RISKS AND RETURNS ON NEXT GENERATION ACCESS NETWORKS

Comments on the draft Commission Recommendation on Regulated Access to NGA

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1 SUMMARY

1. The Competition Economists Group ('CEG') welcomes the opportunity to respond to the Commission's draft Recommendation on regulated access to Next Generation Access Networks ('NGA'). CEG is a group of economic and financial experts who have advised a number of operators on regulatory issues associated with NGA. We have limited our response to the Commission's proposed treatment of investment risk through an ex ante allowed return on investments in NGA.

2. In its draft Recommendation, the Commission advises that where National Regulatory Authorities mandate access to NGA infrastructure, price controls should incorporate "*a project-specific risk premium to reflect any investment risk incurred by the operator*". In further explaining the risk premium, the Commission states:

> The return that is allowed on equity capital (hereinafter the "required rate of return") should be based on a concrete pricing model built on realistic assumptions and rigorous implementation through an objectively verifiable methodology. The Capital Asset Pricing Model (CAPM) is an adequate instrument to calibrate such required rate of return. The CAPM equates the required rate of return to the sum of the risk-free rate and a risk premium, where the latter is defined as beta times the market risk premium. Other methods could be used if they are fully justified as meeting the same quality standards.

3. In our view, there is risk (and potential errors) in relying solely on the CAPM to set the required return to reward investors for the risk associated with NGA investment. It is important to distinguish between the different types of risks facing an investor in NGA. In particular, we draw a distinction between CAPM risk and asset stranding risk where:

   - CAPM risk reflects the risks associated with variability in *expected* returns on the NGA that are correlated with returns on other assets or with the state of the economy more generally (**CAPM risk**); and
   - Asset stranding risk reflects the risks associated with not achieving *expected* returns due to, say, a new technology making the NGA investment obsolete or, say, demand simply not materialising for the new services (**asset stranding risk**).

4. In order to attract investment in NGA, investors must be compensated for both types of risk and hence these must be allowed for in an *ex ante* price controls. However, the approach to measuring, benchmarking, and compensating for each type of risk should differ.

5. It is appropriate for CAPM risk to be compensated for in a manner envisaged by the Commission in its draft recommendation, i.e. by using the CAPM to estimate the required return having "*recourse to regulatory precedent or by direct statistical and financial comparator methods*". It is our experience, however, that the form of *ex ante* regulation

applied to the NGA (e.g., fixed prices, price cap, or revenue cap) will be one of the most significant determinants of systemic risk.

6. In relation to asset stranding risk, we caution that allowing such risk to be compensated for in the CAPM causes confusion and may lead to error, because such risks are not CAPM risks. It is our view that such risks are better accommodated for explicitly in the cash flows of the NGA, whether it be through modelling of probability weighted cash flows based on the expectations of asset stranding or by including an 'insurance premium' to reflect the perceived asset stranding risks. Such approaches not only aid transparency but more appropriately reflect finance theory and compensation principles.

7. The complexity and subjectivity of estimating stranding costs may well mean that governments/regulators and prospective NGA builders are unable to reach an agreed estimate. In this case, asset stranding risk may need to be addressed by alternative policy measures.

8. Where governments are seeking to promote NGA developments but are faced with operators seeking large amounts of compensation for asset stranding risk, the government could 'indemnify' the NGA investors for such risk. An auction could be held to determine the market's best estimate of the cost of this insurance with potential participants in such an auction including reinsurers, telecoms businesses, investment banks and consortiums of these players. The cost of this insurance could then be recovered in a levy on NGA customers, i.e. the very same people who would bear the cost of higher prices that would result from allowing some administratively determined risk premium. We discuss further in our submission, how this market-based approach could be designed. We believe that it offers an alternative way forward that can avoid NGA investment being delayed by protracted debates over access prices.

2 RISK AND REWARD FOR NGA

2.1 CAPM risk

9. The building block of modern finance theory is the capital asset pricing model (CAPM). The primary insight of the CAPM is that uncertainty in the returns of an asset does not necessarily imply that the asset is 'high risk' and requires a high rate of return. Rather, it is the contribution of an asset to the overall uncertainty of the investor's portfolio that determines its risk.

10. The CAPM is a commonly used tool to reward regulated firms for market risk. In the CAPM, market risk is represented in the asset beta. The asset beta captures the sensitivity of the cash flows generated by the firm's assets to fluctuations in the market (or the economy in

general). It represents the systematic or non-diversifiable risk. This can be thought of as the amount of cash-flow variation that investors in an NGA could not eliminate by holding a fully diversified portfolio of investments – both inside and outside the telecommunications sector.

11. In our view, the CAPM risks faced by a monopoly NGA are substantially affected by the nature of the regulatory regime under which they operate, even more so than by the nature of the service which is being provided. In particular, there is little reason to believe that the existing copper customer access network will be subject to significantly different CAPM risks than NGA networks if they are subject to the same regulatory regime.

12. The one area where CAPM risks may materially differ is in relation to the variability of demand. However, even here regulation can help dampen the effect of any such differences on the path of long term revenue. For example, if regulated prices are allowed to rise where demand is lower than expected, then the impact of demand variability on cash-flows can be mitigated.

2.2 Asset stranding risk

13. Additional (project specific) investment risk may need to be reflected in prices for NGA services to ensure that investors can reasonably expect to receive their required CAPM return. In particular, investors' expected returns may fall below their required CAPM return if there is a risk of asset stranding due to, say, technological obsolescence. Seeking to compensate for this risk by allowing a higher equity beta in the CAPM would be inconsistent with the principles on which CAPM is based and may lead to confusion and error.

14. Modern finance theory (reflected in the CAPM) implies that the probability of technological obsolescence due to technological change is not relevant to determining investors' *expected* returns unless the probability of technological obsolescence is somehow correlated with returns available on other assets. The CAPM provides the *expected* return required by investors in NGA based on probability weighted cash flows. Consistency with the CAPM requires that the risk of technological obsolescence is reflected in probability weighted cash flows.

15. For example, consider an asset that has a CAPM risk-adjusted expected return of 8% p.a., i.e. an asset whose owners would require an 8% p.a. return given the CAPM risk. However, the investment may have a 10% probability of 'failure' in one year's time – where (to take an extreme example) the effect of failure is that the asset becomes worthless and the entire value of the investment is lost. It can be shown with simple algebra that investors will then require a 20% return on the investment f it does not fail. In particular, this can be seen algebraically as:

$$\underline{\textit{Expected return} = 8\% = 0.1 \times (-100\%) + 0.9 \times 20\%}$$

16. For investors to expect a return of 8% (as they require to undertake the investment), they will therefore need to achieve a 20% return where obsolescence does not occur. The reason for this higher level of return where the investment succeeds is to compensate for the 10% probability of catastrophic failure in which the entire asset becomes worthless.

17. Put another way, in order for regulated prices not to result in monopoly profits, prices must be set such that the discounted value of expected cash-flows is equal to zero. That is, the discounted value of expected revenues (at regulated prices) must be to be equal to the discounted value of expected expenditures. As a matter of finance theory, this discounting must be undertaken using the expected return investors require from the investment (i.e. 'the CAPM return'). This is the rate at which investors will rationally discount the future cash-flows for a project.

18. If there is a positive probability of asset stranding then the probable cost of this must be included in the modelled cash-flows and allowed revenues be set higher compared with a scenario in which there is no risk of stranding. By setting allowed revenues above the discounted value of expected expenditures the regulator is effectively including in the NGA owners' revenues not just their expected expenditures but also an estimate of the actuarially fair cost of self insuring against the prospect of asset stranding (e.g., due to technological obsolescence). The difference between the discounted value of allowed revenues and the discounted value of expected expenditures is, in effect, the cost of an insurance premium that the NGA owner is writing to itself.

3 ALTERNATIVE TO ADDRESSING ASSET STRANDING RISK

19. An alternative to compensating the NGA investors for the probable cost of asset stranding would be to indemnify them against this risk (either in whole or in part). This may be an attractive solution where:

- A competitive tender for the construction of the NGA is not practical; and
- There is disagreement between the incumbent operator and the regulator over the required compensation for stranding risk.

20. In this situation it may be mutually satisfactory to governments (who believe the risk is lower than the incumbent) to take on that risk rather than pay (in the form of higher prices for customers) the incumbent's estimate of the cost of this risk. Governments could then choose to retain or pass on the risk. The obvious group of people to pass this risk onto would be customers. Alternatively, governments could pass the risk onto private sector insurers to find out the 'true value' of such risk.

3.1 How the NGA could be indemnified

21. There are many ways in which governments could indemnify incumbents for stranding risk. In order to do so, there must be some way to keep track of how profitable (unprofitable) the investment has actually been which is likely to require separate regulatory accounting.

22. Measured on a particular date in the future, an NGA will have avoided making an economic loss provided that:

The remaining value of the NGA on that date	≥	Compounded value* of past expenditure	*less*	Compounded value* of past revenues

* Where all values are compounded through time to the relevant date at the CAPM WACC.

23. So long as the owner of the NGA knows that, on a date in the future they can sell the NGA assets (or otherwise receive an amount of this value) according to this formula then asset stranding risk will have been eliminated.

24. One way, but not the only way, to achieve this is for governments to provide a 'put option' to the NGA owner prior to construction. Under the approach, a government guarantees that they will buy the NGA from investors on a particular day in the future for an amount equal to 'the remaining value of the NGA on that date' as per the above equation.

25. Under the approach the event that triggers exercise of the put option is a calculation by the NGA owner that the future revenues less expenses are worth less than the remaining unrecovered value of the NGA.

26. Such an approach would provide a 100% indemnity against any event that caused the NGA asset value (as perceived by its owners) to fall below the unrecovered value of past expenditure. However, providing a 100% indemnity against asset stranding would overcompensate the NGA investors to the extent that it removed all downside risk but left them with some positive upside risk (assuming such upside risk exists in the regulatory regime). A 100% guarantee would also likely provide a benefit to investors by reducing CAPM risks and may create incentive problems once the put option is 'in the money'.[1]

27. A superior approach would be to set the value of the put option at some proportion (X%) of the unrecovered value of past expenditure. For example, the NGA could be granted a put option that states that in, Z years time, the NGA has the option to sell at a price equal to:

$$\text{Put option exercise value} = X\% \text{ of } \left(\text{Compounded value* of past expenditure} \textit{ less } \text{Compounded value* of past revenues} \right)$$

* Where all values are compounded through time to the relevant date using the CAPM return.

28. The higher the likelihood of up-side variation in profits, the smaller the value of X that needs be offered for the expected value of the put option to make the NGA whole.[2]

29. If the NGA does exercise the put option on date Z then they would be required to deliver ownership of the NGA asset to the government/consortium.[3] The government (or other new owner if the government chooses to sell or has already on-sold responsibility for the put option) can then sell NGA services and earn a return from the asset so purchased.

3.2 How the risk could be auctioned to investors

30. Instead of issuing the put option itself, the government could purchase it from private entities. To do so it could hold an auction to determine the market's best estimate of the expected cost of issuing the put option. Participants in such an auction are likely to be reinsurers, telecoms businesses and investment banks or consortiums thereof. In effect, the government would be buying a market-tested insurance premium.

3.3 How the cost of the risk could be funded

31. There are a number of options available to governments to fund the insurance premium that would allow governments to purchase a put option equivalent to the put option granted to NGA. Or, equivalently, if governments retain the risk, there are a number of options available to fund the expected cost of that risk. These include:

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1 That is the NGA owners may not have an incentive to operate the NGA efficiently once they believe that the most likely course of action will be an exercise of the put option.

2 Assuming that regulated prices are set based on the CAPM return that ignores the existence of the put option.

3 It is also worth noting that such a put option would guarantee a minimum future asset value. It would reduce the variation in the asset value and, therefore, would likely have an effect on the CAPM return.

- Imposing a levy on the NGA revenues (economically equivalent to adding an increment to the NGA's CAPM return). Thus the NGA customers would fund the insurance premium in an expected sense;[4] and
- Imposing a levy on the telecommunications industry generally (e.g., through an increment to any existing universal service levy – although this cost would be borne by general customers of the telecommunications industry rather than the customers of the NGA itself).

32. It is important to remember that, under the model where the NGA receives an increment to the CAPM return, telecommunications customers will have to pay for the insurance premium anyway. A government levy based on the market tested cost of this insurance premium is economically identical but has the advantage of the value of the premium being set transparently in the market.

4 CONCLUSIONS

33. Following are our key conclusions.

- It is inappropriate to set maximum regulated revenues based on the firm earning a CAPM return if there is a material risk that this will not be possible in the long run (i.e., a material risk of asset stranding);
- In such a scenario regulated revenues must include an actuarially fair compensation for the probable cost of asset stranding;
- However, the complexity and subjectivity of estimating stranding costs may well mean that governments/regulators and prospective NGA builders are unable to reach an agreed estimate with the consequence that NGA investment is delayed; and,
- In this case it may be desirable for governments to indemnify the NGA builders for some of these risks. We have provided a high level example of how this might be done in this paper.

[4] Note that such a tax can only fund the insurance premium in an expected sense. That is, the expected revenues from the tax could equal the cost of the insurance premium but this could not be guaranteed as tax revenue would depend on demand.