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That sinking feeling

PROBLEMS ON THE HORIZON FOR NETWORK COST RECOVERY

Traditional methods for recovering the cost of large network investments have historically been relatively simple. But those methods are breaking down as countries pursue decarbonisation policies, raising potential concerns amongst investors that they will not recover their investment. This briefing explores the drivers of this change, and outlines the potential options for policymakers to consider.

The energy industry, and energy networks in particular, have always been characterised by long lived assets whose cost needs to be recovered over a broad group of customers. Historically, the solutions adopted to deal with this in mature markets have been relatively simple, but those solutions are breaking down, driven partly by policy and partly by technology.

The energy sector needs to continue to attract investment. Securing future gas supplies and decarbonising our economy both depend on on-going investment in

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networks. It is therefore critical that new solutions for cost recovery are found which are credible over the long term. If they are not, investors will fear that if costs cannot be recovered in an acceptable way, politicians and regulators may not allow them to recover their principal, and investment will either dry up, or be available only at a high price.

STEADY AS SHE GOES

The energy sector is characterised by high sunk costs (costs associated with decisions which, once taken, cannot be reversed). Energy networks are a good example. Huge sums of capital have been invested in electricity and gas networks, but the variable costs of additional throughput are small. Economic theory tells us that, if there is significant spare capacity, the cost reflective price for access should be low. Charging in this way will ensure that the existing infrastructure is put to efficient use, but will not ensure its sunk costs are recovered.

The problem is not limited to the sunk costs of energy networks. Particularly in the electricity sector, the cost of subsidies to low carbon generation to ensure that renewables targets are met (so-called "policy costs") are a growing source of sunk costs which need to be recovered.

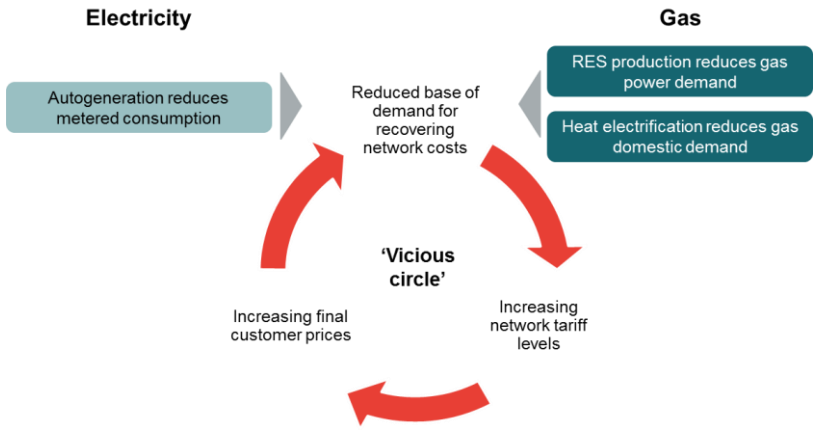
The economic principle behind the recovery of such costs is relatively simple. Since they are sunk, they should be recovered in a way which does not affect future consumption decisions. This principle is easy to describe, but harder to implement, as most things which regulators or policymakers do have an impact somewhere.

However, in the energy sector it has been easier than elsewhere. Electricity demand has been largely insensitive to price. Therefore, charging electricity customers extra on their bill (e.g. a constant €/kWh "levy") hardly affects their future consumption of electricity. Sunk costs in this sector have therefore typically been "socialised", or recovered from the generality of customers in a way which has been perceived to be fair. Gas demand is more sensitive to price as it competes with more fuels, but as more customers take up gas, the existence of material switching costs (particularly for smaller customers) has meant that similar socialised levies to recover sunk costs have been workable.

STORMY WATERS

The situation is changing for both fuels. Creating the risk of a 'vicious circle'.

Figure 1. 'Vicious circle' of falling consumption from networks in electricity and gas sectors



Source: Frontier Economics

In the electricity sector, autogeneration has long been an option, particularly for larger customers. Producing electricity on site, particularly when this has been a by-product of the production of steam required by industrial processes, has allowed customers to avoid the costs of buying wholesale electricity and avoid socialised cost recovery charges.

Technology and policy are both driving a greater volume of autogeneration particularly for smaller customers. As a result of subsidies and declining technology costs, the private costs for smaller customers of on-site renewable generation (e.g. rooftop solar PV) are falling. And since rising renewables subsidy costs are driving up overall requirements for sunk cost recovery, if such on-site generation can help customers avoid socialised cost recovery charges, the benefits are rising as well.

For example, in Germany the falling cost of roof-top solar PV and the rising cost of renewables support mean that generation costs have been lower than household electricity prices including all policy costs and taxes since 2012. This creates a strong incentive for German consumers to reduce their net consumption of electricity from the grid by investing in solar PV.

Put another way, electricity demand net of on-site generation has become much more price sensitive for large numbers of customers. Total electricity consumption is still insensitive to price, as it always has been. But at around today's levels of overall cost per MWh, there are credible economic options for customers of all sizes to reduce their net consumption by generating their own power, and so customers will look to do so.

This means that attempts to socialise increasing levels of sunk cost across electricity demand may result in a reduction in (net) consumption of electricity from the grid. This creates a vicious circle. With a reduced base of demand over which to recover network costs, the per unit socialised charge to recover a given level of cost increases, which encourages more on-site generation, which reduces demand further. There is a risk that a small number of customers end up bearing a very high socialised charge: unfair if these are voters, uncompetitive if these are industrial customers.

The situation in gas is similar, though the reasons are slightly different, and it is important to differentiate between large and small customers.

In terms of large customers, the last couple of decades have seen massive growth in the use of gas for power generation. Experience varies across Europe, with countries like the UK, the Netherlands and Italy seeing the highest penetration, but the growth trend has been visible nearly everywhere. However, future growth in demand looks less certain – Europe has set further renewables growth targets through to 2030, and significant further growth in renewable production will continue to eat away at the total market to be served by gas (because once built, most renewable sources are cheaper to run than gas plant).

Even in the most optimistic scenario for gas generation, i.e. one with substantial use of gas carbon capture and sequestration technologies, we still expect to see less gas used in 2050 than today. The EC Roadmap to 2050 shows falling gas used for power generation relative to today across all of the scenarios. While peak demand may be reasonably comparable to today or even higher (as gas plant will continue to be required to serve demand when renewable infeed is low), total demand looks likely to be materially lower, creating an issue for socialised per kWh levies. This issue is made worse by the trend to allow users to pay for the use of the gas network more cheaply on a day by day basis. While this encourages marginal use of the existing assets, it creates more challenges for sunk cost recovery as flows fall.

For smaller customers, again policy could be the biggest barrier to growth. If Europe is to reduce its emissions by 80% against 1990 levels most commentators (including the EC in its Roadmap) foresee a decarbonisation of the electricity production sector, followed by reduction of heat and transport emissions through electrification and energy efficiency measures. If achieved, this would imply a significant reduction in demand for gas for space heating by smaller customers.

Sunk costs in gas may rise more slowly than in electricity (as there are fewer policy costs and network investment is probably set to be lower). However, falling demand across both industrial and small gas customers means that the same sort of vicious circle relating to sunk cost recovery is possible in both fuels.

MAN THE LIFEBOATS

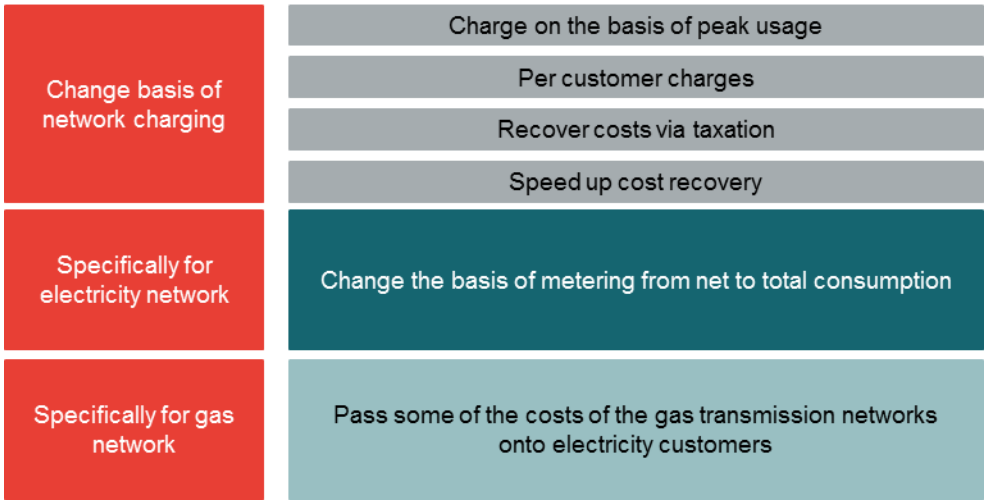
As a society, we need more investment in long life energy assets. Networks need renewing and reinforcing – to connect new and diverse sources of gas, to connect renewable generation sited in different locations to conventional plant, and allow for consumption growth in electricity driven by new uses such as heating and transport. As decarbonisation proceeds, policy costs also look set to rise on an ongoing basis.

But the investors we need to deliver these outcomes will increasingly look at the risk of such a vicious circle developing with suspicion. Faced with the prospect of political crises related to energy costs or uncompetitive industry, it would be easy to see politicians and regulators taking the "easy option" and telling energy sector investors that they will not be getting their sunk costs back.

It is true that no option is without a cost. This sort of policy will simply result in energy investors increasing the return they demand on long lived investments in order that they are compensated for this risk, and so the costs customers will have to bear will go up (as, ironically, will the risk of a vicious circle developing!) Nevertheless, political short-termism may dominate thinking.

So if the status quo may lead to increased costs because of fears of opportunism, what credible alternative options exist? The answers may differ for gas and electricity.

Figure 2. Overview of policy options in the electricity and gas sectors



Source: Frontier Economics

For electricity, many have suggested that the tax regime holds the answer, particularly in relation to policy costs. Policymakers caused this problem, goes

the argument, so policymakers should fix it by recovering costs from tax revenues.

Even if there is something in this argument, the approach is not without its drawbacks, both theoretical and practical.

From a theoretical viewpoint, taxation can alter people's incentive to work, save or earn profits. So for every additional euro collected through taxation, a proportion is lost to the economy through distortions in economic output. Estimates vary by country and tax. Estimating the scale of this proportion is clearly difficult. In the UK, the proportion lost has been estimated to be 20-30%, across a range of taxes (e.g. income tax, corporate tax, indirect taxes etc).[1] A recent working paper for the EC estimated an EU wide average of 90% for taxes on labour only[2]. The same paper indicated that the distortion arising from consumption taxes on energy products is likely to be significantly lower.

Equally, from a practical viewpoint, while much depends on the overall structure, payments from the tax regime may be considered significantly less bankable than payments from a regulated revenue stream. In the same way that investors are wary to make long life investments which rely on the continuation of specific tax regimes, so they may worry about revenue streams which rely on continued political support, and costs to customers may increase as a result of demands for increased political risk to be compensated.

A different form of socialised charge may be an alternative. Peak consumption may be less easy for customers to manipulate (although in countries where transmission charges are levied on peak consumption, there is evidence of customers achieving just this), and so a per kW charge may work better than per kWh levies. However, a per kW charge will focus cost recovery more on customers with "spiky" consumption, including households. A per customer charge would also be possible, though it is not clear whether this would be perceived as resulting in equitable burden sharing between domestic and industrial customers.

But possibly the simplest answer is to go back to the old approach. The price sensitivity of total electricity demand is unlikely to have changed materially. The problem arises when we try to apply socialised charges to consumption net of on-site production. So if we can estimate (or better, meter) total (rather than net) consumption for all customers, it would be perfectly possible to go back to business as usual. In fact, in Germany the allocation basis for the Renewable

1 HM treasury Spending Review (2000)

2 The marginal cost of public funds in the EU: the case of labour versus green taxes, European Commission Working Paper No.35, 2013.

Energy Levy has already been extended to shares of own-consumption for new autogeneration installations.

The situation is more complicated for gas, and again it is worth differentiating between large and small customers.

For larger gas customers, moving cost recovery to the tax system would be possible, though would have similar drawbacks to those identified above in relation to electricity. A per customer charge would also have drawbacks – for those exposed to international competition, the level of a per-customer charge may render them uncompetitive.

Some differentiation may therefore be required among the customer group (though this runs counter to current EU legislation which focuses on non-discrimination).

In a world where power generation volumes fall materially but the gas network continues to be required to provide a reliable back up to intermittent renewable electricity production, it could be argued that the gas network is providing both a service to its customers (gas transport) and a service to electricity customers (security of supply). At most estimates of the Value of Lost Load in electricity, there would be significant willingness to pay to fund the cost of the gas network as a back-up source of fuel for generation.

This may therefore point to differential recovery of sunk costs between power generators and other industrial gas customers. This might be achieved by focusing a greater proportion of network costs on gas generators[3], or more radically, by charging some costs associated with the gas network directly to electricity customers (again on the basis of total consumption).

For smaller gas customers, a move of costs to the tax system or to a per customer charge would have similar advantages and disadvantages to those identified above in relation to electricity.

Unless gas microgeneration were providing a back-up source to intermittent renewables, there would arguably be less of a rationale for moving costs to the electricity sector. It is not obvious that electricity customers would be benefiting in any ongoing way from the existence of the network serving small gas customers.

This may in turn point to further solutions – recover its costs more quickly or find new uses. There is clearly some scope for new uses. There is sustained effort being invested in the use of gas (CNG or LNG) as a fuel for road or maritime transport. Biogas may prove an alternative to low carbon electricity for space heating in some areas. And small scale gas generation may prove to be a

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3 This may still result in a distortion – for example, it would mean gas plant would be less competitive than coal plant as a result of sunk cost recovery

critical source of flexibility for the electricity system as intermittent RES penetration increases.

If these new uses are not sufficient to secure cost recovery, the choice may be between a small increase to a large group of customers, for example by speeding up depreciation, as Ofgem has done in relation to gas distribution or a large increase to a small group of customers, for example by allowing the customer base to gradually erode and continuing to recover costs from those that are left, as would be the case in the status quo.

So alternatives to a risky "do-nothing" approach exist. But some of them require quite dramatic changes in regulatory thinking, and most will work better if they are implemented early, before the problem becomes too severe. Early action also makes sense in terms of reassuring putative investors in energy infrastructure that there is a plan to secure credible cost recovery. It is time for this issue to be given serious consideration by regulatory authorities – a little effort now will pay dividends in the future.

CONTACT	**Dan Roberts** dan.roberts@frontier-economics.com
	Sam Street sam.street@frontier-economics.com
	Frontier Economics Ltd
	FRONTIER ECONOMICS EUROPE – BRUSSELS | COLOGNE | LONDON | DUBLIN | MADRID
	www.frontier-economics.com