

FUNDING OF ENERGY NETWORKS

A brief discussion on profit margins

28 April 2022

SUMMARY

Frontier has been asked by the ENA to comment on recent debate around the profitability of the energy network. As an example, the recently published Common Wealth report “Hiding in Plain Sight” discussed the operating profit margin achieved by the sector, and used this to draw the conclude that the profitability of the sector may be unduly high¹. We set out our key observations on this topic in this short paper:

- Operating profit margin is the wrong measure to use in order to assess profitability and it is therefore wrong to draw a conclusion on profitability based on operating margin. The correct measure of profitability is returns.
- A reasonable level of return in a capital intensive industry can be expected to translate into a high operating margin. For example, a 3% return on assets translates to approximately 30% operating margin in the electricity transmission sector.
- The combination of high upfront costs and long-lived assets means that the energy network industry is by its nature highly capital intensive. A high operating margin should therefore be expected, but this alone does not allow us to infer anything about the level of allowed returns.

Attention should therefore not focus on the operating margin – which does not directly measure profitability – but instead on allowed returns. The sector regulator Ofgem has just set allowed returns at unprecedentedly low levels for the forthcoming regulatory period.

WRONG MEASUREMENT? WRONG CONCLUSION.

Imagine measuring the weight of a box, but with a ruler. Without knowing what is in the box, this will be wildly inaccurate. The ruler will measure the size of the box but not directly the weight, which also depends on density. This is similar to measuring the profitability of energy network companies using **operating margin**.

¹ Common Wealth, 2022, Hiding in plain sight: The Electricity and Gas Distribution Network Operators at the Heart of the Energy Crisis.

The appropriate measurement of profitability should be some form of **return** on investment (e.g. return on asset, return on equity, return on capital employed, etc.), which shows by how much each pound of invested capital is remunerated. Measures of this kind can be directly compared to the cost of the capital of the sector, and an assessment can then be made of whether the profitability is high.

Just like the ruler which measures size rather than weight directly, operating margin measures **profit as a proportion of revenue** rather than profitability directly. As a result, operating margin depends not just on the amount of profit made, but also on the amount of capital invested, and hence requires careful interpretation.

To illustrate this point with an example, consider buying a house with a mortgage of £200,000 over 30 years with an 2% APR interest rate. In the first year of the loan, 45% of the payment would be interest cost, effectively a margin of 45% (profit as a percentage of revenue) to the lender.² But one would not quote this profit margin on the loan to assess whether the mortgage is reasonably priced. Clearly, the relevant measure of profitability on the loan is 2%, not 45%. The reason why the profit margin is high on the loan is because the capital invested is high in proportion to the revenue.

GB energy networks are highly capital intensive, it is therefore natural for the profit margin to appear high when compared to other, less capital intensive sectors. Rather than confusing and confounding the assessment of profitability by relying on operating margin, the relevant question is whether the returns on investment allowed in the sector are reasonable.

The energy network companies are price-regulated regional or national monopolies. Their allowed returns are set by the regulator (Ofgem). At the latest round of price controls (RIIO-2) Ofgem allowed a **CPI-real post-tax return of approximately 2.7% - 2.9%** on Regulated Asset Value (RAV, a carefully monitored measure of the capital invested in the business over time).³ The level of this figure – set well below what Ofgem had allowed hitherto – was subject to intensive debate and scrutiny, including the CMA which ultimately upheld Ofgem's decision. Of course one can continue to debate whether or not this level of profitability is reasonable. But such debate should coalesce around the far more informative measures (i.e. returns) – not the measures of operating margin even if these may appear to be eye catching at first glance.

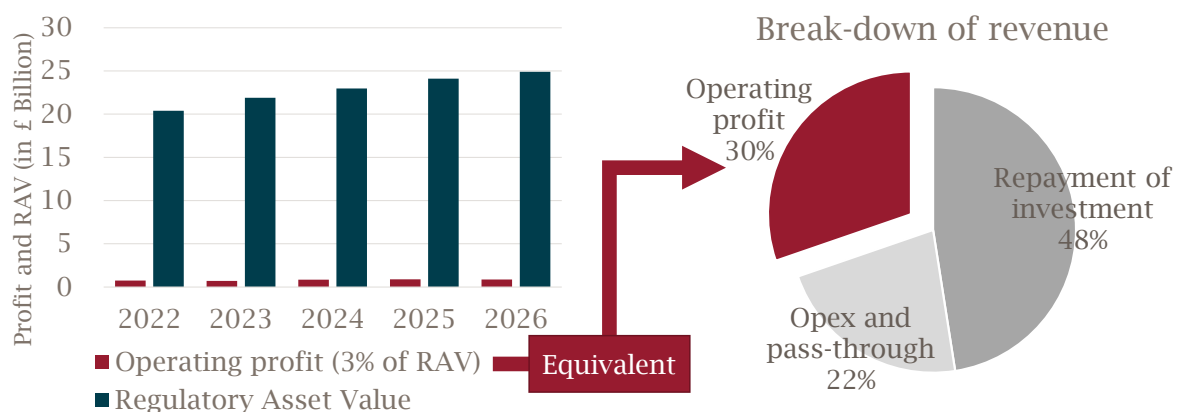
² Monthly payment would be £737, yearly payment £8,849. Interest cost in the first year would be around £4000.

³ Based on Ofgem Final Determinations of RIIO-GD2/T2, adjusted for the removal of outperformance wedge.

WHAT LEVELS OF OPERATING MARGIN SHOULD WE EXPECT?

Using RIIO-2 data for the electricity transmission sector as an example, Figure 1 shows that in the next five years networks are allowed by the regulator to make a 3% pre-tax return on the RAV, which is equivalent to approximately 30% operating margin.⁴

FIGURE 1 OPERATING PROFIT AND REGULATED ASSET



Source: Ofgem, RIIO ET2 Price Control Financial Model, November 2021

Note: Figures include all ETOs. Pie chart shows operating margin of average ET2 period.

The figures are similar for the gas transmission and gas distribution sectors, although the latter is slightly lower. Both sectors also have high levels of capital intensity (See Annex A for more detail).

However, the RIIO-2 price control also covers two other sectors, i.e. the Gas System Operator and Electricity System Operator. These businesses do not own the transmission networks, but are responsible for managing energy flows on them day to day. As a result they are much less capital intensive than the asset owner businesses. All sectors regulated using the RIIO-2 framework are allowed a similar level of returns on invested capital (around 3% of RAV). But with a much lower capital intensity, the 3% return translates to much lower levels of operating margin for the system operators (see Annex A). The high margins observed within the transmission and distribution networks are therefore a consequence of the nature of the sectors, a predictable result of the sector's capital intensity.

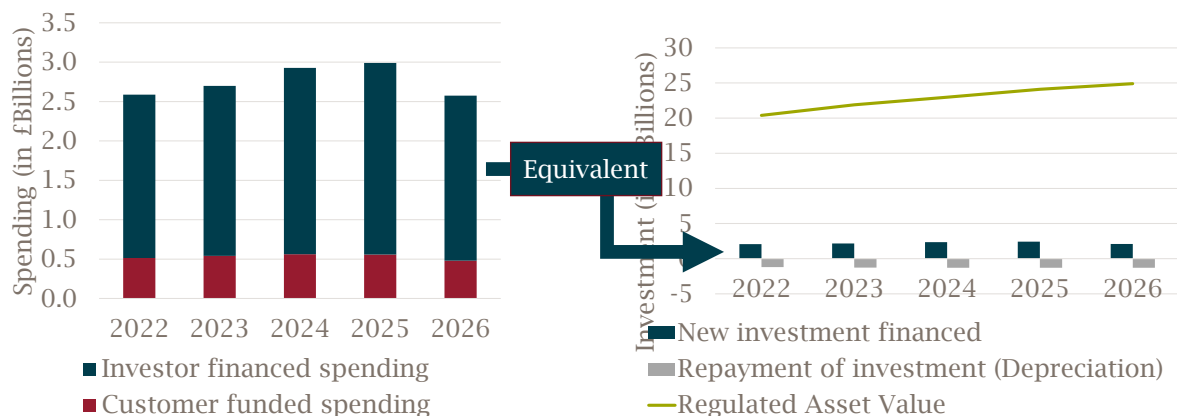
⁴ This is estimated by allowed return (including tax allowance) on the Regulatory Asset Value. Networks may end up earning more or less than this, depending on how they perform against a wide range of performance targets set by the regulator.

WHY HIGH CAPITAL INTENSITY FOR THE T&D NETWORKS?

So why is capital intensity high in the transmission and distribution network sectors? This is mainly because the assets needed to provide the service are expensive to install and also very long lasting (in many cases 50 years or more). Policy makers have taken the view that it would not be right to ask customers to pay for these assets all in one go. Instead, private investors are asked to finance a large majority of the upfront cost. The value of their investments is logged up and repaid slowly, with a return set by the regulator, over a long period of time. This allows customers to enjoy the service from day one without having to pay all of the upfront costs. It also ensures a degree of societal fairness over time, as future customers that will benefit from investments made today will later pay their fair share.

This is not dissimilar to the mortgage example above, where a large proportion of the upfront cost of the house purchase is financed instead of paid outright. In that example, the profit margin of the loan starts at 45% initially and drops as it gets repaid and interest makes up a smaller share of each monthly payment. However, for some energy networks, new investment accumulates faster than old investment is repaid, which is why margins can increase over time. Using the RIIO-ET2 as an example again, Figure 2 below shows how a large majority of expenditure over the price control is not paid up front, but is financed by investors, causing RAV to increase over time.

FIGURE 2 SPENDING FUNDED BY CUSTOMER V.S. FINANCED BY INVESTORS



Source: Ofgem, RIIO-ET2 Price Control Financial Model, November 2021

Furthermore, large scale investment is needed in energy networks going forward, to support the ongoing transition to achieve Net Zero by 2050. Given the scale of these future investments, a smoothed profile of customer funding over a long period continues to be the sensible policy choice.

ANNEX A - DETAILED FIGURES FOR ALL NETWORK SECTORS

In this annex, we present some more detailed figures referred to in the main paper. This includes operating margins and capital intensity measured by RAV/revenue. All of these figures are sourced from Ofgem's published Price Control Financial Models, and hence can be readily verified.

The allowed operating margin, measured as Earnings Before Interest and Tax (EBIT)/revenue, for all energy network sectors as derived from the Ofgem RIIO-2 price control determinations are shown below. This includes electricity transmission, gas transmission, the gas system operator, gas distribution, and the electricity system operator.

TABLE 2 ALLOWED OPERATING MARGIN AT RIIO-2

	2021-22	2022-23	2023-24	2024-25	2025-26	AVERAGE
Electricity Transmission	28.20%	27.39%	31.28%	31.83%	32.47%	30.28%
Gas Transmission Operator	28.16%	23.75%	29.17%	30.19%	30.24%	28.25%
Gas System Operator	2.03%	1.53%	3.54%	2.80%	1.96%	2.25%
Gas Distribution	21.92%	16.56%	23.14%	23.56%	23.51%	21.53%
Electricity System Operator	6.54%	5.81%	6.48%	6.22%	5.93%	6.19%

Source: Ofgem RIIO ET2, GT2, GD2 and ESO Price Control Financial Model

As can be seen, the operating margin for the transmission and distribution asset owner sectors ranges between 20%-30%,. For the gas and electricity system operators operating margin is much lower, at 2.25% and 6.19% respectively, despite the fact that all sectors in RIIO-2 have been allowed a similar level of return (around 3% of RAV).

The capital intensity, measured by RAV/revenue, for all energy network sectors as per the Ofgem RIIO-2 price control determinations are shown below.

TABLE 3 CAPITAL INTENSITY AT RIIO-2

	2021-22	2022-23	2023-24	2024-25	2025-26	AVERAGE
Electricity Transmission	7.74	8.64	8.42	8.73	9.35	8.58
Gas Transmission Operator	7.67	7.32	7.19	7.64	7.50	7.46
Gas System Operator	0.48	0.37	0.63	0.66	0.67	0.53
Gas Distribution	5.44	4.59	5.54	5.69	5.73	5.36
Electricity System Operator	1.02	1.07	1.27	1.29	1.28	1.18

Source: Ofgem RIIO ET2, GT2, GD2 and ESO Price Control Financial Model

As can be seen, the capital intensity for the transmission and distribution asset owner sectors is large, but for the system operators it is much lower.

We have excluded the electricity distribution sector from the tables above. This is because the sector is currently still within its RIIO-ED1 price control period and the ED2 price control review process is still in progress (with Ofgem scheduled to finish its review by the end of 2022). However, for completeness we show the equivalent figures for the ED1 period.

TABLE 4 OPERATING MARGIN AND CAPITAL INTENSITY AT ED1

	2016	2017	2018	2019	2020	2021	2022	2023	AVERAGE
Margin	21.63%	21.22%	20.64%	20.50%	19.95%	20.85%	20.42%	20.71%	20.74%
Intensity	4.35	4.39	4.41	4.56	4.56	4.71	4.79	4.87	4.58

Source: Ofgem RIIO-ED1 Price Control Financial Model

As can be seen, the capital intensity of ED1 is similar to GD2 in Table 3, and as a result, the operating margin is also similar to GD2.