Where are energy prices heading?

Introduction

The oil price shocks of the 70s and 80s kicked off the wind industry in Denmark, as the country sought to secure its own source of energy. 40 years on, wind and solar parks now generate the cheapest form of electricity. In fact, for the first time ever, developed nations can generate all the power they need from renewable sources, without reverting to fossil fuels or nuclear power, and at an affordable price.

However, Russia's invasion of Ukraine has brought into sharp focus our continued reliance on oil and gas for heating, electricity and transport. This has led to a steep rise in energy prices, as well as large price fluctuations, to the point that future predictions are almost meaningless. In comparison, wind and solar energies are characterised by low and stable prices where the main risk is weather rather than politics.

Oil and gas supply worries

Modern society is totally reliant on power and more than 70% of this still comes from oil and gas, with Russia representing one of the largest suppliers in the world. As a consequence, there has been a significant knock-on effect from the war in Ukraine. If nothing else, the insecurity of fossil fuels should hasten the transition to sustainable power. In the case of the Isle of Man, our immense resources of wind, sun and water mean that we have the very real prospect of being energy self-sufficient. In reality, however, we are currently locked into a traditional system which limits how quickly we can move to renewable energy.

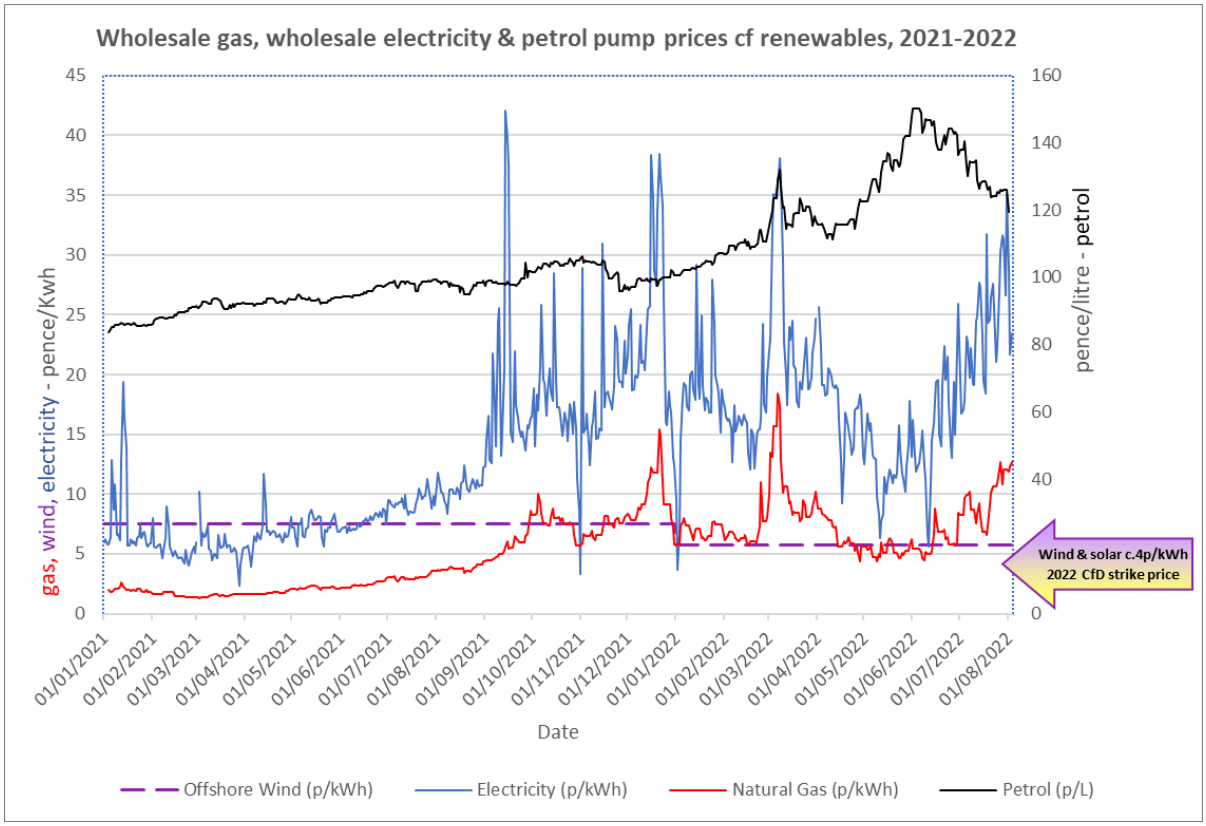

Figure 1. Graph showing the variation in energy prices over the last 20 months. Gas, electricity and wind are shown as the wholesale price for one kWh (kilowatt hour) - typically 45-60% of the price paid by domestic customers - whereas petrol is shown as the pump price per litre. From mid-2021, prices have been rising, largely due to pressures on gas & oil supplies.

International tension in the months leading up to the invasion on 24 February 2022 was already causing nervousness amongst energy traders and prices had been rising for more than 6 months. This, coupled with increased demand as Covid-19 restrictions were relaxed, as well as worries about inflation & recession, has led to imbalances between the supply of and demand for gas, electricity and transport fuels. The result is volatile & unstable market conditions. Like all consumers, the Manx Utilities Authority has no control over this situation. The prices of materials have also been affected by meaning that it is hard to forecast, for example, the costs of installing any new power plant, whether this involves fossil fuels, nuclear, biomass, wind, solar or water.

Renewable energy prices

Since 2014, the market for renewable energy in the UK has been controlled by the Government under the Contract for Difference (CfD) scheme. This supports the start-up of large-scale renewable projects (generating over 5 MW) by giving the renewable developer a fixed price for electricity called a "strike price" instead of the market variable rate. The contract is awarded for a 15-year period and occurs between the renewable generator and the Counterparty, also known as the Low Carbon Contracts Company, which is government owned. When the developer is generating renewable power, if the strike price is higher than the market price then the Counterparty pays the difference, whereas the developer pays the difference to the Counterparty if the strike price is lower. This provides long term price security for renewable energy providers and provides for a lower cost of capital for the up-front investments.

The renewable technologies which have so far been included in the CfD scheme are onshore wind, offshore wind, solar photovoltaic (PV), geothermal, hydro-power, ocean power (tidal & wave), landfill gas, sewage gas, anaerobic digestion & other biogases, biomass and combined heat & power (CHP) plants.

Renewable developers bid for CfD contracts at a competitive auction ("allocation rounds"). The bidding or strike price is capped by an Administrative Strike Price (ASP) for the type of technology and bids cannot be higher than this. The ASP is the maximum amount that the government is willing to offer developers for each technology in a given delivery year and the price is per MWh. The lowest bid for each technology can secure the contract if it fits the capacity and price criteria. The CfD price closely reflects the economics of the technology and can therefore be used as a measure of the cost of each specific renewable energy, once profit has been factored in.

CfD prices for wind and solar in Round 4 (2021/2022) are around half to one-third of what they were in Round 1 (2014/2015), reflecting the fact that the cost of mainstream renewable energy technologies has decreased remarkably over the last 7-8 years.

Can renewables replace fossil fuels?

Of course, we would all like to see low & stable energy prices. At first glance, Figure 2 suggests that renewables provide exactly this, in stark contrast to the unpredictable oil & gas prices shown in Figure 1. However, things are not this simple.

For renewable energy projects to compete with traditional power plants one needs to deal with intermittency: i.e. the fact that wind and sun energy varies with weather and daylight, not with electricity demand. Power production has to be delivered exactly when the grid requires it ("dispatchable") which means that renewable energy has to be stored and regenerated, introducing an additional cost. There are various options for energy storage including batteries and hydro schemes. The grid also needs a steady background of power ("baseload"), typically provided by continuously running turbines. To avoid emissions, these turbines can be powered by burning sustainable fuels such as hydrogen or by water in hydro schemes. Even so, extra equipment and electronics ("ancillary services") may be needed to ensure that under all situations the voltage and frequency of the electricity remains stable with no risk of blackouts. Finally, the transmission and distribution cables of the grid will have to be upgraded to deal with the anticipated increase in demand for electricity in heating and transport.

In all, energy storage, baseload turbines and ancillary services can double the cost of renewable energy. However, nowadays this is still cheaper than using fossil fuels (e.g. Figure 1). The value is even higher once stable, predictable prices, energy security and environmental responsibility are accounted for. In addition, new industry will be attracted to the Isle of Man if green power can be guaranteed.

The next step is getting legislation in place to encourage energy companies to invest whilst, at the same time providing maximum benefit to the Island. This will involve a streamlined permitting process and guarantees on supply & prices. The goals are to ensure that the Island has its own secure energy and that power is cheaper for the entire community.

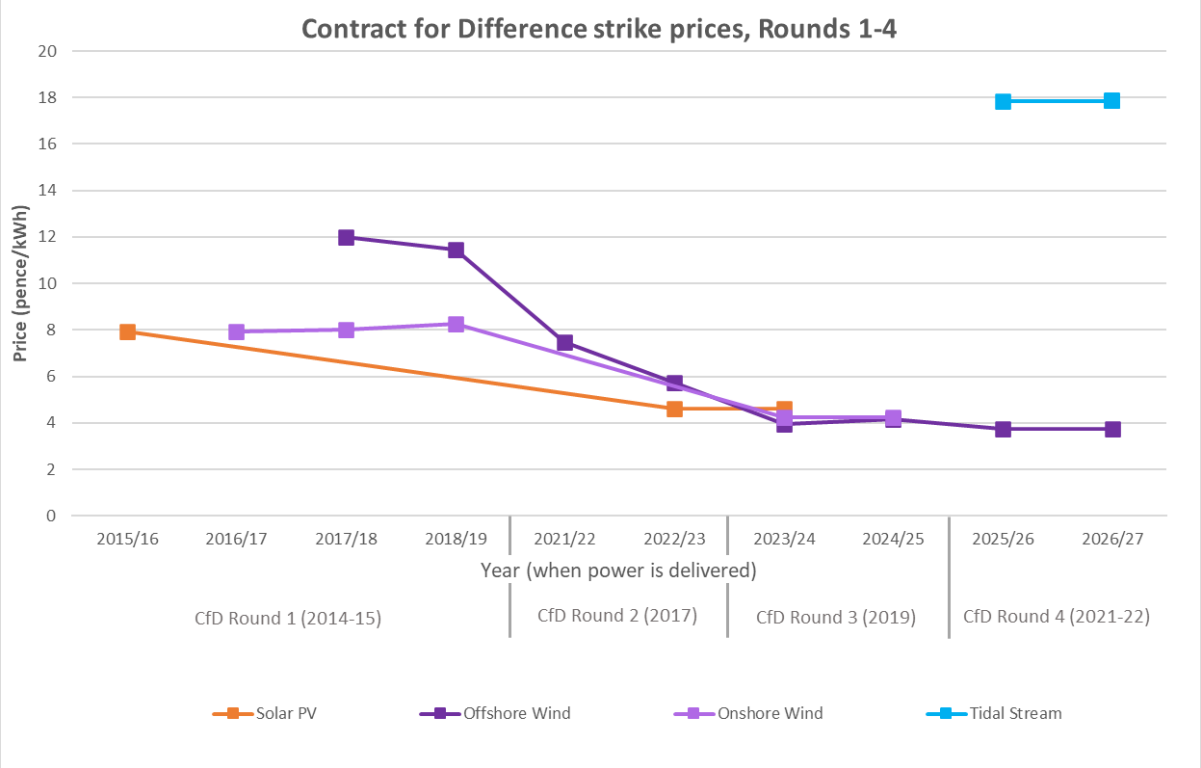

Figure 2. UK CfD prices since 2015 for selected renewable energy projects.

Reference: Keeley, R. & Quirk, D.G., 2022. Where are energy prices heading? Energy & Sustainability Centre Isle of Man, 4 p.

Sources

https://www.energy-stats.uk/wholesale-energy-pricing/

https://www.racfoundation.org/data/wholesale-fuel-prices-v-pump-prices-data

https://tradingeconomics.com/commodity/uk-natural-gas

https://www.statista.com/statistics/262861/uk-brent-crude-oil-monthly-price-development/

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/407059/Contracts_for_Difference_-_Auction_Results_-_Official_Statistics.pdf

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