BY THE COMMITTEE

JOC Questions & Replies

Background		
1 a) Much has been made of NBI's experience in the delivery of projects such as this?		Please see attached document
1 b) What projects if any on the scale of the National Broadband Plan has Granahan McCourt delivered?		The Granahan McCourt Group and management team have over three decades' experience partnering to deliver large scale global telecommunications infrastructure projects. These including deploying almost 22,000km of new fibre builds across North America with Rogers, RCN & MFS, circa 2,000km in Mexico with Megacable, & 200km in UK cities with McCourt Kiewit International.
2. What infrastructure projects (If any) of a scale greater than €5m in value has Granahan McCourt ever delivered?		See above
3 a) What fibre broadband projects (if any) has David McCourt delivered in the last 20 years?		David McCourt was the chairman of enet from 2013-2018, which managed fibre MANs across 94 cities and towns in Ireland on an open-access, wholesale-only basis and provided services to over one million end users in Ireland. During this time, enet also deployed a FTTP network for enterprise customers in a number of towns in Ireland and expanded its network into Northern Ireland. During this timeframe, David McCourt also deployed over 8,000km of fibre network, passing nearly two million homes in the United States.
3 b) How many of the GMC team today were involved in the RCN Corporation rollout or other fibre rollouts of scale overseas?		Principal shareholders, and management team of GMC have all managed fibre rollouts of scale, including RCN Corporation. Please see detail in 1(b) above and attached document.
4. Have any of the companies owned by David McCourt filed bankruptcy while owned by or within 3 years of the departure of David McCourt?		No.
5 a) Prior to enet, what was the primary business of Granahan McCourt?		Please refer to answer 1(b)
5 b) What did it invest in?		Telecommunications, technology and media.

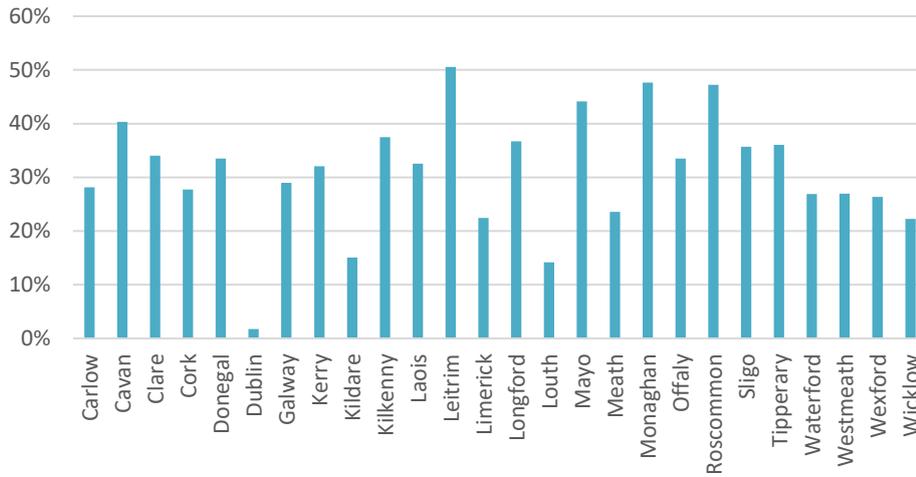
6. When was GMC founded?	Granahan McCourt Capital was founded in 2004, and for the last 15 years GMC has been the primary business for David McCourt's involvement in telecommunication businesses.																					
7. How many directly-employed staff does GMC have today?	GMC Group are focused on direct management of telecommunications and media businesses, with GMC consultants directly contracted to these entities. For the NBP there is an appropriate number of the GMC team assigned to the project – please refer to the reply to Q.15.																					
8. How much are GMC's 'assets under management' today?	This is commercially sensitive information.																					
Structuring																						
9. a) Can you provide a timeline of the membership of the bidder, and the reasons for which changes occurred in the process? b) Can you provide a narrative of the elements of the bidder which were used to pass each test within the National Broadband Plan process and state whether each of these constitutes a part of the consortium which was declared the preferred bidder?	<p>9. (a) Membership of the bidder</p> <table border="0" data-bbox="568 723 1316 936"> <thead> <tr> <th>March 2016</th> <th>Sept 2017</th> <th>Sept 2018</th> </tr> </thead> <tbody> <tr> <td>Granahan McCourt (GMC)</td> <td>GMC</td> <td>GMC</td> </tr> <tr> <td>Enet</td> <td>Enet</td> <td>Enet</td> </tr> <tr> <td>Kelly Group</td> <td>Kelly Group</td> <td>Kelly Group</td> </tr> <tr> <td>3i Investments PLC</td> <td>John Laing</td> <td>KN Networks</td> </tr> <tr> <td>John Laing</td> <td>SSE</td> <td>Actavo</td> </tr> <tr> <td>Northern Powergroup</td> <td></td> <td></td> </tr> </tbody> </table> <p>NBI cannot comment on the reason other companies take certain courses of action.</p> <p>9. (b) The current consortium comprises Granhan McCourt. Tetrad Corporation are being relied on to provide economic and financial standing for the bid. The Kelly Group, KN Networks and Actavo are providing technical capabilities. The latter are key contractors with vast experience and expertise on major telco project delivery in Ireland, the UK and further afield.</p>	March 2016	Sept 2017	Sept 2018	Granahan McCourt (GMC)	GMC	GMC	Enet	Enet	Enet	Kelly Group	Kelly Group	Kelly Group	3i Investments PLC	John Laing	KN Networks	John Laing	SSE	Actavo	Northern Powergroup		
March 2016	Sept 2017	Sept 2018																				
Granahan McCourt (GMC)	GMC	GMC																				
Enet	Enet	Enet																				
Kelly Group	Kelly Group	Kelly Group																				
3i Investments PLC	John Laing	KN Networks																				
John Laing	SSE	Actavo																				
Northern Powergroup																						
10. a) What is the relationship between NBI and Frank McCourt?	None																					
10 b) What is the relationship between NBI and Tetrad?	Tetrad is a shareholder in Granahan McCourt Dublin, and GMC Dublin is the sole shareholder in NBI.																					
10 c) Are they currently members of the consortium?	Yes, Tetrad are by virtue of their shareholding in Granahan McCourt Dublin.																					
10 d) Had they previously been members?	Yes, Tetrad have been shareholders in Granahan McCourt Dublin since its inception in 2013.																					
11. With regard to the structuring of NBI and its ultimate investors, what protections does NBI have in																						

<p>place in the event that the NBI company is not profitable and/or that an unexpected expenditure arises?</p>		<p>NBI is required upon contract signing to meet the obligations of the NBP Project Agreement; this includes meeting deployment timelines, all service level KPI's and future proofing of the network and products over the 35-year period. NBI and it's shareholders will provide appropriate financial security in meeting these obligations.</p>
<p>12. At what point did NBI seek mitigation for commercial rollouts in the intervention area?</p>		<p>The NBP contract contains express provisions which addresses changes to the Intervention Area over the course of the project.</p>
<p>13. a) What are Granahan McCourt's long-term plans for NBI?</p>		<p>NBI are committed to delivering high speed broadband in the IA and plan to operate, maintain and upgrade the network over the 25-year contract, the 10 year extension period to this, and beyond indefinitely into the future at no extra cost to the State.</p>
<p>13 b) Will Granahan McCourt confirm that they have no plans to sell NBI or its parent companies in the coming years?</p>		<p>GMC can confirm that there are no plans to sell NBI or its parent companies.</p>
<p>14. What resources (if any) does can Granahan McCourt draw on in the event that National Broadband Ireland is not successful?</p>		<p>NBI will provide appropriate financial security in meeting the NBP Project obligations - this includes an event of NBI default, by way of financial compensation to the Minister.</p>
<p>15. How many staff are directly employed by NBI today (i.e. excluding contractors)?</p>		<p>NBI, as a company, was recently established for the sole purpose of building and operating the NBP. It is expected that from the current core team of 40, a further 140 people will be hired in year one, and this will increase upwards to a workforce of 265. The core current team is separate to around 100 consultants, advisors, equipment vendors, specialist sub-contractors and others currently working on behalf of NBI. Up to 2000 people will be working directly on the NBP during the construction phase.</p>
<p>16. Can you confirm that the €175m equity to fund the NBP will be provided entirely by Tetrad Corporation and no further changes or 'selling down' of the equity will be made before financial close or shortly thereafter?</p>		<p>Granahan McCourt Dublin is the sole shareholder in NBI and will be providing all the equity. Granahan McCourt Dublin will rely on its shareholders, which include Tetrad Corporation, to provide financing.</p>
<p>17. The EIB allocated funding of €500m for the National Broadband Plan. Do you intend to draw on this funding? If not, why not?</p>		<p>We have no current plans to utilise funding from the EIB, as there is no borrowing involved for the NBP, and this would result in a negative upwards cost to the subsidy via interest payments.</p>

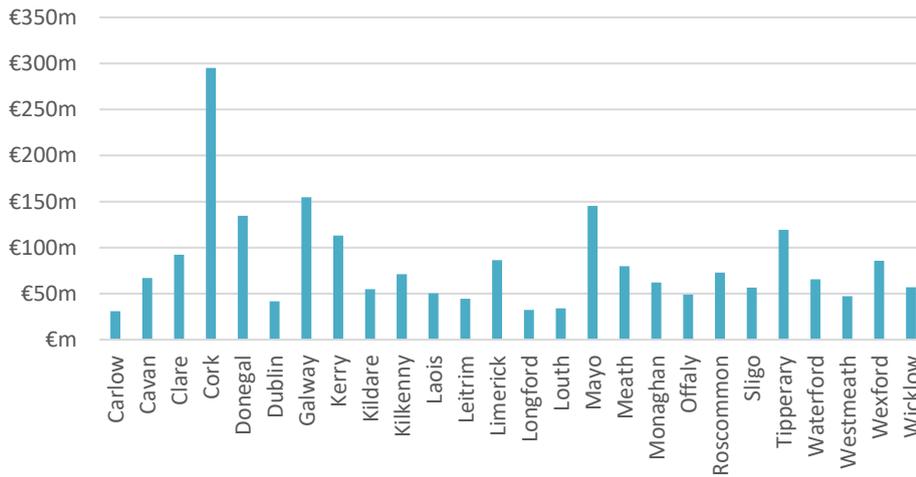
<p>18. Do you intend to open a retail arm that would sell directly to homes or businesses within the NBP Intervention Area? If yes, how will you ensure that state subsidy is not used for the benefit of this business?</p>		<p>We have no plans to set up a retail arm in the NBP.</p>
<p>19. Why did you decide to maximise usage of the MANs for backhaul rather using than eir or other providers with infrastructure closer to the NBP?</p>		<p>Enet MANs were chosen due to the fact they are a bidder member, that their locations are strategic for service providers already utilising them, thus making it easier to interconnect at MAN locations. At the time it was not possible to connect to other service providers in an eir exchange – a process called “co-mingling” - which would have made it difficult for NBI to interconnect with service providers, other than eir.</p>
<p>Overbuild</p>		
<p>20. Why does NBI intend to overbuild on eir’s commercial infrastructure? In particular, what is the value or utility of the use of the MANs to NBI?</p>		<p>After a review of multiple design options NBI have chosen to build new fibre connected NBI equipment as the most cost-effective solution to provide high speed broadband to premises in the IA. Eir active equipment, and other connectivity options were, and will continue to be, evaluated to ensure NBI utilises the most cost effective methods over the medium term. NBI are engaging with eir in the use of eir’s “FVI” fibre product as it may be useful to have the solution fully available in the event that NBI’s detailed design identifies specific premises or areas, where the solution is more cost effective than NBI fibre. NBI are also engaging with ESB and enet to ensure we are able to utilise products to minimise the costs in our design.</p>
<p>21. Do you intend to use the infrastructure which will be build over eir’s to provide a product in the future?</p>		<p>No, the NBI network is not designed to facilitate connections in the 300K transit area.</p>
<p>22. What additional requests did Granahan McCourt make of NBI following the departure of eir from the tendering process?</p>		<p>Granahan McCourt owns NBI – which was the entity set up to deliver the NBP - and GMC did not make any additional demands of NBI when this occurred.</p>
<p>23. Why did Granahan McCourt choose not to rollout fibre to 130,000 premises as announced in September 2017?</p>		<p>This was an SSE/ENET joint initiative and was never part of GMC’s business plans.</p>
<p>Meetings</p>		
<p>24. a) What was the nature of the discussion which took place between the Minister for</p>		<p>Please refer to the Peter Smyth report.</p>
<p>Communications and Mr McCourt in January 2018?</p>		

<p>24 b) What evidence did David McCourt provide to Peter Smyth of his interactions with the Minister?</p>		<p>David McCourt provided all information as requested. Please refer to the Peter Smyth report.</p>
<p>25. a) What was the nature of the discussion which took place in New York with the Minister?</p>		<p>Please refer to the Peter Smyth report.</p>
<p>25 b) What did Frank McCourt discuss with the Minister for Communications at that same meeting?</p>		<p>Please refer to the Peter Smyth report.</p>
<p>26. Did the extension of the enet MANs contract ever come up in private conversation with former Minister Naughten? If yes, when and in what context?</p>		<p>No.</p>
<p>27. At what point did David McCourt first make the former Minister or the Department aware that Granahan McCourt were in discussions to sell enet?</p>		<p>Enet submitted a letter re the sale - seeking approval from the Minister – prior to the transaction.</p>
<p>28. Did the extension of the MANs contracts by the DCCAE play any role in the valuation that Cube Infrastructure or the Irish Infrastructure Fund placed on enet?</p>		<p>We have no knowledge of how other third parties' evaluation methodology is concluded.</p>
<p>29. Did the decision to use the enet-managed MANs as backhaul for the NBP bid play any role in the valuation that Cube Infrastructure or the Irish Infrastructure Fund placed on enet?</p>		<p>We have no knowledge of how other third parties' evaluation methodology is concluded.</p>
<p>30. Why did Granahan McCourt decide to abandon the deal to sell enet to Cube Infrastructure in favour of the Irish Infrastructure Fund? Was the decision at all linked to the NBP?</p>		<p>Granahan McCourt decided to sell Enet to focus all of its financial and human resources on the National Broadband Plan. We are prohibited under an NDA from discussing details of the sale.</p>

% of IA premises in each county



Spend rounded to nearest million on NBP



National Broadband Ireland Team

NBI's leadership team have significant national and international expertise in delivering transformative broadband networks to both residential and business communities. This includes developing, building and operating networks and co-ordinating all the elements required to finance and deliver a project of the size and complexity of Ireland's National Broadband Plan.

Combined Team's Experience

24 National Telecom Networks rolled out / managed in Ireland, Europe, US and Central America

120,000km fibre delivered across 56 projects

380 years of combined telecommunications experience in the leadership team 16

Greenfield Telecom operating companies built and launched

€40bn Funding, Financing and Management of Infrastructure Assets

Specific Experience

NBI has – over the last three years – built a team of the most experienced telco professionals in Ireland, who have significant national and international experience of delivering large scale projects. These include a former Eircom head of fibre networks with 40 years' experience who managed a team of 640; a former Chief Operating Officer for Magnet Networks, a former Vodafone Technology Strategy Manager responsible for the design of their core fibre network, and the former Chief Financial Officer at Eircom.

In addition, the former Eir Chief Technical Officer – who oversaw the national roll-out of 4G and was also responsible for the national core fibre upgrade – is a key member of the senior management team. Other team members have held senior management positions at Ericsson, Digicel, BT, Siemens and Saudi Telecom. The NBI chief executive is a founding partner of Airspeed Telecom and subsequently acted as Chief Technology Officer at Enet.

This Irish experience is further complimented by international experience that includes the former Chief Operations Officer and Chief Customer Officer of Rogers Communications, the largest facilities-based cable and wireless carrier in Canada, with over nine million wireless customers and two million broadband customers. In addition, the team includes the Vice President of Granahan McCourt who has over 35 years of design, build and operate experience in the telecoms sector, and who has been responsible for the laying of almost 14,000km of aerial and underground networks for McCourt, RCN, MFS, Level 3, Rogers and Comcast.

JOC Q.1 (a) Much has been made of NBI's experience in the delivery of projects such as this?

National Broadband Ireland have – and have always had – the capability and expertise to deliver the National Broadband Plan (NBP). The Department have consistently said this, including in their most recent statement to the Committee where they re-iterated such. Secretary General Mark Griffin told the Committee in his opening statement on July 3, 2019:

“NBI has been subject to a rigorous evaluation process both in terms of its financial and technical capabilities and its proposed solution. NBI has participated in the process for more than 3 years and at each point in that process, has met the Department's detailed assessment criteria which have been published and in some key areas well exceeded those requirements.”

Experience of other bidder members/key subcontractors

NBI's other bidder members include KN Group, Kelly Group and Actavo. Nokia are providing all the active equipment for the project and 4Site will be a network design partner.

KN Group

KN Group are the largest telecom contractor in Ireland and have 3,500 strong work-force.

Their work with OpenEir entailed the deployment of in excess of 5,000 active cabinets to the kerb technology (MSAN lite) throughout Ireland for provision of VDSL service and a GPON network for FTTH (Fibre to the Home). KN provided a full turnkey service from civil works through to integration, passing 1.3m homes. This project is the largest of its type ever deployed in Ireland.

They were also tasked with helping deliver BT and SKY's home broadband by installing MSAN equipment in over 70 exchanges throughout Ireland.

The BDUK (Building Digital UK) project involves the rollout of next generation broadband and is one of the largest civil engineering projects undertaken in the UK. KN were awarded works in both Scotland and Cornwall. The contract involves the deployment of fibre optic cable in both urban and rural locations, including islands. Much of the rural work takes place on narrow single track roads which are kept passable for the local farming communities in their daily movements of livestock and goods.

Kelly Group

The Kelly Group is a leading telecommunications and utilities service provider in both Ireland and the UK and have 3,500 staff working across over 40 operational centres. Their clients include Virgin Media, Vodafone, BT and BT Openreach.

At BT Openreach they are the contractors providing 15,000 high speed broadband connections per week in the UK. There are over 950 installation engineers engaged on this workstream. As part of Virgin Media's Project Lightning, Kelly Communications have been working on designing and building new network for Multi Dwelling Units (MDUs). All MDUs contain bespoke civil & cabling solutions and the Kelly team have had to produce innovative and cost effective design to meet each buildings' requirement. Over 10,000 homes have been fitted with this and a further 35,000 are in planning.

In Ireland the Kelly Group have worked with Enet – one of NBI's other bidder members – to deliver new FTTH equipment in Tralee, which will be a template for future fibre network builds. They installed 28km of fibre in the Kerry town, utilising 417 Eir telephone poles and delivered 250 Mbps fibre broadband speeds.

Actavo

NBI will work with Actavo's Network Solutions division who specialise in the design, build and maintenance of the key infrastructure. They have strategic partnerships with leading telecoms organisations worldwide including Sky, Digicel, Liberty Global, SIRO and Virgin Media.

In April 2015, Actavo commenced the survey, design and construction of a new optical Fibre-To-The-Building (FTTB) network in Ireland on behalf of SIRO [the ESB Vodafone joint venture fibre broadband business]. The network is being built on existing ESB overhead and underground infrastructure. Actavo has been awarded 70,000 homes to date to construct across towns that include Cavan, Dundalk, Mullingar, Newbridge, Naas, Johnstown, Kill, Sallins, Clane, Carlow and Navan. Network delivery at present is approximately 2,000 homes passed per month.

Nokia

Nokia are NBI's technology partner and will provide the active equipment for the NBP. Nokia Fixed Networks solutions are used in the largest, fastest and most advanced fixed broadband networks in the world and are the only equipment vendor with a leading market position in every region.

They are an innovation leader in every established and emerging fixed access technology, enabling gigabit broadband speeds over ordinary copper telephone lines, powering the world's first 10 gigabit fibre communities, and further developing the potential of the 'smart' home. Their extensive portfolio of fixed network services and solutions spans copper, cable, fibre and wireless technologies.

4Site

NBI are working with this innovative Irish company on the network design of the NBP. 4site are providing consenting, way-leaving, survey and design services for SIRO's national "Fibre To The Building" (FTTB) communications network. The company provided a complete 4G / LTE nationwide enabling and upgrade project for Ericsson Ireland on the Vodafone Ireland Network.

4site are providing design services for EE's programme to build capacity and enhanced services on its extensive 4G network in the UK. EE was formed through the merger of T-Mobile UK and Orange, owned by parent company's Deutsche Telekom and France Telecom. Approval has recently been given for the acquisition of EE by BT.

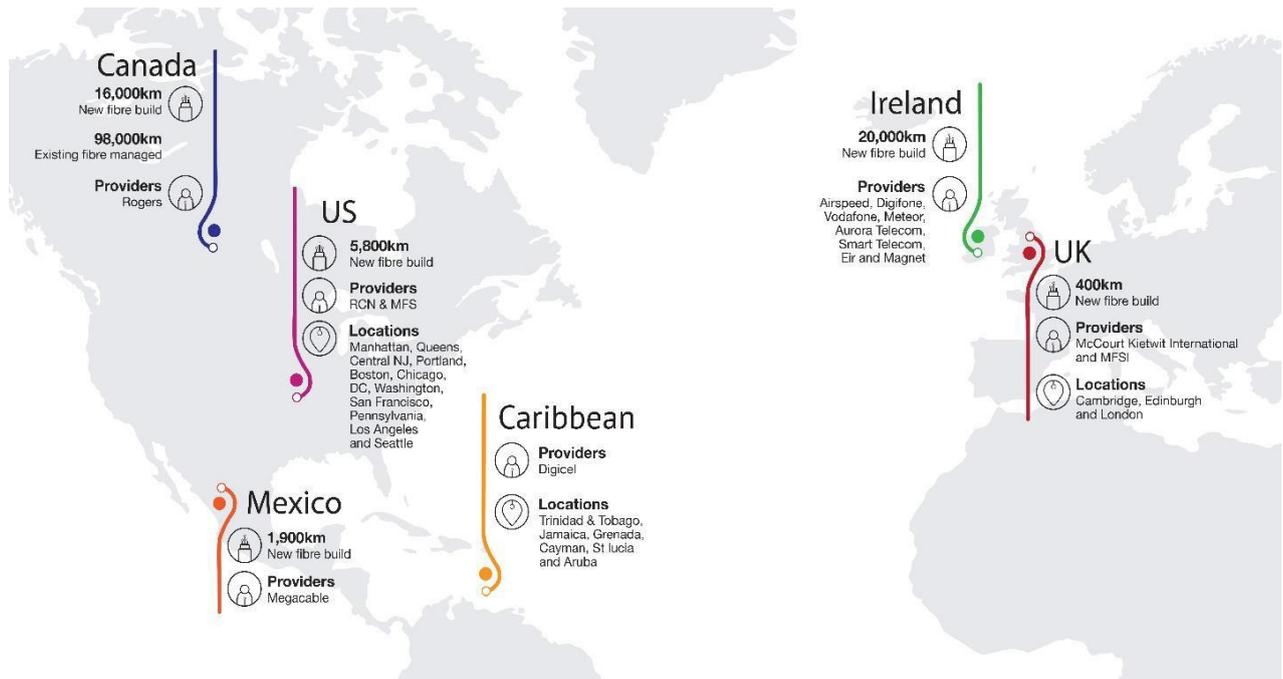
Granahan McCourt/GMC Dublin

Granahan McCourt was established by long-time partners David McCourt and Walter Scott Jr., through his family office Tetrad Corp., for the purpose of investing in the Irish telecoms market.

- The company has been active in Ireland since 2013, when it acquired enet, and shortly thereafter followed with its acquisition of AirSpeed Telecom.
- Mr. McCourt and Mr. Scott have partnered together in various telecommunications businesses over the past 30-years, including Level 3 Communications where Mr. Scott was the founding chairman and Mr. McCourt was a founding director, C-TEC and RCN Corporation, MFS/McCourt and McCourt Kiewit International.
- Mr. Scott also sits on the Board of Berkshire Hathaway.

JOC Q.2 What infrastructure projects (if any) of a scale greater than €5m in value has Granahan McCourt ever delivered?

As stated previously Granahan McCourt and Tetrad Corporation have worked together in delivering large scale infrastructure projects for more than three decades. Please see a map below that details significant projects the company and NBI team delivered in Ireland, the UK, US, Central America, Canada and Mexico.



National Broadband Ireland (NBI)

A new standalone open access wholesale company National Broadband Ireland (NBI) has been established by GMC Dublin, as Preferred Bidder, to deliver the National Broadband Plan. Upon contract conclusion, NBI will comply with the NBP's 25-year Project Agreement, with an additional 10-year commitment to offer services at no cost to the State (i.e. a 35-year commitment).

NBI will be responsible for the design, build and management of the network and the operations of the open access wholesale company for 25 years. 130,000 homes will be passed in first two years, and 70,000-100,000 per year thereafter. In year one, we will also deliver over 300 Broadband Connection Points (BCPs) – with access to high speed broadband – available across the 26 counties. These BCPs have been determined by local authorities and include a mix of schools, libraries, community halls, GAA clubs, business hubs etc. By year three, up to 1000 BCPs will be in place.

Wholesale Provider

NBI will sell a range of wholesale services to other wholesale and retail service providers serving the residential and business broadband market. NBI will not have its own retail presence competing with these other retailers. Its products will be available on a wholesale basis to all retailer service providers from the largest to the smallest, on a non-discriminatory basis.

NBI have already begun to work in a collaborative co-operative way with these RISPs (Regional Internet Service Providers) and WISPs (Wireless Internet Service Providers) and intend to continue doing so as these small and medium providers play a key role in the provision of broadband in rural Ireland - and have an ongoing part to play in the National Broadband Plan (NBP). NBI has already held two information sessions for these groups, which were well attended – and upon contracting signing – an Industry Forum will be established and technical workshops will be accessible to all.

NBI also have several other good relationships in place already – including with Eir, who will be providing access to their pole and ducts copper line network – Enet and ESB, whose infrastructure will also be utilised. The NBI team has been focussed on delivering the NBP in the most efficient way

– through whatever infrastructure is readily and easily available – and to ensure this is done with minimum disruption to the public. We continue to engage on network delivery access with all parties and are also working closely with our key partners including Nokia, Kelly Group, KN Group and Actavo.

Value for Money

VfM is a key element when a subsidy is being provided and NBI's bid was assessed under this important criterion, among multiple others. In being appointed Preferred Bidder for the NBP, NBI also had to agree to a suite of VfM provisions built into the contract by DCCA. Some of these include:

- Subsidy only released once proof that a relevant deliverable has been achieved and this is established by an independent certification process
- Oversight of the purchase of materials and subcontractor contracts year on year
- Significant checkpoint reviews at various stages in the project in addition to ongoing monitoring
- Substantial claw-back provisions on cost savings achieved, or a share in future excess profits
- Key performance indicators to ensure the service is maintained appropriately
- Significant penalties to address under performance should it occur
- Independent audit of accounts

Clarifications

In recent weeks and months, a number of incorrect assertions continue to be made, on a regular basis, which we would like to address. These include:

1. Cost over-runs on the National Broadband Plan

There have been no cost over-runs on the National Broadband Plan, which is a capped contract [with clawbacks] that construction has not yet started on. The roll-out – which will see 540,000 premises and 1.1 million people gain access to high speed broadband in areas deemed commercially unviable by current high-speed operators – will cost the State a maximum €2.1bn *over 25 years*. A further €480m has been put aside as contingency funding - only if certain issues arise - and another €355M in VAT has been set aside by the State and will not be paid to the successful bidder.

2. Wireless would be a cheaper and easier solution

Comreg have completed a report on 5G roll-out which found it would require building up to 6,000 additional masts across the country – where planning permission would be an issue – and these would all need to be upgraded when 6/7G arrive. The cost of this is estimated at €1.8bn and the regulator concluded that 5G is not a substitute for fibre and is merely “complementary” to fibre. Our own expertise and the general international experience is that FTTH is the futureproof solution. However, wireless will be a useful solution in around 2% of the ‘hardest to reach homes’ in the IA.

3. The National Broadband Plan will require digging up ‘every boreen’

This is not the case. As previously addressed NBI are looking at all available infrastructure already in existence on which fibre can be placed, and Eir's copper line overhead network and ESB's poles are just two widespread examples of these. Much fibre will run overhead – and only where necessary –

will the fibre cabling be placed underground. The purpose of the NBP is to deliver the infrastructure to every customer or premises, with no envisioned additional cost to that customer if ducting is necessary. The vast majority of the NBP is not new build. NBI are also planning to use enet's MANs (Metropolitan Area Networks) for access across the country.

4. Granahan McCourt is a Boston 'investment firm' and David McCourt is a venture capitalist

As previously highlighted Granahan McCourt Dublin is a company that was set up in 2013, when it acquired enet, and shortly thereafter followed with its acquisition of AirSpeed Telecom. GMC Dublin is the shareholder in NBI and David McCourt, its chief executive has over 30 years' experience in the telecoms industry. He is first generation Irish American and has a home in Ireland for over 20 years.

5. Ownership of the NBP network should lie with the State

As addressed above, only a minority of the NBP poles and ducts will be 'new build' – and the vast majority of the fibre will run through, over, or on infrastructure owned by other companies such as Eir, ESB and enet. It is the poles and ducts that have the most infrastructure value. Access to these assets will be provided to NBI through access agreements.

NBI will be a wholesale provider that operates and maintains fibre over these assets. Current service providers can access new and existing customers, through this network, once high-speed broadband is rolled-out in their communities.

The Government decided in 2016 to choose a model of gap funding for this 25 year project, whereby the operator of the network must use its own funding to maintain and upgrade the network, and not the taxpayer. The running costs may well outweigh the value of the fibre asset, in other words it may be a liability rather than an asset in the longer term. Should the running costs be lower than forecast the government and taxpayer is protected through clawback mechanisms.

1. What is the estimated value of the network at the end of the NBP?

The value of the company at the end of the NBP Contract is based on the performance of the business at that point in time and therefore, the actual value will not be known until the final years of the contract. However, as part of the bidding process, the Bidder was required to set out its estimate of the value in the Project Financial Model for the purpose of calculating the subsidy required. This indicated limited value in the business post year 25. While the Bidder model projects average annual revenues above €130m, these are offset by the costs which include infrastructure rental, the costs of operating and maintaining the network and other overheads. The estimated value of the network after the expiry of the NBP Contract is based on the value of ownership of NBI and is known as the Terminal Value.

The Terminal Value is calculated based on a 10 times multiple of profits (Earnings before interest, taxation, depreciation and amortisation, 'EBITDA') and is a commonly used approach to valuing a business. For example, if a business has an EBITDA of €10m then its value, using this metric, would be €100m. In NBP the Terminal Value is calculated based on 10 times the average EBITDA for the last three years of the contract, excluding any subsidy payments.

In the event that NBI generates more profit than is anticipated from the modelling done at the time of its final tender, NBI will be required to pay the State 60% of these additional profits. In addition, if at the end of the 25 year Contract with NBI, the value of the company, as a result of the unanticipated profits, is more than the value modelled at the time of the final tender, then the State will be entitled to be paid 40% of this additional value by NBI.

2. What would be the cost to the State to retain State ownership of the asset?

In July 2016 Government chose the gap funded ownership model and the procurement proceeded on that basis. There were a number of reasons why this ownership model was chosen, including that the vast majority of infrastructure would be rented from third parties and therefore, not owned by either the State, or the winning bidder, under either ownership model. This issue has been comprehensively addressed in evidence provided by the Department at the JOC and in reports published by the Department.

Legal advice provided to the Department indicates that there would be significant legal risk attached to changing the ownership model, including to one where the State retains ownership of the assets (gap funded) during an ongoing procurement process.

The NBP Contract provides for a number of circumstances in which the assets or business of NBI, can transfer to the State.

- At the end of the contract period of 25 years, NBI is required to commit to providing services for a further 10 years (ie, to 2054) at no further cost to the State and this includes NBI carrying out upgrades and maintenance of the network from the operating profits of the business over those years. Should NBI not honour this commitment, the State will have the option to take the assets and/or the business at market value (which would not be expected to be significant where the Bidder is not willing to continue offering services at its own cost).
- There are two other circumstances in which the State could gain ownership of the assets and/or business of NBI:
 - (a) Where the Contract is terminated as a result of NBI default and certain criteria are met,
 - (b) Where at any of the checkpoints throughout the Contract period, additional subsidy above what is forecast for that stage/time, is assessed as necessary to complete the Project

3. Could including ducting into the house be made a requirement for planning permission for new housing in the NBP intervention area?

Yes. The European Union Cost Reduction [Directive \(2014/61/EU\) sets out measures to reduce the cost of deploying high speed electronic communications networks](#) . The Directive includes provisions for Member States to implement planning requirements for new homes. In that regard, DCCAE is actively pursuing the effective implementation of the relevant provisions of Directive 2014/61/EU, consulting with the Department of Housing, Planning and Local Government as appropriate.

4. Please estimate what the cost saving of this would be for the National Broadband Plan, if such a planning condition was ordered for any new housing in the NBP intervention area.

It is difficult to quantify the cost saving that could arise were all new housing in the NBP intervention area to include ducting. Contrary to some of the evidence provided to the Committee, under the NBP Contract the most cost effective approach to connect premises will be used. Specifically, NBI will conduct a detailed site survey of each deployment route and each premises on that route. Every effort

will be made to reduce costs by using existing infrastructure. It is anticipated that for existing premises the majority of premises will be connected by means of an overhead connection.

The Department anticipates that up to 60,000 new premises will be built within the Intervention Area over the next 25 years, consistent with the predictions outlined in Project Ireland 2040. There is nothing to suggest these new builds would be different in distribution to existing premises, with approximately 85% of premises being within 50 metres of the road. The estimated average cost of connecting an individual premises in the NBP intervention area is in the order of €1,100.

In advance of the actual NBP deployment commencing it would be very difficult to estimate the likely difference in the average cost of connecting the existing premises in the intervention and the average cost of connecting new premises, were all new premises to have good quality ducting in place. It would be reasonable to assume, however, that the cost saving for new premises could be significant and run to hundreds of euros per premises. Savings from more cost effective solutions to connect premises will revert to the State through the claw back provisions in the Contract.

