Appendix A – Energy Procurement

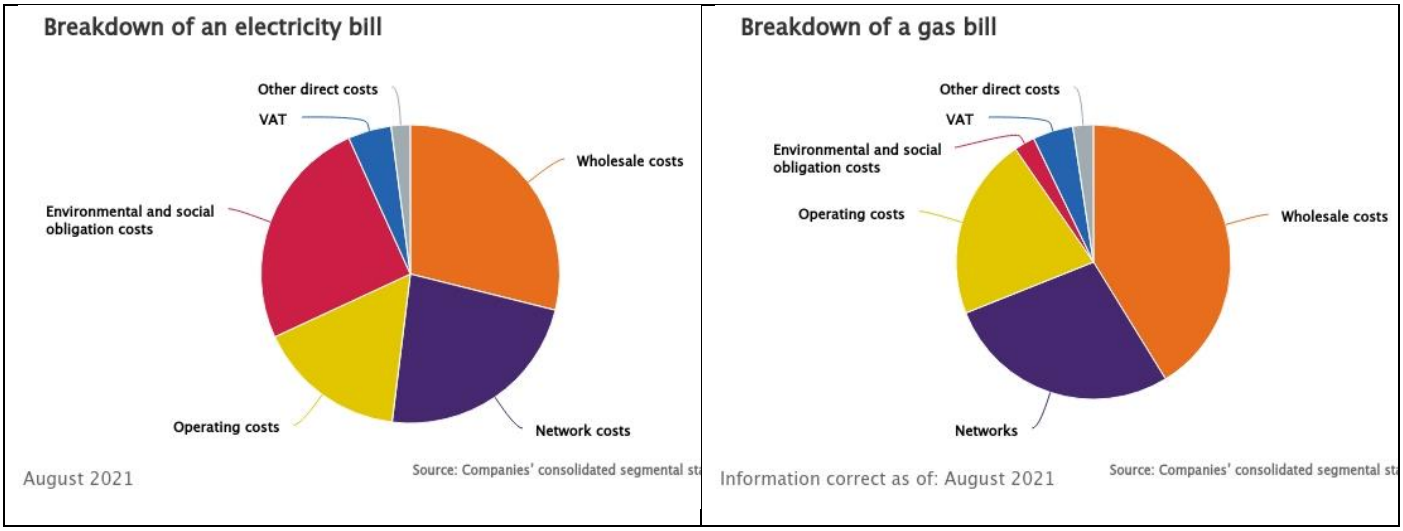
This Appendix outlines the make-up of a typical energy bill, procurement options for contracting for grid supplies, and an outline of how 'sleeving' supports the use of locally generated energy.

Cost of Energy

Energy bills are complex. A typical UK energy bill is made up of:

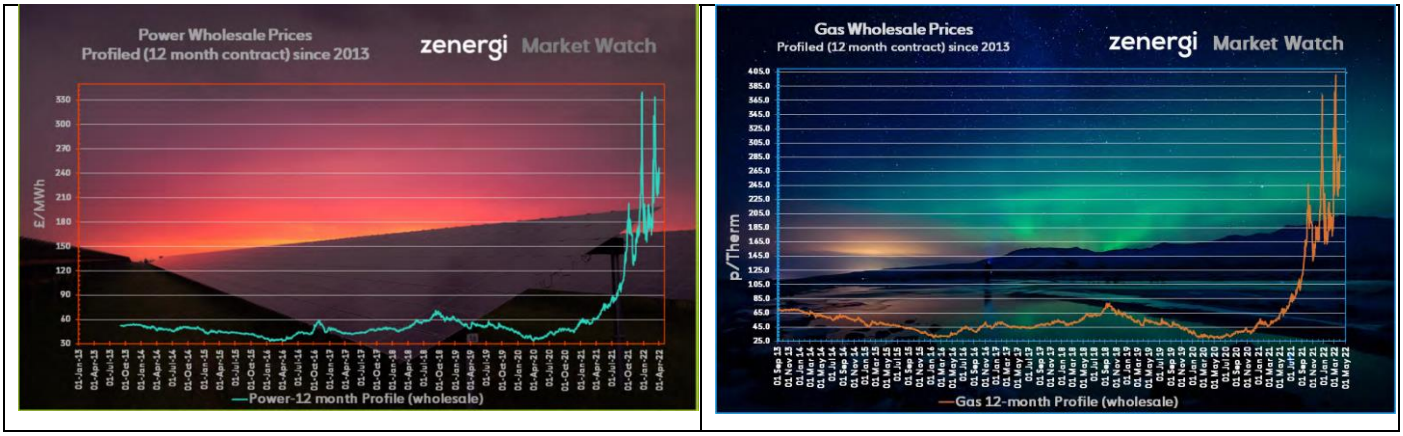
- The wholesale price of the energy used (ie gas, electricity, etc)
- Network operating costs to cover the cost of moving energy from where it is produced to where it is used
- Government environmental and social levies
- Taxes
- Other costs such as administration, metering, etc

A typical breakdown of UK gas and electricity bills is shown below[1].



Many of these costs are typically absorbed in to a combined unit rate (average cost of energy + network costs + levies, per unit), or are applied as a fixed or standing charge (per day).

Wholesale cost. Producing energy does have a cost. This could be for the fuel used to generate electricity, the cost of extracting oil and gas, etc. However, energy is a traded commodity. This means that the price is not set directly by what it costs to produce, but by what price traders are prepared to pay to buy or sell energy. The wholesale price of energy will fluctuate, depending on levels of demand and availability. This market can be disrupted by major events, such as the recovery of economies emerging from a pandemic, or the outbreak of a war. The wholesale cost was typically around 1/3rd of an electricity bill, or under half of a gas bill, but this part has gone up significantly in recent months, with wholesale prices reaching unprecedented levels[2].



[1] All available charts | Ofgem

[2] March-2022-Wholesale-Market-Report.pdf (zenergi.co.uk)

The unit charge set in an energy supply contract to cover wholesale costs takes account of market prices. Suppliers trade for enough energy to meet expected customer demand. They will set the price they offer based on current market prices for energy, and on how much energy the supplier has already banked to cover future demand over the length of the contract. Energy can be bought ahead for use over various periods (next-day, next month, next season, next year, etc) at differing prices depending on supply and demand over these periods.

Network Operating Costs. Network costs are charged by gas and electricity network operators, both national and local, to cover the cost of transporting energy and balancing the grid. With the growth of renewable energy generation, balancing the electricity grid to ensure that the right quantity of electricity is available at the right voltage is complex. National Grid ensure that the grid remains in balance, taking account of generation sources available at any given moment[3]. The cost of this and overall grid operation is covered by a range of specific charges[4]. These are paid by the supplier on behalf of the customer, so are a transparent or 'pass-through' cost. These charges can be broken out in energy bills if a 'pass-through' tariff is requested, otherwise they are added as an average in to a consolidated unit rate. Some of these charges are time-of-day dependant, so overall costs can be reduced if demand is reduced during critical times of the day (eg 5pm – 7pm for electricity on weekdays in the Western region).

Environmental Levies. The UK Government applies levies to energy bills to cover the cost of developing and operating various social and environmental initiatives[5]. These are typically fixed charges per unit. These apply especially to electricity bills, adding typically around 10p per unit in levy charges. Gas bills currently have much fewer levies applied, but additional charges such as a Green Gas levy have been proposed.

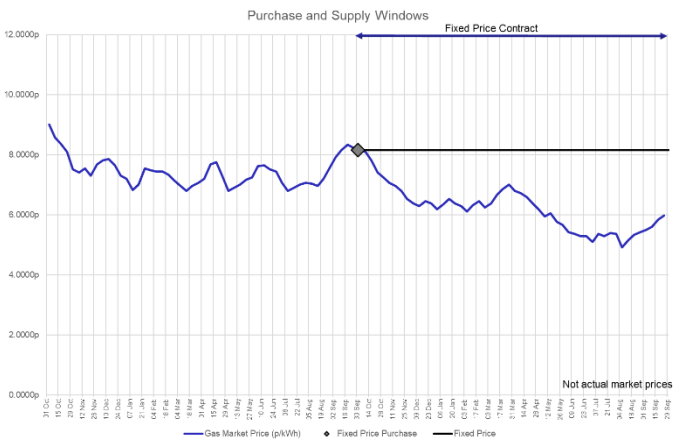
Tax. Energy bills have a specific tax applied in the form of the Climate Change Levy (CCL), although this does not apply to domestic and certain other supplies. CCL is being progressively equalised (as a charge per unit levied) between gas and electricity, with the CCL rate for electricity held and that for gas increasing annually.

VAT rates applied to energy bills depend on whether the energy is primarily used for domestic purposes (reduced rate), or business use (full rate). Note that VAT applies to the whole bill, including CCL, so has also increased significantly as wholesale prices have risen.

Price Caps. Overall costs for energy are capped for domestic supplies, based on regional energy costs and payment methods used by customers. This sets an upper limit on the cost per unit, not on the overall bill; annual costs quoted by OFGEM and the press are based on typical household usage at these capped rates. Industrial & Commercial supplies (which covers the majority of BCC energy usage) are not capped, but have historically cost less than domestic rates due to the higher volumes used.

Fixed Price contracts

The simplest form of energy procurement involves a fixed price contract over a short term. Suppliers are asked to bid to provide a quantity of energy over a given period, and will set the price they offer depending largely on market prices on the day the contract is let. The customer is held to that price even if the market price subsequently falls, but equally is not charged any more if the market price subsequently rises. This gives the customer price certainty, if not necessarily the best possible price.



Longer duration contracts will include price revision or indexing options, so are firm rather than fixed price.

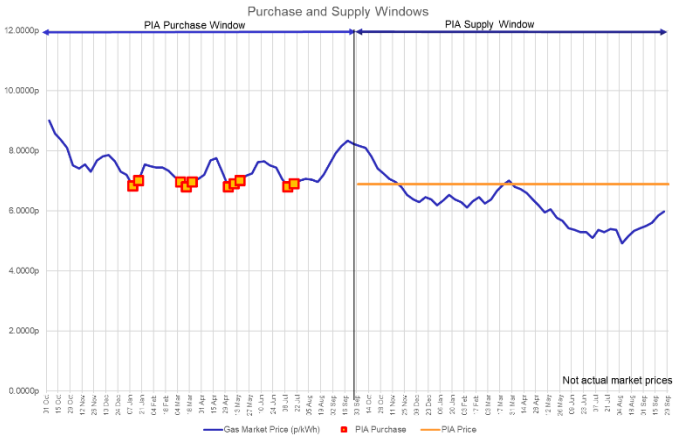
[3] GB Fuel type power generation production (gridwatch.co.uk)
[4] The Ultimate Guide To Non Commodity Costs [Updated For 2021] (zenergi.co.uk) (Chapter 4)
[5] The Ultimate Guide To Non Commodity Costs [Updated For 2021] (zenergi.co.uk) (Chapter 5)

Flexible Procurement

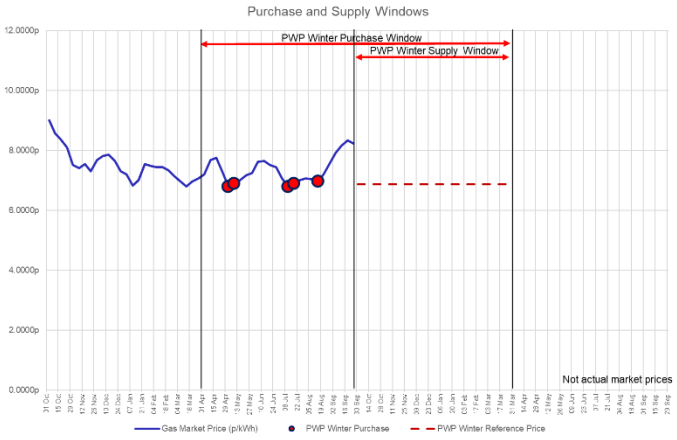
Flexible procurement avoids committing all the customer's demand to a single price commitment on a single date. It spreads the price risk over a number of smaller purchases. This will give a better price overall, but is more complex to manage. It is important that the trading decisions are taken independently of the supplier, so as to ensure the best interests of the customer are upheld. Public Sector Buying Organisations, such as Laser, have their own trading desk, and will make trading decisions on behalf of their customers, passing the gas and electricity they secure on to an appointed licensed supplier to manage supply and billing arrangements.

There are a range of flexible procurement trading options available. The two most commonly used involve either buying the energy required ahead of when it is to be used, or continuing to buy energy after a supply has started.

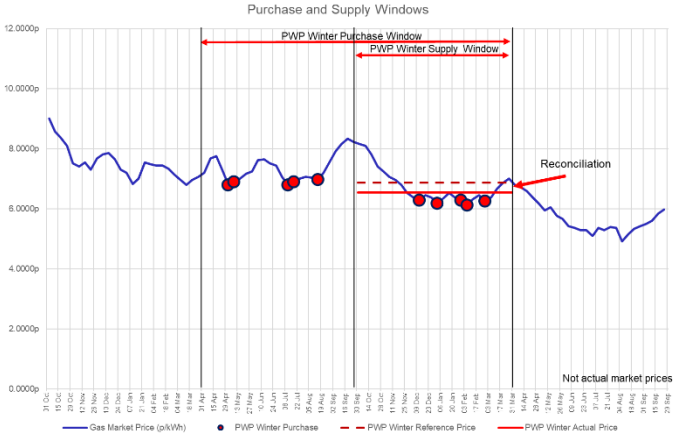
With a Purchase in Advance (PIA) option, the customer enters in to an agreement some while before they want their supply to start. During this advance purchase window, the trading desk will monitor the market, and make a number of purchases until all the customer's expected demand has been secured. At the start of the supply period, a price is set based on the purchases already made, giving the customer effectively a fixed price for the duration of their supply window. This process can be repeated over successive purchase and supply windows. If the market price should continue to fall during the supply period, there is no scope for further purchases, all the supply required has already been secured.



Purchase within Period (PWP) does allow for continued purchases to take place even after a customer's supply has started. In PWP, the trading desk will still make purchases ahead of the supply start, but will typically aim to only secure around half the expected demand ahead of the supply starting, leaving scope for additional purchases after the supply has started. This does mean that the actual cost of energy is not known at the start of the supply window, as not all the energy required has been bought. This would complicate billing arrangements, so a reference price is set, which is used for billing purposes through the supply window.



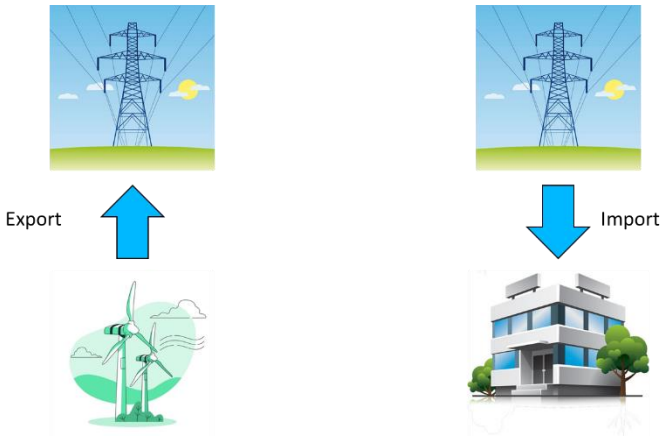
The trading desk will continue to monitor the market after the supply has started, and will make further purchases to secure the balance of the requirement. Safeguards are put in place through a risk management strategy to protect the customer should the market price rise, otherwise traders will look to secure the best market price for the remainder of the customer's requirement. The final energy price will not be known until the end of the supply window. At this time, a reconciliation is carried out to adjust the actual cost incurred against the reference price charged. If the reference price was set too high, a rebate is paid to the customer, if it was set too low, the customer pays an additional charge.

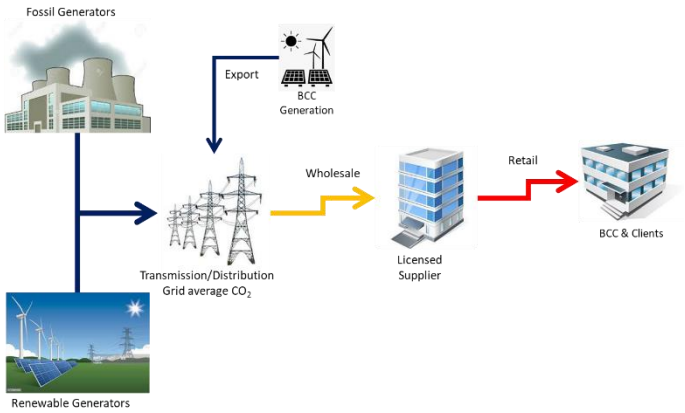


Sleeving

The Council owns and operates two large onshore wind turbines, a solar farm, as well as various rooftop solar systems. The electricity generated by the wind turbines and solar farm is currently sold to the grid under an export Power Purchase Agreement (PPA). The rooftop systems supply the building they are located on.

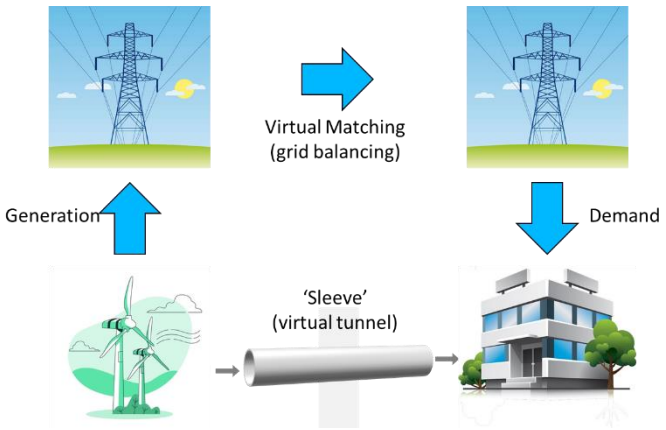
The price offered for the sale of electricity generated by the wind turbines and solar farm is typically a bit less than the cost of electricity on the energy market. This difference is the PPA provider's operating costs and profit margin. At the same time, BCC is buying electricity from the grid at market prices. If the electricity generated by the wind turbines and solar farm could be supplied directly to BCC buildings, there would be a cost saving, as this would replace more expensive grid electricity.





BCC does mandate renewable electricity in its supply contracts, but this only addresses how the electricity is generated. Most electricity supplied to BCC goes over the grid, where it gets mixed in with other supplies. Consequently, all grid supplied electricity carbon loading is averaged out, depending on the current GB generation mix[6]. The wind turbines and solar farm have Renewable Energy Guarantee of Origin (REGO) certificates that confirm that this is renewable energy. These certificates prove that BCC has a supply of zero-carbon electricity, if this could be supplied to BCC buildings

The issue is how to connect BCC buildings to the wind turbines and solar farm. A direct connection[7] is not possible, but a virtual connection can be made. This is known as 'sleeving'. Under a sleeving arrangement, the output from the wind turbines and solar farm is treated as if it was supplying BCC buildings when the grid operator balances the grid. Each unit of electricity exported by the wind turbines or solar farm is matched to a unit supplied to a BCC building. This creates a virtual link, like a private tunnel or channel, connecting the wind turbine or solar farm output to BCC buildings, but on paper rather than physically.



Depending how many buildings are connected under the sleeving arrangement and how much electricity is being generated, sometimes there will be more electricity being produced than can be used, sometimes there won't be enough to meet all the demand. Any surplus generation can still be exported to the grid, any shortfall can be topped up from the grid. Because the electricity is being distributed via the grid, a Licensed Supplier is still required, who is approved to carry out grid balancing transactions.

[6] Greenhouse gas reporting: conversion factors 2021 - GOV.UK (www.gov.uk)

[7] A direct connection between a renewable energy system and a customer is very cost effective if it can be done.