

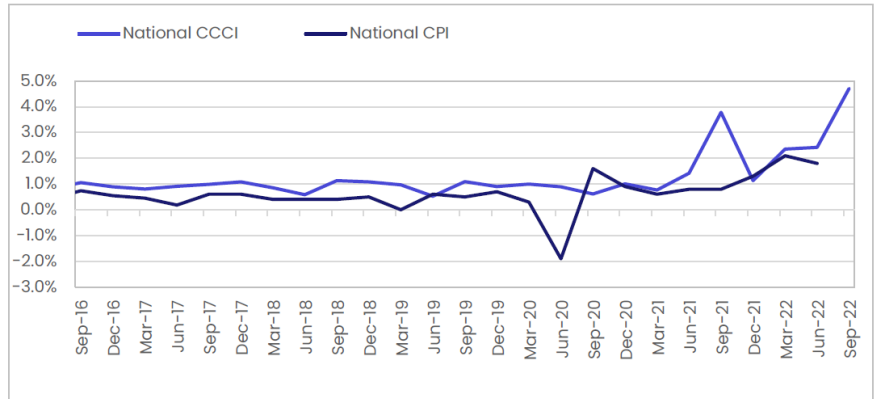


HOW IS INFLATION AFFECTING THE POWER SECTOR

Mark Williamson – Managing Director, Construction Services

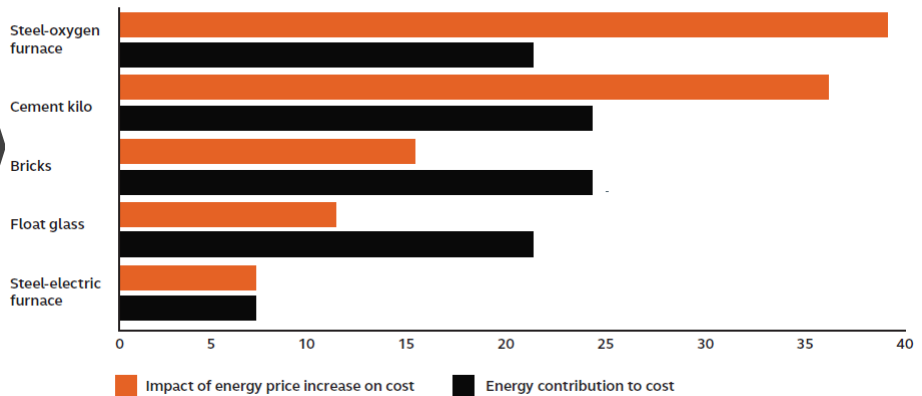
Inflation v's Construction Cost Index

Quarterly change in construction costs v CPI, National



Energy Costs

Figure 1: The contribution of energy costs to construction materials prices and impact of recent energy price increase (quantified in % increase on product price)



Case Study 1

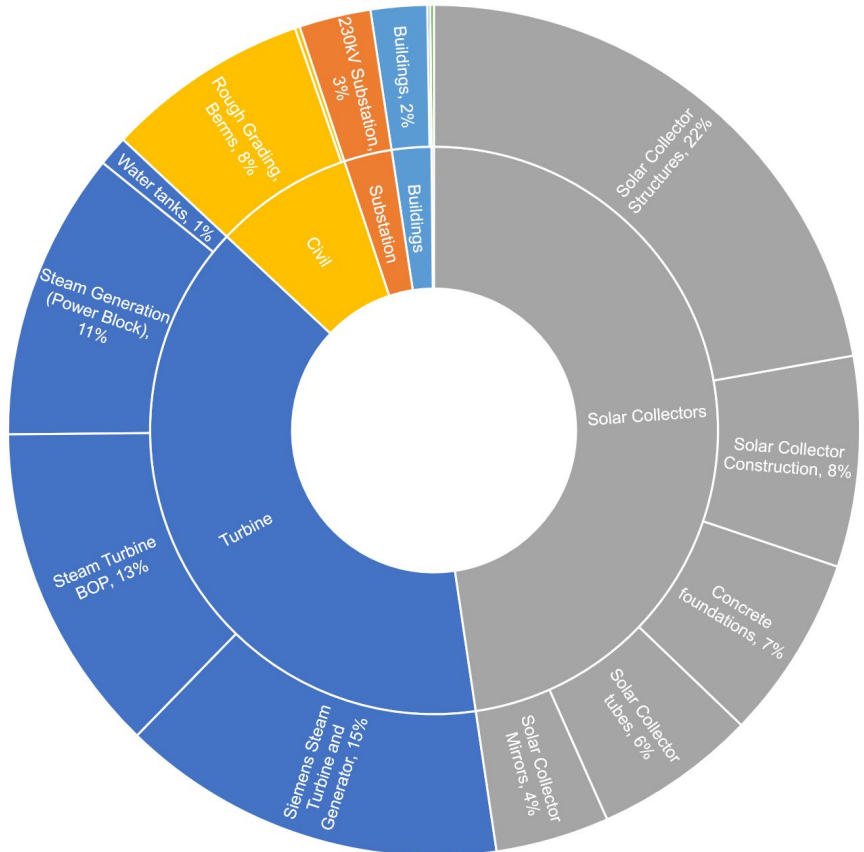


Case Study 1

Category	Description	Cost	Percentage
Turbine	Steam Generation (Power Block)	\$18,810,500.00	10.97%
Turbine	Siemens Steam Turbine and Generator	\$25,088,000.00	14.63%
Turbine	Steam Turbine BOP	\$21,569,280.00	12.58%
Turbine	Water tanks	\$1,978,309.00	1.15%
Substation	230kV Substation	\$4,669,591.91	2.72%
Solar Collectors	Solar Collector Structures	\$38,050,966.00	22.18%
Solar Collectors	Solar Collector Construction	\$13,715,838.00	8.00%
Solar Collectors	Solar Collector tubes	\$10,579,200.00	6.17%
Solar Collectors	Solar Collector Mirrors	\$7,401,600.00	4.32%
Solar Collectors	Concrete foundations	\$11,984,994.00	6.99%
Solar Collectors	NREL Hydrogen Removal equip	\$250,000.00	0.15%
Civil	Rough Grading, Berms	\$13,257,207.20	7.73%
Civil	Roads	\$316,800.00	0.18%
Buildings	Buildings	\$3,663,224.76	2.14%
Total		\$171,521,363.87	100%

Case Study 1

Nevada Solar One Cost Breakdown



Case Study 2



Case Study 2

Asset Category	2012 Value	2020 (escalated) Value	Cost Variation	% change from 2012 - 2020	% change from 2020 - 2023	2020 - 2023 (escalated) Value
Wind Turbines, Towers and Pads	\$278M	\$348M	\$70M	25%	25%	\$435M
Roads and General costs	\$6M	\$7.5M	\$1.5M	25%	25%	\$9.4M
Interconnection	\$6M	\$7.8M	\$1.8M	30%	30%	\$10.1M
Substation and Collector system	\$7.7M	\$9.6M	\$1.9M	25%	25%	\$12M
O+M Building	\$1.3M	\$1.7M	\$0.4M	30%	30%	\$2.2M
Total	\$299M	\$374.6M	\$75.6M	25.3%	25.3%	\$468.7M

Case Study 2

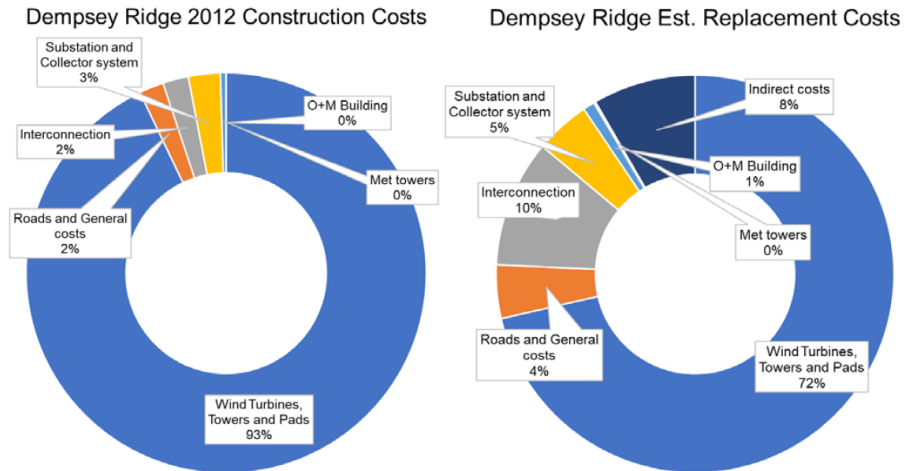


Figure 3-1: Graphical comparison of distribution of Dempsey Ridge costs in 2012 vs. the estimated replacement costs.

What does
all of this
mean?





HOW IS INFLATION AFFECTING THE POWER SECTOR – BUSINESS INTERRUPTION

LEE SWAIN, PARTNER, MDD LONDON



@mdd1933



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Making Numbers Make Sense
> mdd.com

Agenda

01

Introduction -
Power
Market 2022



02

Volatility in
Inputs and
Outputs



03

Types of
Markets



04

What Does it
Mean?



Introduction



- > Electricity demand slowing in 2022
- > Natural gas prices pushing more coal consumption
- > Renewables growing faster than demand and replacing fossil fuels
- > Wholesale electricity prices skyrocketing
- > Europe gearing up to reduce Russian imports
- > Large uncertainties for 2023

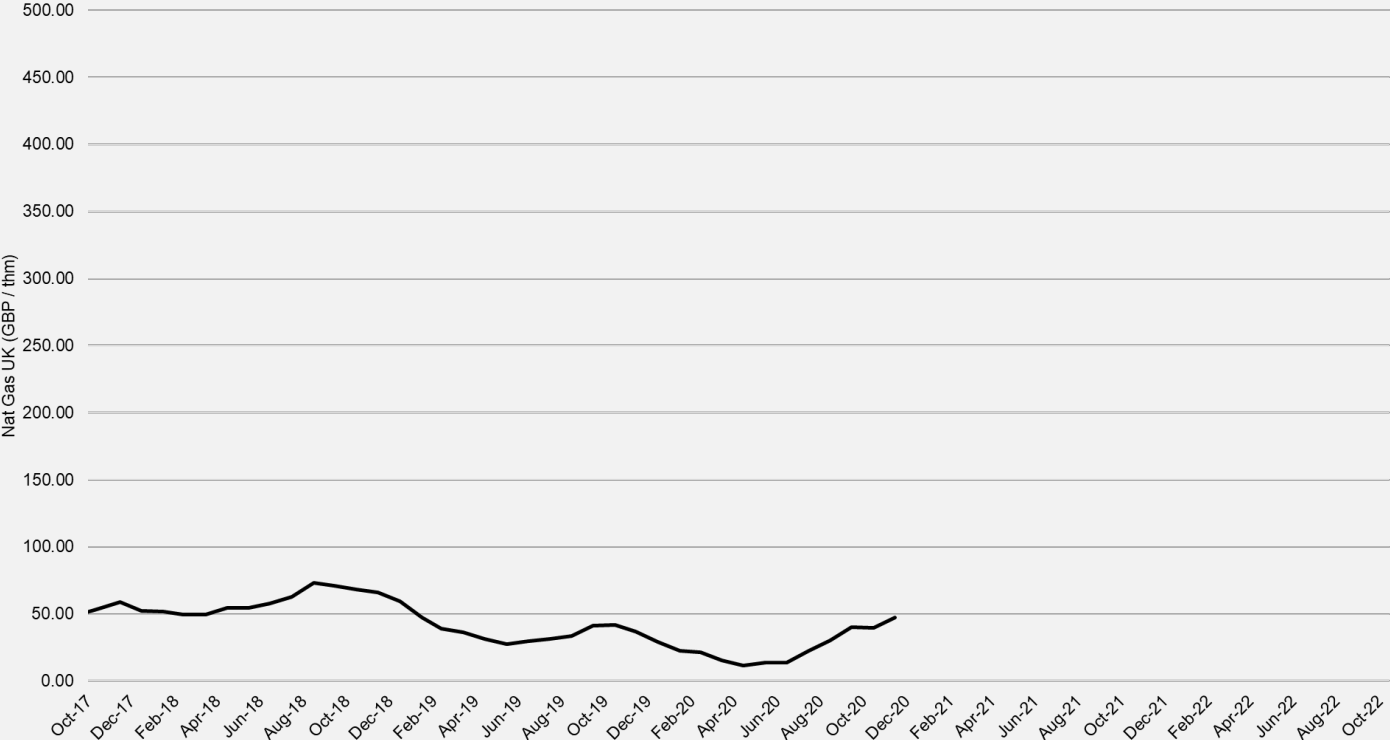
Conclusion = Volatile Market



Volatility in Inputs and Outputs

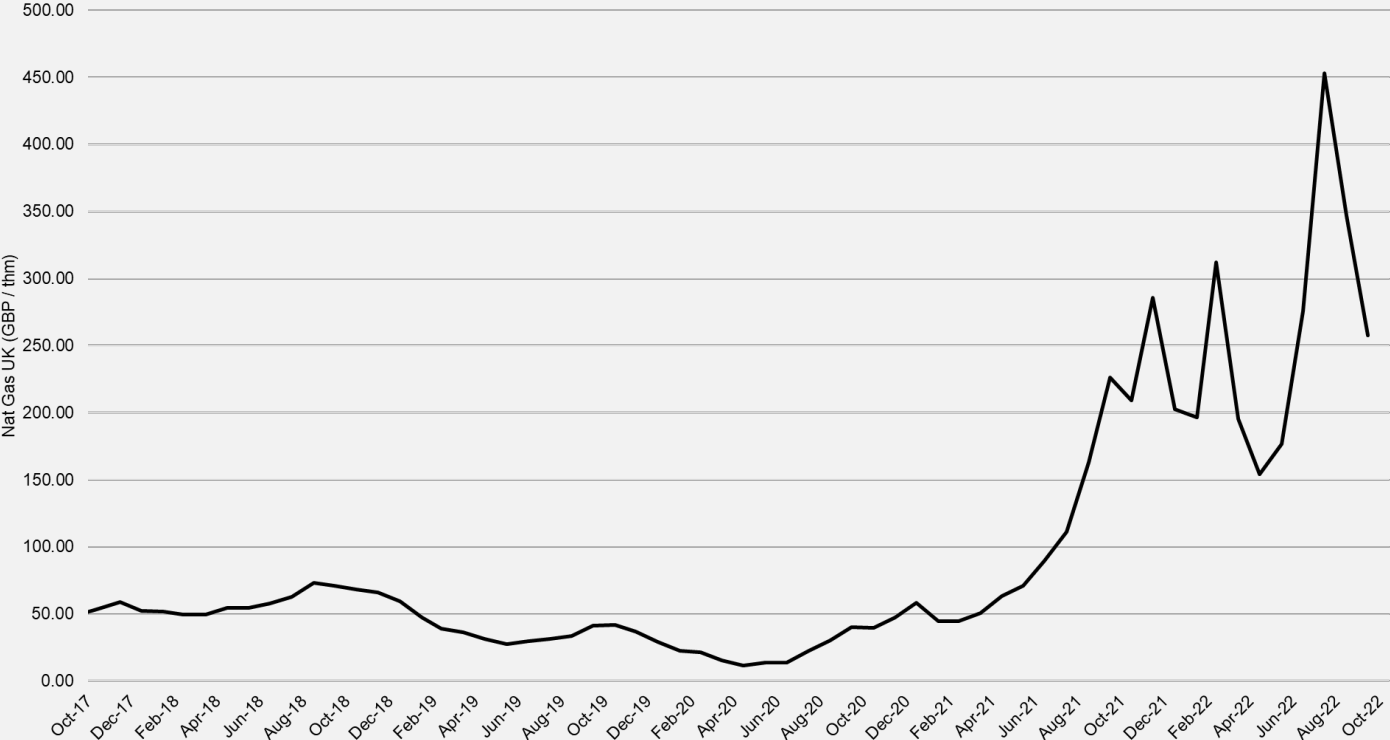
Natural Gas - UK

Source: tradingeconomics.com



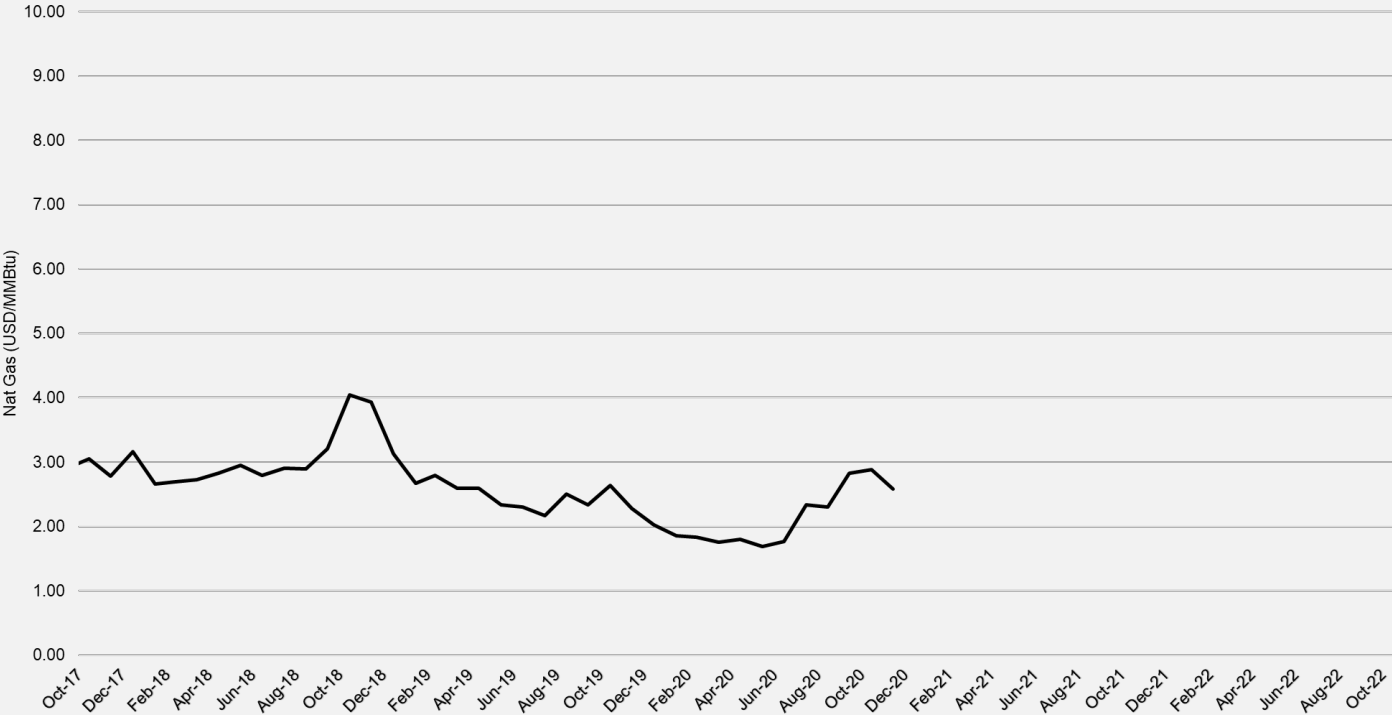
Natural Gas - UK

Source: tradingeconomics.com



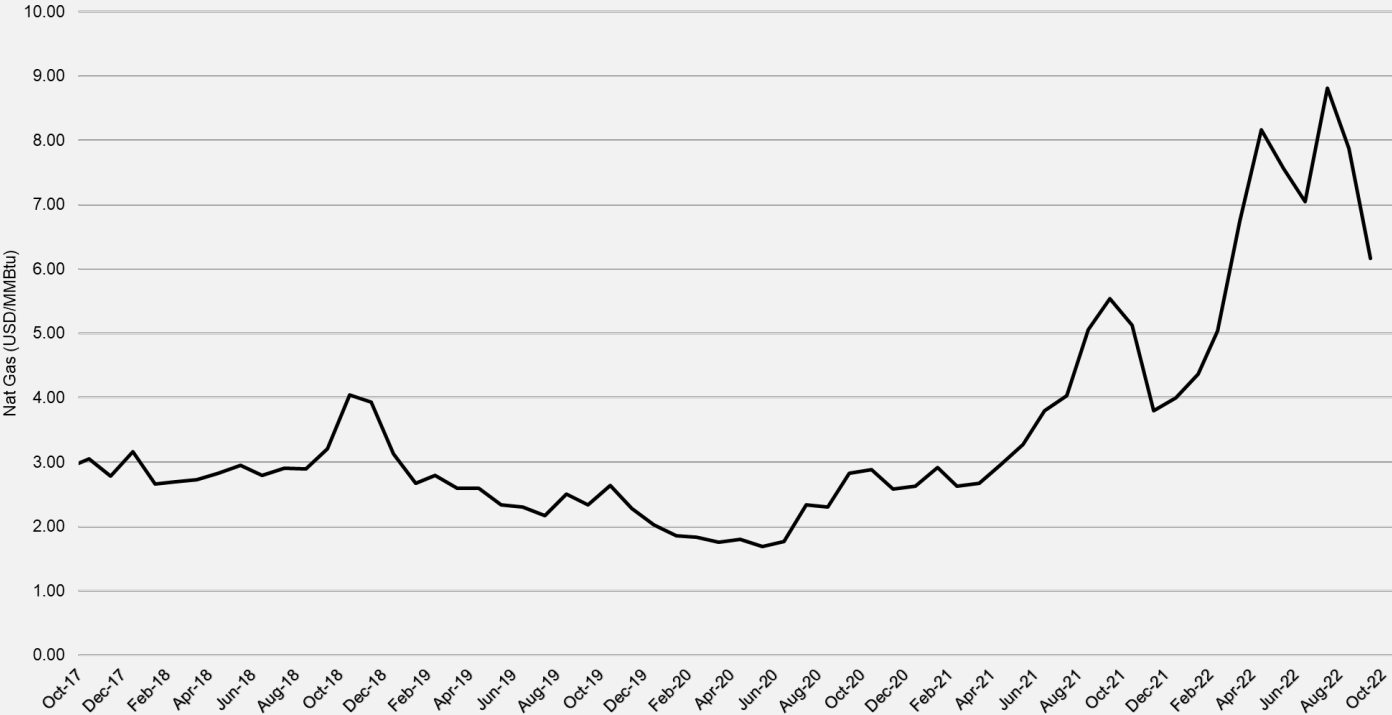
Natural Gas – USA (Henry Hub)

Source: tradingeconomics.com



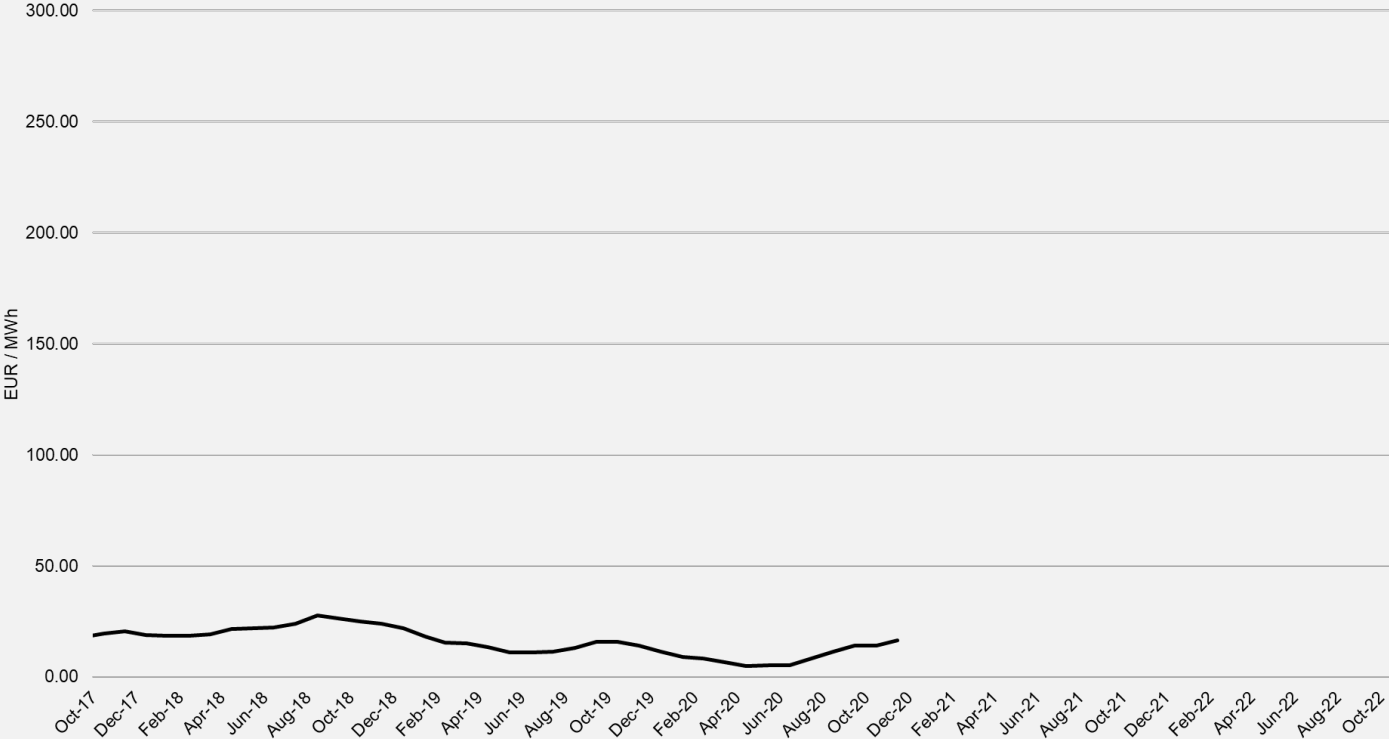
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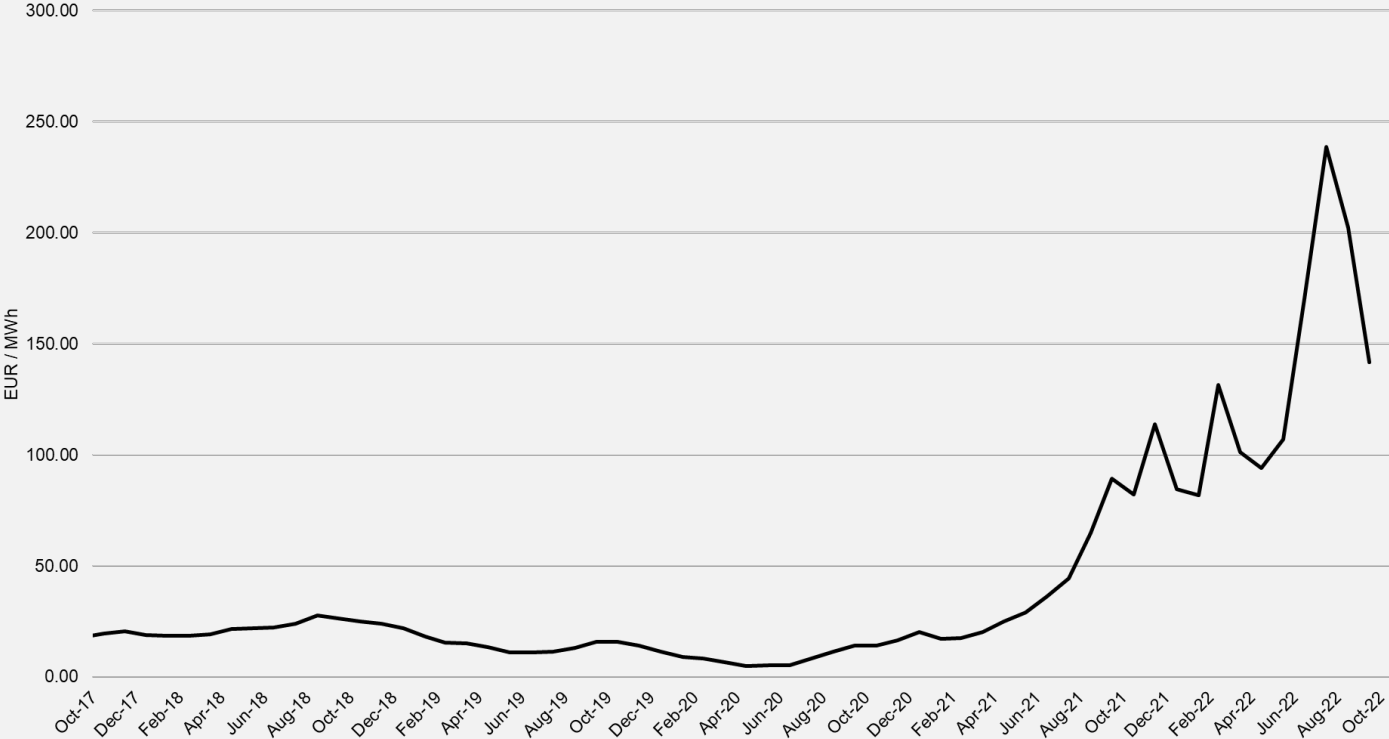
Natural Gas – EU (Dutch TTF)

Source: tradingeconomics.com



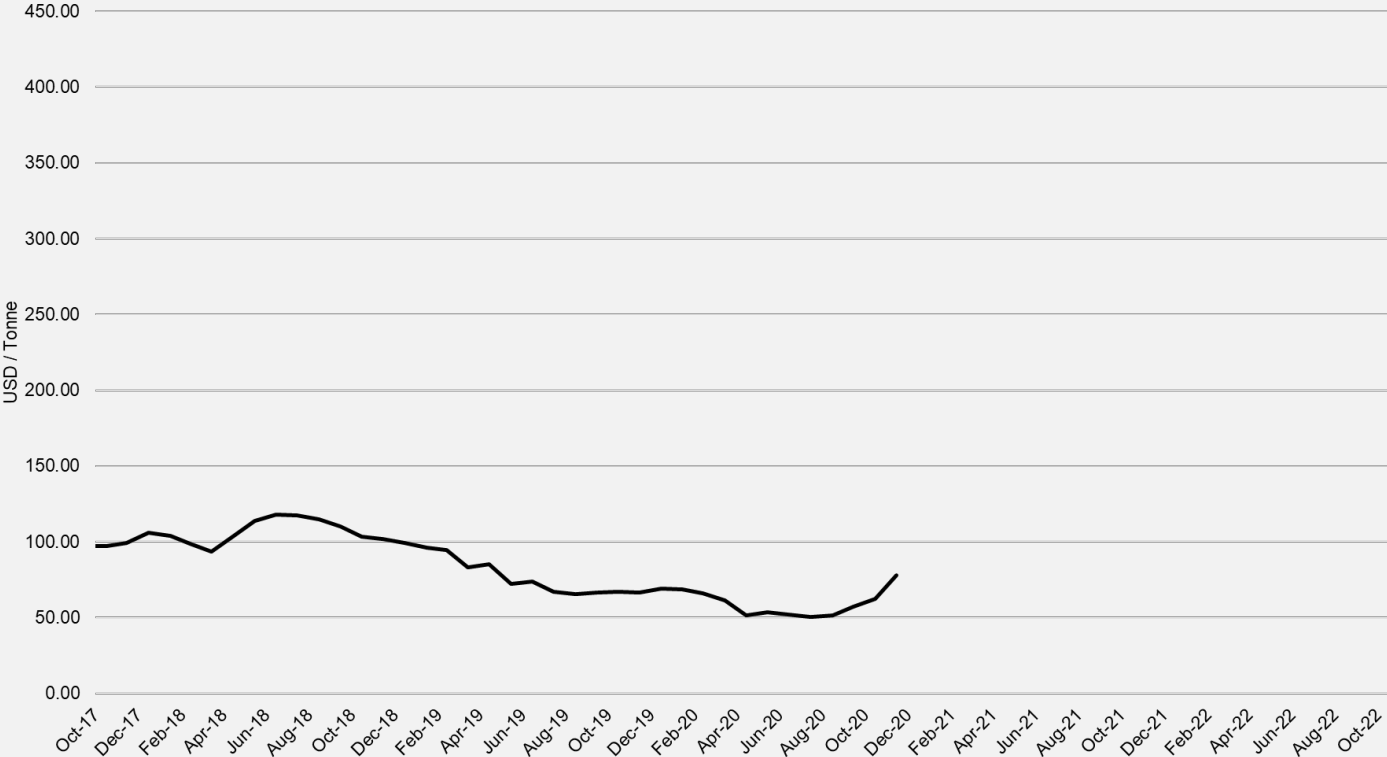
Natural Gas – EU (Dutch TTF)

Source: tradingeconomics.com



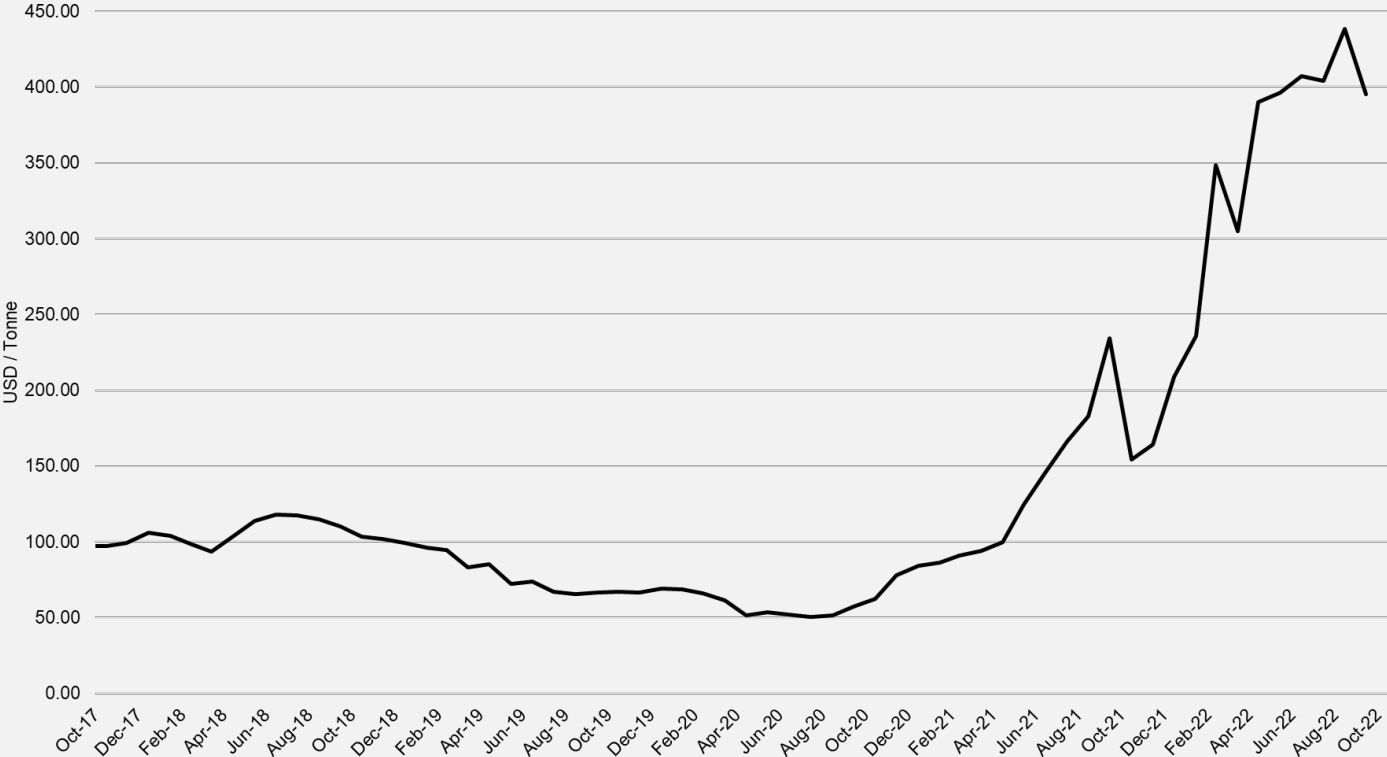
Coal – US

Source: tradingeconomics.com



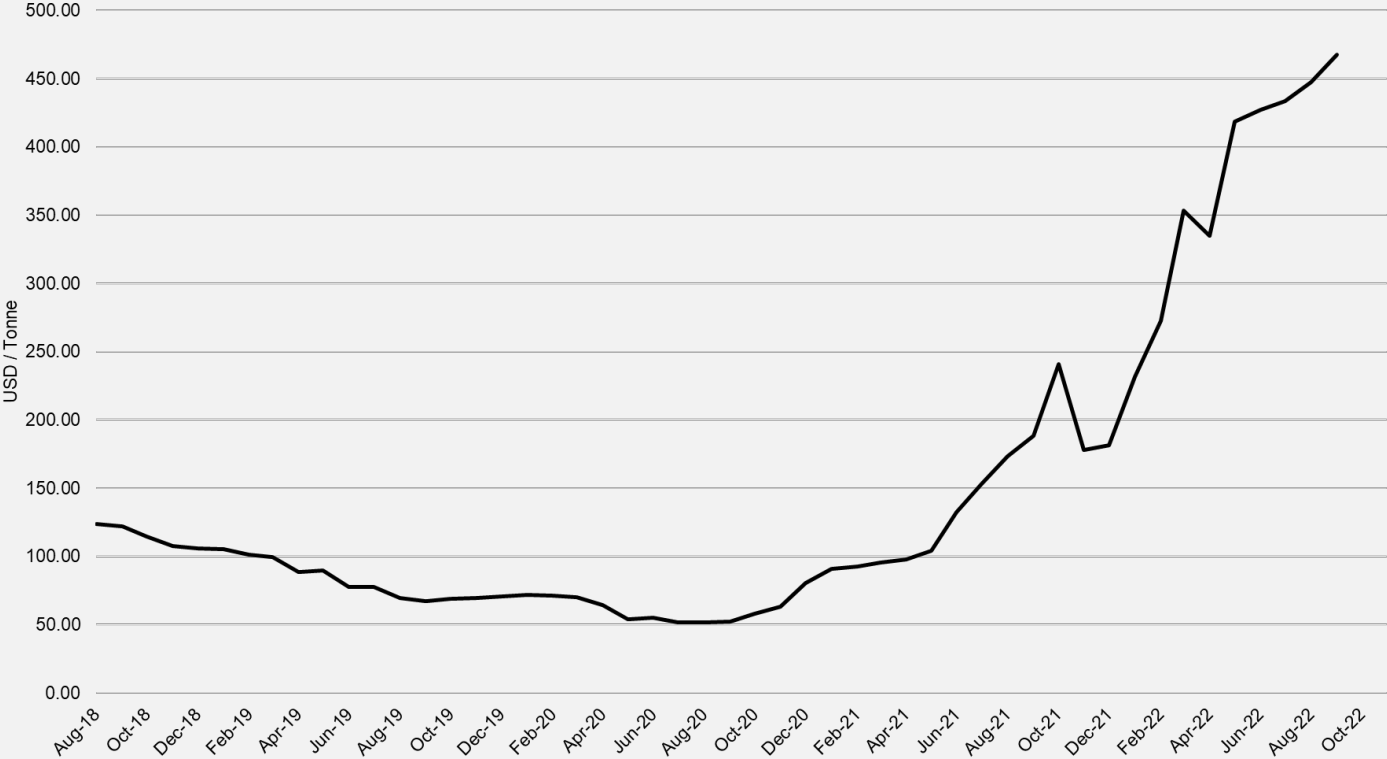
Coal – US

Source: tradingeconomics.com



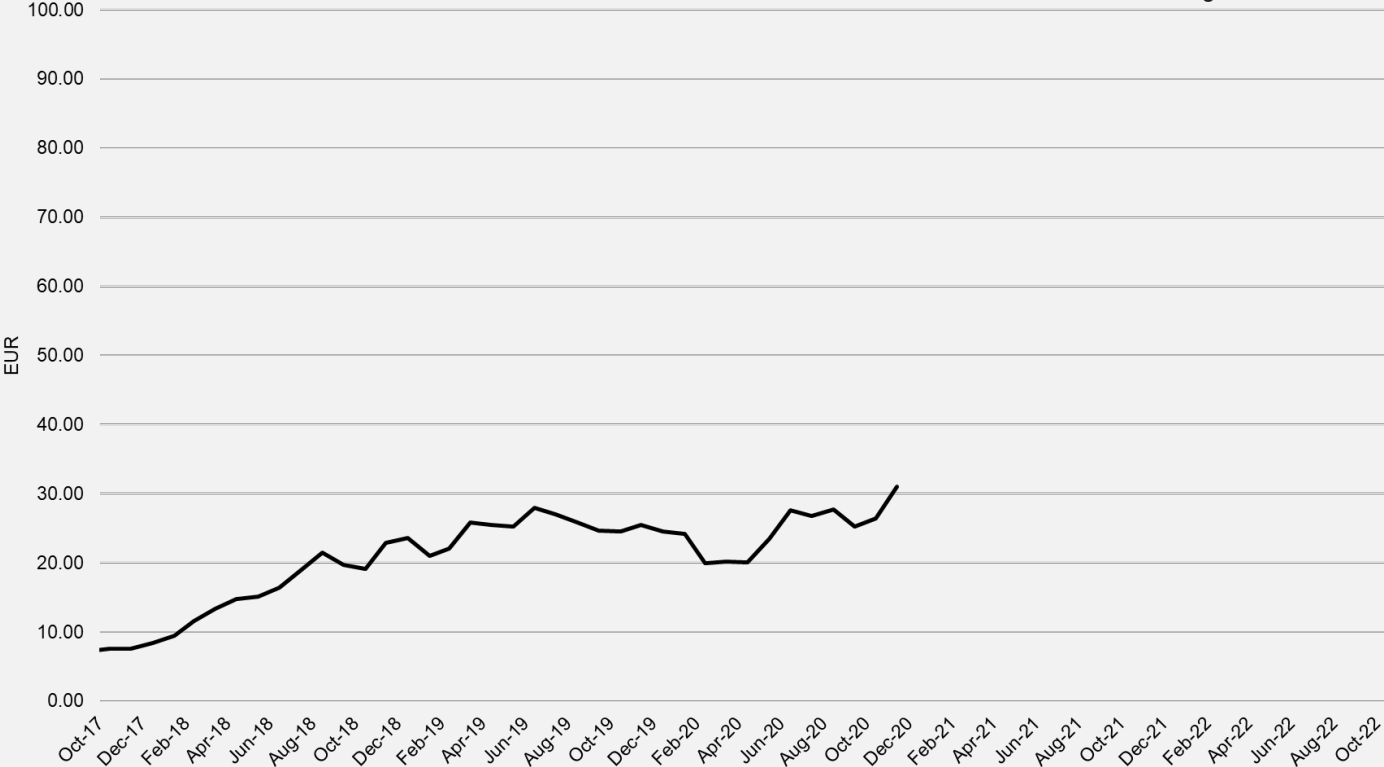
Coal – Australia

Source: <https://ycharts.com/>



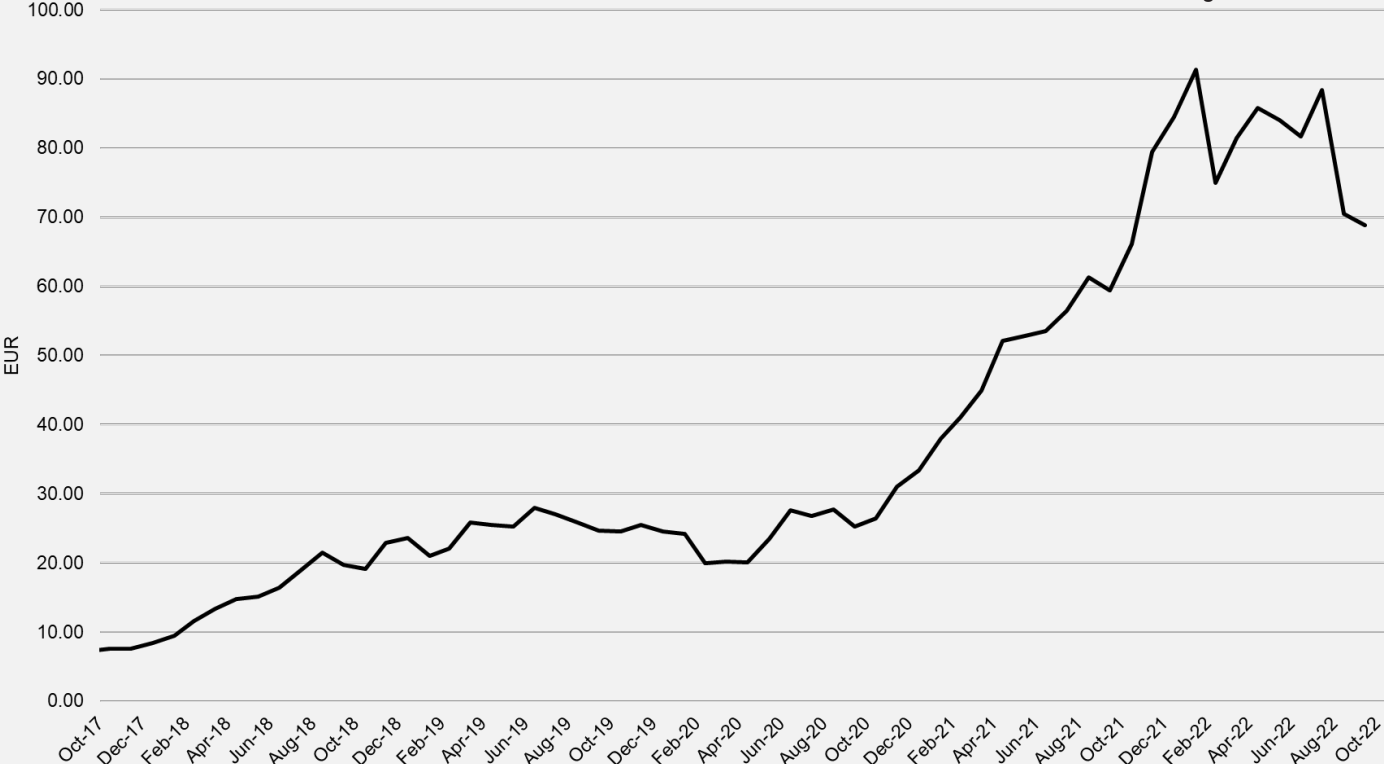
EU Carbon Permits

Source: tradingeconomics.com



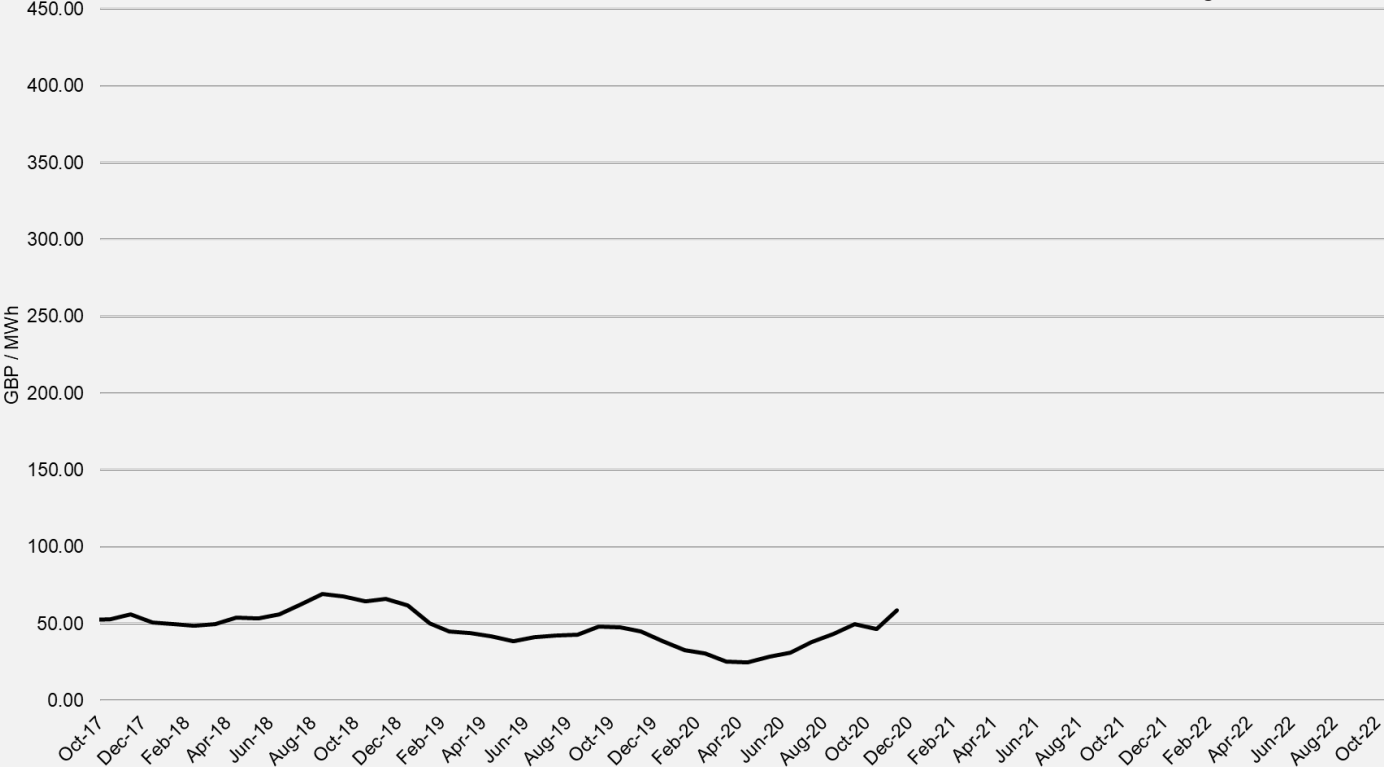
EU Carbon Permits

Source: tradingeconomics.com



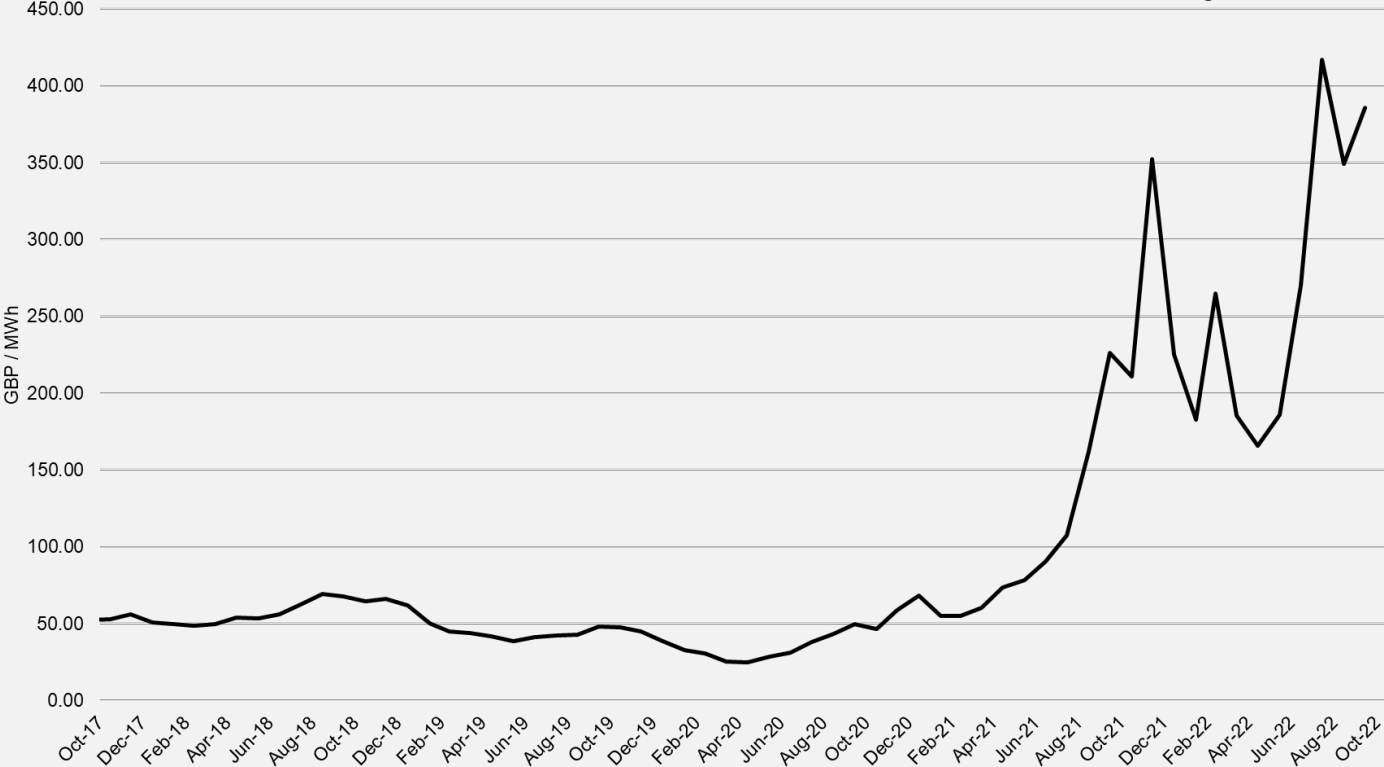
Electricity Price - UK

Source: tradingeconomics.com



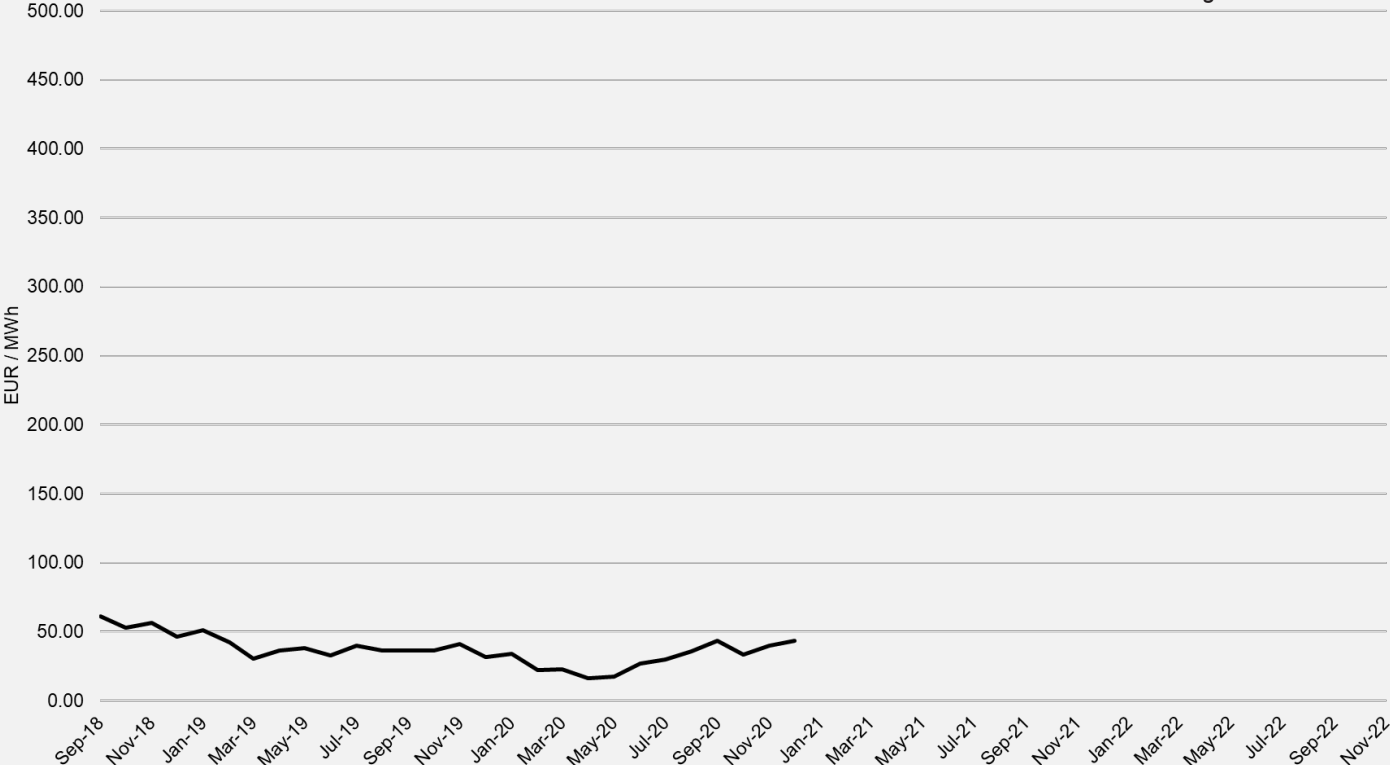
Electricity Price - UK

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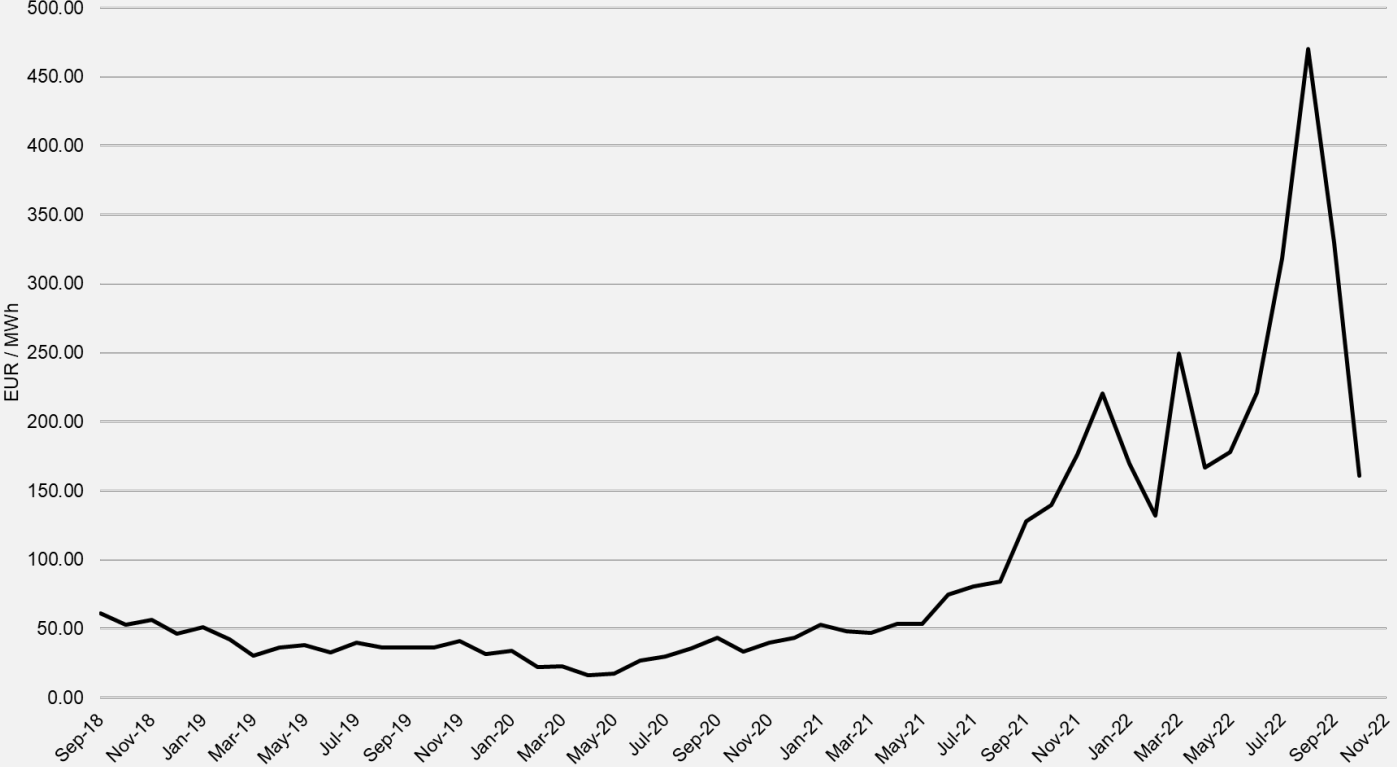
Electricity Price - Germany

Source: tradingeconomics.com



Electricity Price - Germany

Source: tradingeconomics.com



Key Takeaways



- > Relatively stable input and outputs through early 2021
- > Early 2021
 - > Prices increasing
 - > Worldwide Covid / travel restrictions eased
 - > Demand greater than supply in many industries
- > 2022
 - > War in Ukraine
 - > Significant worldwide inflation
- > Comfort in forward looking prices?

Forward Looking Prices

As at 17th October 2022:

Source: tradingeconomics.com

Commodity	Unit	Last	+1Q	+2Q	+3Q	+4Q
Natural gas	<i>USD / MMBtu</i>	5.93	6.87	7.31	7.77	8.27
UK Gas	<i>GBP / thm</i>	232.25	299.93	344.20	395.00	453.31
Coal	<i>USD / Tonne</i>	392.15	415.62	440.11	466.02	493.45
EU Carbon Permits	<i>EUR</i>	67.11	71.21	74.55	78.05	81.71

As at 26th October 2022:

Commodity	Unit	Last	+1Q	+2Q	+3Q	+4Q
Natural gas	<i>USD / MMBtu</i>	5.38	5.31	5.65	6.01	6.39
UK Gas	<i>GBP / thm</i>	190.00	234.66	269.77	310.12	356.52
Coal	<i>USD / Tonne</i>	388.15	412.93	437.23	462.93	490.15
EU Carbon Permits	<i>EUR</i>	76.45	71.91	75.25	78.74	82.39

Significant changes in 10 days

Forward Looking Impacts - September



- European gas traders dare to dream prices have peaked – *FT 16-Sep*
- No end in sight for EU energy crisis – *oilprice.com 1-Sep*
- Portugal says could face shortage – *Euronews 4-Sep*
- Germany keeps two nuclear reactors on standby – *Reuters 6-Sep*
- Europe countries face risk of gas shortages – *Economist*

Forward Looking Impacts - October



- Too Much Gas. Europe's Energy Crisis Takes a Surprise Turn, Much depends on the weather over the coming winter months – *Bloomberg 25-Oct*
- The end of Europe's energy crisis is in sight – *FT 27-Oct*
- Europe's 'not out of the woods' despite gas prices falling to 4-month lows – *CNBC 28-Oct*
- Europe now has so much natural gas that prices just dipped below zero – *CNN 27-Oct*

Types of Market

Types of Market – Europe

Contract

Merchant

- > Belgium
- > Finland
- > France**
- > Germany**
- > Greece**
- > Italy
- > Netherlands
- > Norway**
- > UK

***PPA predominately for renewables only*

Types of Market – Africa

Contract

- > Angola
- > Kenya
- > Morocco
- > Mozambique
- > Nigeria
- > South Africa
- > Tunisia
- > Uganda
- > Zimbabwe

Merchant

Types of Market – Middle East

Contract

- > Bahrain
- > Saudi Arabia
- > UAE
- > Qatar
- > Jordan
- > Egypt**

Merchant

- > Oman*
- > Turkey

**Spot market launched January 2022*

***Aiming to move to a liberalized structure*

Types of Market – Americas

Contract

- > Colombia
- > Mexico
- > Peru

Merchant

- > United States**
- > Brazil**
- > Chile

***PPA predominately for renewables only*

Types of Market – Asia Pacific

Contract

- > China*
- > Malaysia
- > Thailand
- > Indonesia
- > Hong Kong

Merchant

- > Singapore
- > India
- > Japan
- > South Korea**
- > Vietnam
- > Philippines
- > Australia**

**China is in the process of introducing competitive spot market.*

***PPA predominately for renewables only*

What Does it Mean?

What Does It Mean?



- Increasing claims
- Limits being breached
- Increasing instances of under insurance
- Increasing values
- Increasing premiums
- Increasing policy deductibles / excesses
- Reintroduction of specific clauses to address under insurance

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