

Paper from the RPI-X20 Finance Working Group

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Introduction

This paper has been written by the industry finance working group as part of Ofgem's visioning exercise for the RPI-X@20 review.

We have tried to set out:

- the background to the financing problem in both legal and monetary terms;
- the changing background against which networks will have to be financed in the future;
- the network risks which need to be considered; and
- suggestions for ideas to be more fully explored as part of the process

At this visioning stage in the review, our objectives have been limited:

- we have not attempted to develop concrete proposals about how energy network ought to be financed;
- neither have we attempted to tackle the formidable technical material which surrounds this topic.

In framing the financing discussion in this way, we have identified a number of questions which we believe the review ought to tackle as it moves forward.

Section 1 – The Background

1.1 The Financing Duty

At the privatisation of gas and electricity, one primary legislative duty common to both Ofgas and Offer (Ofgem's statutory predecessors) was what has come to be known as the financing duty – i.e. the duty to regulate the industries in such a way as to enable licence holders to finance the carrying on of their regulated activities.

That duty was as important to the privatisation process as the simultaneous creation of the independent regulators, free from government interference – and for the same reason. It was perceived to be, and effectively operated as, a legal assurance to investors in the privatised companies that the regulators would have their interests fully in mind.

The financing duty has remained essentially the same over the twenty years or more since privatisation, despite the many subsequent amendments of the gas/electricity legislation during that period. Accordingly, Ofgem's financing duty is currently stated as a primary statutory requirement to perform its regulatory functions "having regard to the need to secure" that the regulated companies "are able to finance" their authorised activities.

Two important points emerge from this formulation. The first is that the requirement is framed in terms of the need to *secure* (not to promote, or facilitate, or ensure) financeability, and the second is that the activities to which the requirement is directed are the authorised activities of the regulated companies. These are all those activities that are the subject of obligations imposed upon the companies by legislation (whether primary or secondary) and their operating licences.

In summary, this legal duty constitutes an important provision for the benefit of the gas and electricity industry – which gives investors confidence to invest in the networks that consumers need. It also places a significant constraint on Ofgem's ability to set network price controls, since the duty prevents such controls from being set so tightly as to place licence holders in financial difficulty. On a broad view of the provision, the duty could also be seen to require Ofgem to take full and proper account of the ability of the regulated companies to raise credit.

The importance of this is that companies that provide essential services, in many cases with public good characteristics, must be able to enjoy a reasonable prospect of recovery of their economic and efficient costs, in order to attract capital from potential investors. On any sensible legal view of the financing duty, Ofgem's application of the RPI-X approach to price controls must offer investors a clear prospect of recovering the value of their investment costs and of earning a reasonable rate of return (i.e. the economic cost of capital) on outstanding investment, after recovery of all operating expenditures.

However, it is also important to note what the financing duty does not do. The proper and legitimate expectation of a reasonable opportunity to recover costs does not require Ofgem to permit a complete pass-through, but only the recovery of costs that, in alignment with its statutory objective to protect consumers' interests, are reasonably, economically, and efficiently incurred.

The financing duty does not, therefore, require Ofgem to *guarantee* reasonable returns on capital, or to determine a cost of capital that sets a floor under companies' returns in all foreseeable circumstances. Nor does it require Ofgem to regulate the industry in a way that would enable companies to earn their cost of capital regardless of any management inadequacies or unexpected cost shocks.

The duty also does not extend to ensuring that companies remain financially viable in all circumstances. So it does not mean that Ofgem is obliged to ensure that licence holders are immune from financial pressures, regardless of their efficiency and effectiveness. If that were the case, there would have been no need for Parliament to establish statutory special administration procedures to ensure the continued operation of the companies in the event of insolvency, or Ofgem to produce the recent document in this area.

It does, however, mean that Ofgem, in exercising its functions, must take into account the ability of licence holders to finance their regulated business. And that, in turn, requires Ofgem to regulate the industry in a way that is most likely to enable the companies over time to properly discharge their full range of legal obligations, while enabling investors in them to recover their investments and earn a sufficient rate of return.

A key question for Ofgem's RPI-X@20 project is whether the traditional UK statutory formulation of the regulator's financing duty will be adequate to support the industry's expanding role in delivering a low carbon economy while maintaining energy security and competitiveness, and tackling fuel poverty. At the time of privatisation, the gas and electricity companies were set up with low levels of debt on their balance sheets. This was intended to facilitate borrowing while ensuring that current customers would not have to pay for future benefits.

However, it is unclear how the terms of the current financing duty should properly be discharged in circumstances where the greatly increased future investment requirements of energy network operators (in particular) are likely to push companies to become, increasingly, cash flow negative. There has to be some concern that such a development on any enduring scale could prejudice the ability of the companies to maintain their investment grade credit ratings, which are critical to their continued ability to attract investment on efficient and affordable terms.

At the very least, the legislative expression of the financing duty – both in its terms and in its status and position within the existing statutory framework of Ofgem's duties – may need to be reconsidered. Currently, the duty is structured into the legislation in such a way that, as a matter of law, it sits as an adjunct to the consumer protection principle. It therefore comprises just

one of a number of aims to which Ofgem must have regard in pursuing its over-arching statutory objective to protect the interests of energy consumers.

This is in contrast to the position in the water industry, where the statutory financing duty is structured into the legislation as a stand-alone duty having full parity with the consumer protection principle. In addition, Ofwat is required not merely to have regard to the duty, but to act in the manner that is most likely to achieve its object, in particular by enabling the companies to earn reasonable returns on their capital.

It is common ground that the focus of UK energy regulation will have to shift rapidly to facilitate the delivery of a significantly enhanced capital investment programme largely driven by a new environmental and security agenda. The RPI-X project may need to consider whether a more explicit and prescriptive legal formulation of Ofgem's financing duty is required in order to encourage the surety of cost recovery that may be needed to achieve longer term investment in supply security and environmental programmes.

1.2 The Financial Approach

RAV and index linking

Under the present RPI-X regulatory framework, investors (debt and equity) receive a rate of return on the Regulatory Asset Value (RAV) together with their initial investment through 'depreciation'. The RAV is a measure of the capital invested in the regulated business based upon the historic costs which are then index linked. This approach to setting companies' returns has a number of perceived benefits:

- Investors under this framework are provided with a hedge against inflation.
- Society will also receive a consistent price under such a framework over time i.e. under a stable investment profile customers will pay equivalent amounts in real terms over time and between generations

A fundamental issue with basing the annual revenues companies are able to earn on a real rate of return is that equity and debt providers generally require nominal returns. However this inflationary element of both interest costs and dividends is remunerated to companies via an inflationary increase in the value of the RAV. Companies only receive the cash for this increase over the course of the regulatory asset life and hence face a cash shortfall to pay annual nominal returns. This has significant implications for companies' or investor cash flows (scale of the impact on a UK energy infrastructure asset base of some £30bn would be £500m - £1bn p.a. deferred into the future) which might be viewed differently by the stakeholders involved in financing infrastructure businesses:

- If companies seek to align their revenues and costs and hence pay a real rate of return to investors, investors would need to dispose of their

investment or redeem the debt in order to realise the indexed element of their investment i.e. in the case of a share or index-linked debt.

- If companies pay a nominal return, this would require them to continue to increase their borrowing against the increasing indexed RAV, both in terms of debt and equity with associated issuance costs. Paying a nominal return is the accepted normal funding route adopted by FTSE companies for the majority of their funding and is expected for networks. However, for regulated companies it leads to continued cash shortfalls and consequent pressures on financial ratios.

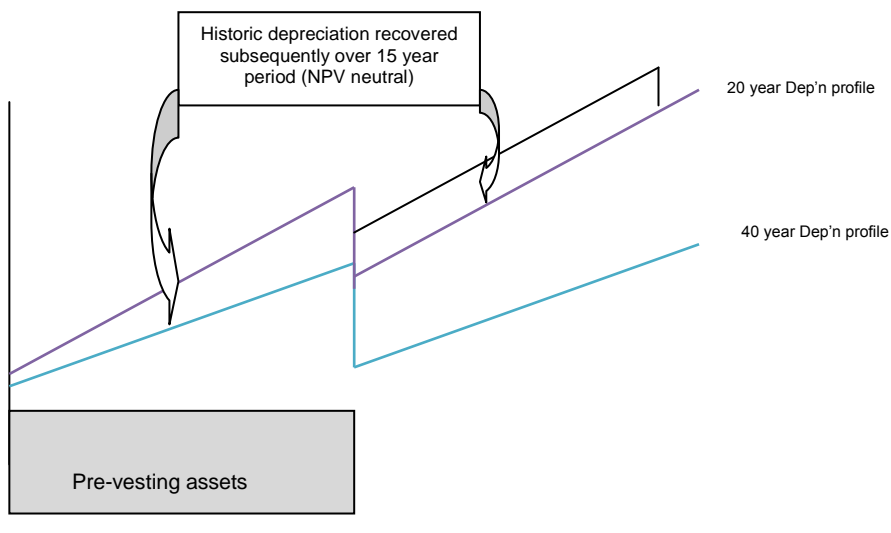
One potential issue in attracting equity is that the regulatory framework presently focuses on debt and financing ratios used by rating agencies, rather than considering the interests of equity i.e. Earnings Per Share (EPS) and Return on Capital Employed (ROCE).

The basis of returns and any intergenerational impacts are of key importance to the RPI-X@20 review, as is the ability of the companies to access funding. This is particularly important going forward due to the future demands being placed on infrastructure companies to finance increasing levels of investment. In the case of the network infrastructure, this is further complicated by the differing approaches taken by regulators to asset lives and impact this has had and will have on financeability.

Adjusting depreciation to achieve financeability

The depreciation assumption in the price control is based upon regulatory asset lives set by Ofgem. Historically, these lives were associated more closely with the physical lives but this has diversified for a number of reasons since privatisation and now is more aligned with the financial requirements of companies i.e. the speed at which investors require their capital refunded.

Following privatisation in 1990, electricity distribution RAVs were based upon the share price at the end of first day's trading and depreciated over the remaining estimated average life of their assets (between 10 and 15 years). New assets installed post-privatisation were initially depreciated over 40 years (20 years at 3% and 20 years at 2%). When the pre-privatisation assets were fully depreciated companies faced a 10-20% drop in revenues without any physical change to their business. This impact would have triggered a number of companies to exceed financial ratios.



As the figure above illustrates, Ofgem's response in DPCR3 was to shorten the depreciation lives to 20 years to accelerate cost recovery and bring cash forward from the future. Revenues companies would have received historically under a retrospective change to a 20 year life (compared to that actually received under 40 year depreciation) are then recovered over the following 15 years in equal amounts in an NPV neutral calculation. This will provide companies with stable cashflows as depicted in the figure above.

In gas, Ofgem has retained the average 45 year asset life. However, the replacement of all iron mains over 30 years (repex) would have resulted in insufficient cash for companies to finance the investment. Consequently, Ofgem adopted a different form of financing adjustment by expensing 50% of repex immediately with the other 50% entering the RAV to be depreciated over 45 years to finance the activities. In the current gas distribution price control around £3bn is due to be spent on replacing these mains, resulting in current customers paying around an additional £300m p.a. in repex.

Whilst these measures sought to ensure that network businesses were able to finance their activities, they did give rise to the following consequences:

- Regulatory asset lives are now divorced from physical lives.
- Current customers are paying for assets which future generations may get for free (however the same could be said for current generations who are using assets now 40 years old funded entirely by previous generations).
- There will be a further (but smaller) cliff-face in electricity in the future.
- The RAV will stabilise at a much lower level, at a point when long run investment aligns with depreciation i.e. depreciation of £100m p.a. aligns with a RAV of £2bn whereas previously it would have been around £4bn under a 40 year life. These are both likely to be less than the current

replacement value (the Modern Equivalent Asset Value) which would better reflect the accurate cost to society.

Effectively Ofgem has brought forward income from the future which, in NPV terms would be the difference between the two asset bases, to fund the businesses in the shorter term. Whilst this action has potential longer term implications for companies and customers, the adjustment was NPV neutral and hence customers overall have not been adversely impacted. However, this approach raises an “intergenerational” issue – is it appropriate that today’s customers are disproportionately funding assets that benefit future customers?

Other regulatory approaches

Other regulators have taken different approaches to overcoming short term financeability issues, for instance in water Ofwat provided companies with additional income in PR04 sufficient to support comfortable investment grade credit ratings without any redress to the future. In the proposals for the next price control, Ofwat is assuming that companies are able to raise additional equity to fund a financing shortfall but Ofwat has allowed companies the cost of raising this equity.

Regulators have to different degrees assumed an element of indexed linked debt where the coupon rate is effectively a real interest rate and the inflationary element is paid on redemption or refinancing of the debt. The index-linked market has always been relatively small and in the current economic conditions this market has all but disappeared suggesting that regulators should not now assume additional index-linked debt is available to network companies.

Summary

We have raised a number of questions in this chapter but have not attempted to solve them. Historically, financing duties of the regulator and companies have largely remained unaltered. However, moving forward we have sought to discuss whether they remain appropriate or not, particularly given the need for increasing investment; clarity on the recovery of both past and future investments; and a reasonable return given the risks involved whilst continuing to protect the interests of consumers. Given these challenges should, in fact, the financing duties be strengthened and be on a par with consumer protection as is the case in water?

The current regulatory framework has continued to diverge from the physical realities and now looks more like a financial construct for the management and financing of the networks as the asset base of companies (RAV) reflects neither the accounting book value nor the replacement value of those assets. Is that appropriate and what are the wider implications:

- How does an index-linked return and RAV align with the needs to fund the activities?
- Does that create incentives to efficiently finance the business or does it favour some financial models over others?
- Does the current framework adequately take into account the requirements of equity investors?
- What intergenerational issues does this create - is it appropriate that current customers subsidise future customers?
- Is there an issue with the financing of electricity distribution assets to be resolved in the future, as a result of the shortened lives and lower asset values? How should any financing issues be resolved?
- Is it an issue that the RAV may be substantially lower than accounting book value and replacement value? The impact of the former may result in an obligation to write down asset book values with a consequent detrimental impact on the network. The impact of the latter is that the capital that is funding the business is substantially less than the actual value of the assets. It could be argued that the difference between RAV and replacement value led to the demise of Railtrack – the low RAV meant that there was insufficient equity buffer to keep the business going when Railtrack’s assets suffered substantial operational issues.

Section 2 – Network Risks

The regulatory framework defines the way risks are passed to other players in the energy supply chain. By way of example, the transmission user commitment model arguably shares stranding risk between those users requiring capacity to be built and the wider consumer base by requiring them to commit to a minimum number of capacity payments.

Without taxpayer intervention, energy consumers ultimately bear the financial impact of all risks:

- either directly, for example by the regulatory regime continuing to respect the RAV and allowing current and future sunk costs to be recovered; or
- indirectly, either
 - through increased capital charges (return and/or depreciation) as network investors seek to cover the operating risks they bear, or
 - if the network risks are passed upstream to generators or producers, through supply prices.

Efficiency considerations would dictate that the risks are borne by the party best able to manage them, however this does not make the risks disappear. If this process results in a reduction or an increase in risk faced by the network then the allowed return should be adjusted accordingly.

Network Activities

Energy networks undertake a variety of tasks linked to the network asset life cycle:

- designing networks and network extensions
- building assets
- operating assets
- maintaining assets

Aside from the **execution risks** directly associated with performing these tasks, there are additional risks associated with managing an asset based business through time. These include:

- **stranding risk** - the risk that unforeseen market or technological changes may render assets redundant before the end of their planned life; and
- **operating model risk** – that unforeseen market or technological change will require organisational or systems changes over time

The RPI-X form of price control defines how the costs of running networks and the cost impacts of these risks are shared between networks and consumers. The details of this approach have varied over time but a brief sketch of the current approach would make the following points:

- The recovery of the costs of building and operating networks operates through two cycles:
 - Capital costs are recovered over a regulatory asset life which varies by network type
 - Electricity – 20 years
 - Gas – 45 years
 - Projected construction, operating and maintenance costs are set at an efficient level five years at a time.

- The risks are dealt with, generally, in the following ways:
 - Execution risks, which are essentially about how well the licensee performs, are generally borne by the networks.
 - Stranding risk has been embodied in the RAV. Ofgem state, from time to time, that they have never stranded significant volume of assets but there are examples (e.g. electricity prepayment meters) where assets classes have been subjected to a market risk and the full value has been unrecoverable.
 - Some operating model risk is passed on to consumers e.g. the “new costs” debate which happens at each review. However, stranding of past operating model costs is generally treated as being to the networks account – generally as a component of the operating “inefficiency” which Ofgem uncovers at each review.

- The five year cycle also creates a risk that efficient network costs are different from projections (to the benefit of either networks or consumers).
 - As far as network costs are concerned, networks would take the view that this risk has moved from being upside to downside risk over the 20 years of RPI-X (to the benefit of consumers). In particular, networks would point to Ofgem’s tendency to capture future efficiencies which their analysis has identified but which haven’t happened yet.
 - As far as exogenous costs are concerned, there are a variety of treatments which may pass-through some or all of the costs to consumers (e.g. Ofgem licence fees and rates).

- RPI-X has also layered in incentives to encourage particular behaviours which have tended to operate in networks’ favour over time – although particular incentives become less generous as they become more established. The size and symmetry of these incentives is a factor which should be taken into account in assessing allowed returns and network financing.

Section 3 – Changes to the environment for network financing

In considering how the financing environment has changed and is likely to change, we reflect on three factors:

1. the level of investment which energy networks will require in the future;
2. the level of risk inherent in those investments when they are made; and
3. how recent developments in financial markets affect networks' ability to raise finance.

Level of investment

From a consumer perspective, network investment balances three factors: maintaining safe and secure energy supplies; meeting society's climate change targets; performing these tasks at an economic and efficient price.

All of the four network types (electricity and gas, distribution and transmission) face cyclical increases in the level of asset replacement required to maintain safe and reliable operation as underlying assets reach the end of their economic lives.

On top of increased asset replacement levels, there is likely to be a change in the amount of network capacity required as energy production and consumption patterns change in response to climate change targets and technological developments.

There is, however, unprecedented uncertainty about how networks capacity requirements will change and how quickly networks will need to adapt. To summarise the levels of uncertainty we perceive:

In electricity:

- there is uncertainty about the size and location of new generation – the small and local versus large and distant uncertainty is captured in Ofgem's LENS work;
- uncertainty about electricity demand – likely to be larger as some heating and transport migrate to electric power but considerable uncertainty about the speed and scale of the ramp up; and
- uncertainty about how consumers will react when they are presented with more timely electricity consumption data through smart meters – particularly when and if supplemented by time of day tariffs

In gas:

- with the rise of LNG and other importation routes, greater day to day uncertainty about the patterns of supply with, on average, low load factor pipe utilisation at the transmission level but the potential for clean biogas injection into local networks

- for similar reasons, gas quality is likely to require greater attention in the future as the country has to cope with gas composition changes at much shorter notice
- in the longer term, uncertainty about how measures to limit climate change will affect gas demand at peak and on average – as electricity generation (on average) and some heating migrates away from gas, gas generation to back up renewable generation and some transport load may migrate to gas; and
- uncertainty about how consumers will react to more timely gas consumption information.

Level of risk when investments are made

A key change in the background for this review is the new level of uncertainty in the way networks will need to adjust their capabilities in the future.

In some ways, Government energy policy is now much more certain than at any time in the recent past; much of it is driven by formal UK and EU climate change targets. However, there is still uncertainty about how these targets will be met and whether they will be met in a timely way e.g. the balance of nuclear to wind, the balance of supply and demand side measure; the balance of local to large scale national generation.

Network assets are constructed to link energy supplies to energy demands – in a sense they integrate all of the uncertainty that exists in other parts of the supply chain; network assets are also long-lived.

Given the level energy supply and demand uncertainty set out above it seems to us that energy network's sunk investments (today's RAV), and those investments being made over the next few years, face an increased risk of being stranded by changes in technology and network capability requirements before the end of their physical life.

This is important for network financing because networks will need to be constructed to serve consumers, and decisions must be taken, in the midst of this unprecedented uncertainty. Network investors will need to see a regulatory framework which allows them to have confidence that they will earn a reasonable risk adjusted return on their investments. With all this network design uncertainty, the impact of stranding of assets on revenue streams will be a material consideration.

Changes in financial markets

For most of the last 20 years, financial markets have been characterised by:

- stable and declining risk free rates
- stable and declining risk premia
- arguably, widespread mispricing (under-pricing) of risk

During the recent market shocks, risk premia widened and volatility increased considerably.

The co-ordinated government and regulatory response has mitigated these effects but it is probably much too early to conclude that current market conditions represent typical conditions for “post-shock” financial markets – arguably the co-ordinated response has had the effect of artificially damping volatility and risk premia below sustainable levels.

This is important for network financing because the regulatory framework needs to accommodate this financial market uncertainty.

As a group, we consider it unlikely that financial markets will quickly (if ever) return to the level of stability which they have enjoyed during much of the RPI-X period and the review will have to consider the implications of this.

Implications of these factors for the review

A number of commentators have noted the shifting background and raised suggestions for accommodating it within the regulatory regime. Examples would include:

- proposals to index returns to the cost of debt (with or without associated trigger levels);
- Professor Dieter Helm’s suggestions for a split cost of capital – to fund the RAV using debt and investment activities using equity; and
- enhancing the reopening provisions of the price control.

We would not advocate closing down any options at this stage in the review but we would make several observations about the factors which will need to be weighed up in moving forward:

1. Great care must be taken in ensuring that customers’ interests are protected and that they bear only the economic and efficient costs of managing risk. Generally, the best value outcome for customers would be expected where networks “retain” those risks that they are most able to control, and which they can reasonably be expected to manage at the most efficient cost to present and future consumers.
2. Consumers value low prices, but it is also in their interests to make sure that companies can continue to attract capital to fund investments. Trying to drive too hard a bargain risks undermining investor confidence and starving the sector of capital.
3. The regulatory framework needs to be transparent on the ownership of risk. Regulatory transparency will enhance investor confidence which is required to facilitate the raising of significant levels of new finance for current investment plans.

4. Stranding and operating model risks in particular look likely to loom larger in the future than the past; further clarity about the proposition to investors could help manage investor concerns. The split cost of capital arguments seem to acknowledge this point. To oversimplify the case (as we understand it) if the risk to the RAV is close to zero then it can be funded overwhelmingly using debt. However, we recognise that the risk to the RAV can never be zero as the networks continue to have to operate and maintain the assets and bear some of the risks of past investment decisions.
5. To the extent that consumers prefer networks to stabilise prices over price control periods, rather than face pass-through of some costs, they will need to be prepared to pay an economic price to networks for providing this insurance service. The fixed cost of debt versus debt indexation discussion could be a clear example of such a choice.
6. To the extent that the risks passed on to the network are not symmetric, they need to be covered in the allowed return. To the extent that they reflect general market risk, they affect the cost of capital of the network business. To the extent that the variance of costs (or the cumulative effect of those variances) is high compared to cash flows they need to be accounted for in financeability assessments.
7. In an era of greater uncertainty, the modelling of network performance under a range of conditions is likely to form an important part of the financeability assessment.

Section 4 - Conclusions

Overall, in considering the financing of the networks going forward, it is essential to take account of the trilemma of Sustainability, Security and Affordability.

The investment environment going forward is highly uncertain at a time when massive challenges are going to be posed to the Networks to meet the changing demands and binding targets of this new, more environmentally aware, world.

During the workgroup process, the group has debated widely and has attempted to encapsulate within this paper key questions from those discussions to which the group believes that the RPI-X@20 review should have regard.

There is no doubt that major investments are required in our gas and electricity networks going forward, both for new build and for renewal. In order for this investment to take place networks must be able to finance their regulated activities.

In today's economic environment, and potentially for some years to come, financing investments on this scale is going to be tough and in order for money to be spent, the opportunities need to be attractive to investors. Investors need to have confidence that the regime will allow them to earn a fair return on their investment.

However, in considering all these questions, there is a crucial balance to be struck between the interests of consumers – both present and future – and the interests of investors. In operating, using and developing the gas and electricity networks, significant risks exist and consumers ultimately bear the cost of those risks. In most cases it is appropriate that risks should rest with the party best placed to manage them or the party who is able to manage them most economically. In some cases it may be most efficient and economic approach for the “consumer” to pay someone to manage the risk on their behalf rather than bear direct exposure to costs.

In looking at the investments and associated risks, it is important to consider who bears the risk throughout the asset lifecycle (given this can be as long as 45 years) and the associated intergenerational issues, i.e. which consumers bear which risk and for how long. For example, if an asset has a 20 or 45 year lifespan, should the costs be shared by present and future consumers.

Threading through all these questions are the issues of regulatory risk and asset stranding. Given the scale of the challenges posed by the 2020 and 2050 targets, the uncertainty of the route(s) by which those challenges can be met, the length of asset lives and technological innovations - not to mention the difficult economic environment - many consider that the risk of stranded assets is greater than ever before. The fear of stranding assets underlies the

concerns felt by potential investors and feeds back in to the debate around investor confidence.

Thus, whilst financing networks is highly challenging and very technical, it is essential that it is done, and done well to find that essential balance between investor confidence and consumer protection.