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IMPACTS OF ENERGY PRICE CAP SYSTEM ON ELECTRICITY AND GAS PRICES IN THE ERA OF ENERGY CRISIS

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IMPACTS OF ENERGY PRICE CAP SYSTEM ON ELECTRICITY AND GAS PRICES IN THE ERA OF ENERGY CRISIS

A Thesis

Presented to the

Faculty of

California State University,

San Bernardino

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

in

Information Systems and Technology

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by

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Approved by:

Dr. William Butler, Committee Chair

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ABSTRACT

29 million households in the United Kingdom (UK) use Energy Price Cap and the UK government spend about 43 billion dollars a year which is 1.7 percent of the GDP in subsidizing the energy price cap subsidies to the households and businesses. The energy prices in the UK have seen a significant rise in the past few years for distinct reasons. This culminating experience project explains the mechanism of the energy price cap used for the household energy supply in the UK and how it has been affected between the years 2022 to 2024. The research questions are: (Q1) How has the energy cap implemented in the UK impacted electricity prices, particularly in the context of natural gas prices? And (Q2) What are the economic implications of people spending on energy caps and subsidizing household energy bills?

The findings and conclusions from the Project are: (Q1) As market conditions are fluctuating the electricity prices were increasing when the natural gas prices were increasing. But the price cap helped the consumers pay significantly less compared to the actual price. (Q2) There was a negative implication on people spending even after subsidizing the household energy bills. The demand for electricity and natural gas has gone down and energy price cap was implemented improperly as high-income households were being benefited paying less percentage of their income into energy expenditure.

ACKNOWLEDGEMENTS

I would like to acknowledge and extend my deepest appreciation for the support provided by Dr William Butler, Dr. Conrad Shayo, and all others who have provided extra encouragement throughout this Culminating Experience project over the past four months.

DEDICATION

This is dedicated to my parents, my friends and other family members. A special acknowledgement to Professor William Butler and Dr. Conrad Shayo for their continuous support throughout my master's program.

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CHAPTER ONE

INTRODUCTION

Over the years, several studies and analysis has been done on the true power price fluctuations in the United Kingdom (UK). This Culminating Experience Project builds upon the existing literature on energy price caps from the research article The electric shock: Causes and consequences of electricity prices in the United Kingdom published by Chanaka N. Ganepola and Navigating the crises in European energy: Price Inflation, Marginal Cost Pricing, and Principles for Electricity Market Redesign in an Era of Low-Carbon Transition published by Michael Grubb and investigates the situation in United Kingdom of how the Energy price caps are implemented to protect consumers while also fostering energy market stability and growth. The UK has recently experienced a series of interconnected problems in its energy industry, resulting in what is now called the "UK energy crisis"(Chat GPT 3.5, 2022). Electricity and gas price increases are at the heart of this complex crisis, attracting the attention of policymakers, industry stakeholders, and the public (Ganepola et al., 2022).

The United Kingdom uses “Energy Price cap system " energy policy scheme that provides a cap on the maximum amount that energy suppliers can charge customers for gas and electricity. This is designed to protect consumers from high energy bills. There have been many potential risks, such as higher

costs for consumers, possible financial implications, and security of supply issues (Herbert, 2021). This project will investigate the effect of energy price caps, the financial consequences of subsidizing the supply of natural gas, and the effect of renewable energy on the cost of electricity, The intricate networks that comprise the UK energy system are examined in this study. This Culminating Experience Project aims to simplify the intricate pricing structure and associated variables (Ganepola et al., 2022).

Problem Statement

Rising power and gas prices are just one aspect of the complicated energy crisis the UK was experiencing. The Energy Price Cap system in the energy sector is the cause of this dilemma (Eisenmenger & Syron, 1970). Although this method aims to promote energy efficiency, it raises questions regarding the actual cost to customers and potential economic repercussions. To address the issues and develop practical solutions for a sustainable and affordable energy future in the UK, it is crucial to comprehend the root causes of this dilemma and think of an alternative (Energy UK, 2024).

Research Questions

There are two main questions which this study will answer:

Q1: How has the energy cap implemented in the UK impacted electricity prices, particularly in the context of natural gas prices? (Ganepola et al., 2022)

Q2: What are the economic implications of people spending on energy caps and subsidizing household energy bills? (Ganepola et al., 2022)

Organization of the Study

Chapter 1 outlined the framework of the culminating experience project. Chapter 2 reviews previous literature and related works. Chapter 3 outlines the methodology and the research papers used. Chapter 4 presents the analysis and findings of the research results. In Chapter 5, the project finishes with a discussion, conclusions, and recommendations for further research.

CHAPTER TWO

LITERATURE REVIEW

Many theories and research have been conducted on the UK energy crisis. This review will focus on the prior literature, aiming to understand what energy price cap is, what are the tools and metrics used by OFGEM to set the price. This chapter also highlights various factors involved like energy price guarantee, price cap and cost involved for the manufacturer before reaching to the consumer.

Energy Price Cap

OFGEM (Office of Gas and Electricity Markets) adopted the energy price cap as a regulatory instrument to restrict the rates energy suppliers may charge their consumers for each unit of energy, ensuring that energy costs are fair and reasonable. The price cap adjustments for various categories of energy users in October 2023 are based on changes in normal consumption levels, which affect both direct debit and prepayment clients. Despite the lowering in the price ceiling, the government's failure to extend the £400 energy bill support payment may restrict families' savings during the winter. Understanding these changes and their repercussions is critical for consumers (Jhonston, 2023).

Table1: Price cap on previous and new energy consumption values

Previous	£1,923	£1,949	£2,052
Current	£1,834	£1,861*	£1,959

A regulatory tool implemented by OFGEM to limit the prices energy suppliers can charge their clients for each unit of energy is the energy price cap. It guarantees the fairness and reasonableness of energy costs. The cap on energy prices for households with two fuel sources that pay by direct debit is currently £1,834 per year, less than it was during the preceding era. The updated consumption statistics show that this cap has decreased from its prior amount of £1,976 between July and September 2023. Although this cap is the lowest it has been since October 2021, according to OFGEM, it is still significantly higher than the average rates that existed prior to the energy crisis. It is important to note that the £400 energy bill help payment will not be extended by the government. As a result, even with the price cap being lowered, homeowners might not save much money during the winter (Jhonston, 2023).

Regarding cost per unit, the October price cap works out to about 27p for electricity and 7p for gas. There are also daily standing charges, which can differ depending on the area. These rates are 53p for gas and 30p for electricity. Regardless of how much energy is used, these standing charges are set costs

for keeping the electricity connection active. The £1,861 price maximum for prepayment customers may be marginally higher, but the Energy Price Guarantee modifies it to match direct debit consumers' prices. Payments for energy made by cash, check, or bank transfer will result in a higher price cap of £1,959. It is crucial to remember that the numbers used to show how much the price ceiling will cost are based on "typical values." Because the price cap assumes that an average household uses 2,700 kWh of electricity and 11,500 kWh of gas annually, the actual amount paid for energy may differ from what is used. Though it may be slightly higher for prepayment customers, the £1,861 price ceiling is effectively adjusted by the Energy Price Guarantee to match the pricing for direct debit users (Jhonston, 2023).

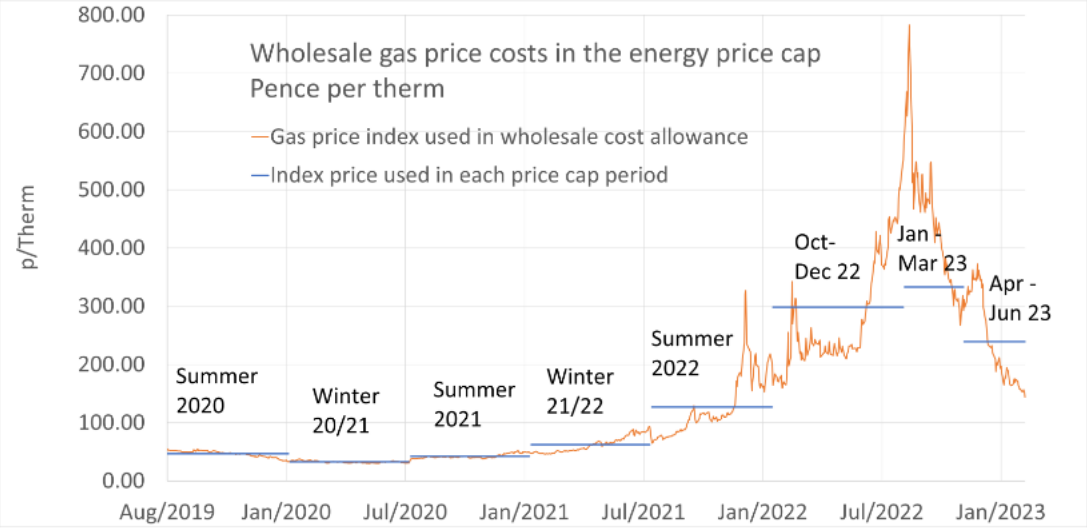

Figure - 1. Wholesale gas price costs in the energy price cap

Source: OFGEM announces latest quarterly price cap update. This is an update from released to the public series at https://www.ofgem.gov.uk/publications/ofgem-announces-latest-quarterly-price-cap-update

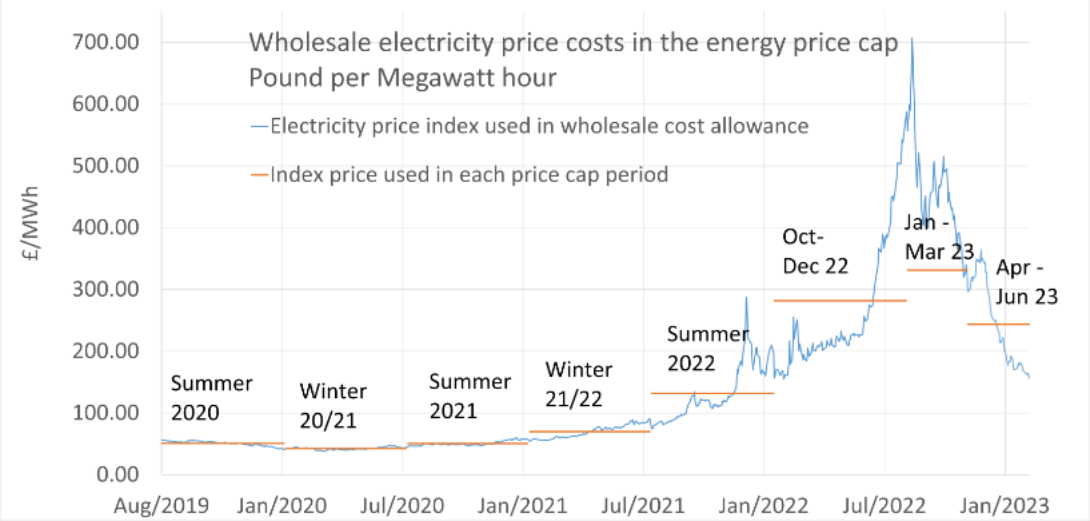

Figure - 2 Wholesale electricity price costs in the energy price cap

Source: OFGEM announces latest quarterly price cap update. This is an update from Ofgem released to the public series at https://www.ofgem.gov.uk/publications/ofgem-announces-latest-quarterly-price-cap-update

Figure 1 & Figure 2 show the change from cap period (Jan.–Mar. 2023) to cap period (Apr.–Jun. 2023) using index wholesale energy prices. Customers' bills are affected by these costs. Wholesale prices were biannually indexed for the winter and summer before October 2022. Direct comparisons with earlier

times, however, are difficult because from October 2022 to March 2023, a transitional approach to price indexation was implemented. Starting in April 2023, wholesale cost allowances are calculated quarterly using energy contract prices projected into the future. The horizontal lines show the typical wholesale cost allowances throughout various time periods (Jhonston, 2023).

Why do we have a Price Cap?

Price caps were first introduced by OFGEM in 2017 for prepayment tariffs, and they were later expanded to ordinary variable prices in 2019. These several caps were combined into a single Default Tariff Cap on January 1, 2021, however different caps continue to apply to different tariff types. Limiting the highest prices that energy providers can charge their clients for gas and electricity is the main goal of these price restrictions. By preventing them from paying too much for the energy they consume, this rule protects households from having to pay the bill for exorbitant energy expenses. More susceptible people who are more likely to fall into the impacted tariff groups will benefit the most from the inflated prices of electricity (Chaudhuri & Huaccha, 2023).

What is an Energy Price Guarantee?

The Energy Price Guarantee (EPG) established an annual cap of £2,500 for average home energy costs for a given period. To shield households from sudden spikes in energy costs, this guarantee temporarily replaced the regular price cap. The EPG was originally intended to last until a specific date, however

since the regular price cap has dropped below the EPG level, it is no longer applicable. As a result, consumers' expenses for gas and electricity are now governed and limited by the price cap. To guarantee that consumers with prepayment meters do not pay more than those on direct debit, the EPG offers a rebate on the price ceiling. The EPG changed course during a designated period, lowering standing costs rather than unit rates, leading to a £1,821 prepaid price cap during that period (Chaudhuri & Huaccha, 2023).

How does the Energy Price Cap Work?

OFGEM formerly reviewed the energy price cap twice a year. Nevertheless, OFGEM declared in August 2022 that it would now be examining the energy price cap four times a year. There will be changes to the energy price cap in January, April, July, and October. This implies that households would be affected more quickly by price cap increases, but it also implies that households will be affected more quickly by price decreases. The global wholesale cost of electricity is one of the elements that OFGEM considers when determining the price ceiling. Stated differently, the sum that suppliers must pay for gas and electricity (OFGEM, 2024).

For instance, the price cap will increase if providers must pay more for energy, as they did in 2022, enabling them to raise prices on customers to offset these growing expenses. In addition to wholesale energy costs, OFGEM considers network and operating costs, the cost of government policies and

schemes that suppliers must participate in, and value-added tax (VAT) when determining the price ceiling level. The maximum price that suppliers may charge for each unit of gas and electricity on variable tariffs is represented by this price limit. In figure 3 all the factors affecting the Energy price are mentioned (OFGEM, 05/22).

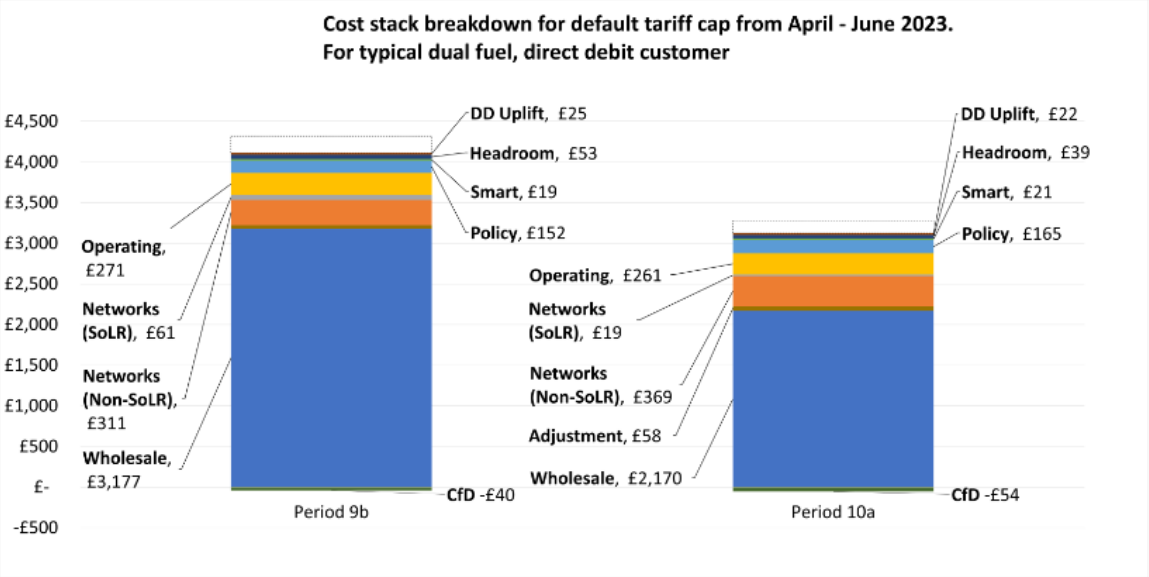

Figure 3 Cost stack breakdown for default tariff cap

Source: OFGEM announces latest quarterly price cap update. This is an update from OFGEM released to the public series at https://www.ofgem.gov.uk/publications/ofgem-announces-latest-quarterly-price-cap-update

CHAPTER THREE

METHODOLOGY

Research

For this Culminating Experience project various search engines were used such as Google Scholar, Scholar Works and Google Search Engine which are free web search engines. For research regarding the first question: “How has the energy cap implemented in the UK impacted electricity prices, particularly in the context of natural gas prices?” Key words such as energy price cap, implementations of energy price cap, fossil fuels, natural gas prices, and wholesale electricity prices were used.

To explore the second question: “What are the economic implications of people spending on energy cap and subsidizing household energy bills?”, the keywords such as electricity demand, gas demand, consumer purchase power, and history of electricity prices were used. The table given below includes the articles/materials found during the keyword search for each question:

Table 2. Keyword Search Based on Theme

Search engine	Key Word	Main Theme	No. of Articles Found	No. of relevant articles	Author(year)
Google	Energy Price Cap	Definition	3	2	Bhattacharjee et al., (2023.)
Google	Fossil Fuels	UK need for Fossil Fuels	4	2	Evans, (2024)
Google Scholar	Fossil Fuels	UK need for Fossil Fuels	2	1	Barrett et al., (2018)
Google Scholar	Natural Gas	Natural gas prices in UK	3	2	Harris, (2024)
Google	Energy Price Cap	Trends in UK	2	2	Bolton, (2024)
Google	Various price cap systems	Information	2	2	Bhattacharjee et al., (2023)
Google	Trends in Wholesale prices	Factors Contributing for the rise in the prices	3	2	University College London – Institute of Sustainable Resources & Grubb, (2022)
Google	UK electricity prices	Electricity Demand	6	4	Jhonston, (2023)
Google	Domestic energy prices in UK	Gas prices Demand	3	2	Eisenmenger & Syron, (1970)

The articles were selected based on a theme. The theme was to research the effect of fossil fuels and renewable energy and the reason for the increase in gas prices. To answer the research questions about “how has the energy cap implemented in the UK impacted electricity prices, particularly in the context of increasing natural gas prices?” which led to the selection of the articles mentioned in the above table. Topics such as electricity demand, natural gas demand, & consumer behavior were also searched, which was the theme to answer question 2 “What are the economic implications of people spending on energy caps and subsidizing household energy bills?”

Hardware used for this Project

To complete the Culminating Experience project, I used my laptop which is ThinkPad P1 Gen3, a 15.6” Inch Screen laptop, Intel Core i7 Pro, 12 Giga bit (GB) RAM, web camera, 256 GB SSD with Windows 11 operating system).

CHAPTER FOUR

RESEARCH FINDINGS

To answer the research questions proposed in this Culminating Experience Project various research articles and reports published by OFGEM and DENZ which are mentioned in table 4 above were selected. The scope of the Culminating Experience Project is to identify what are the impacts and economic implications of energy price caps.

Question 1: How has the energy cap implemented in the UK impacted electricity prices, particularly in the context of natural gas prices?

United Kingdom transition from Fossil Fuels

The UK has placed itself on a transition pathway towards a low carbon economy and society, through the imposition of a legally binding target aimed at reducing its 'greenhouse gas' (GHG) emissions by 80% by 2050 against a 1990 baseline. Reducing industrial energy demand could make a substantial contribution towards this decarbonization goal (Barrett et al., 2018). As a result, fossil fuels made up just 33% of UK electricity supplies in 2023 their lowest ever share of which natural gas was 31%, coal just over 1% and oil just below 1% (Evans, 2024). Figure 4 clearly shows how UK has transitioned from Fossil fuels to renewable energy.

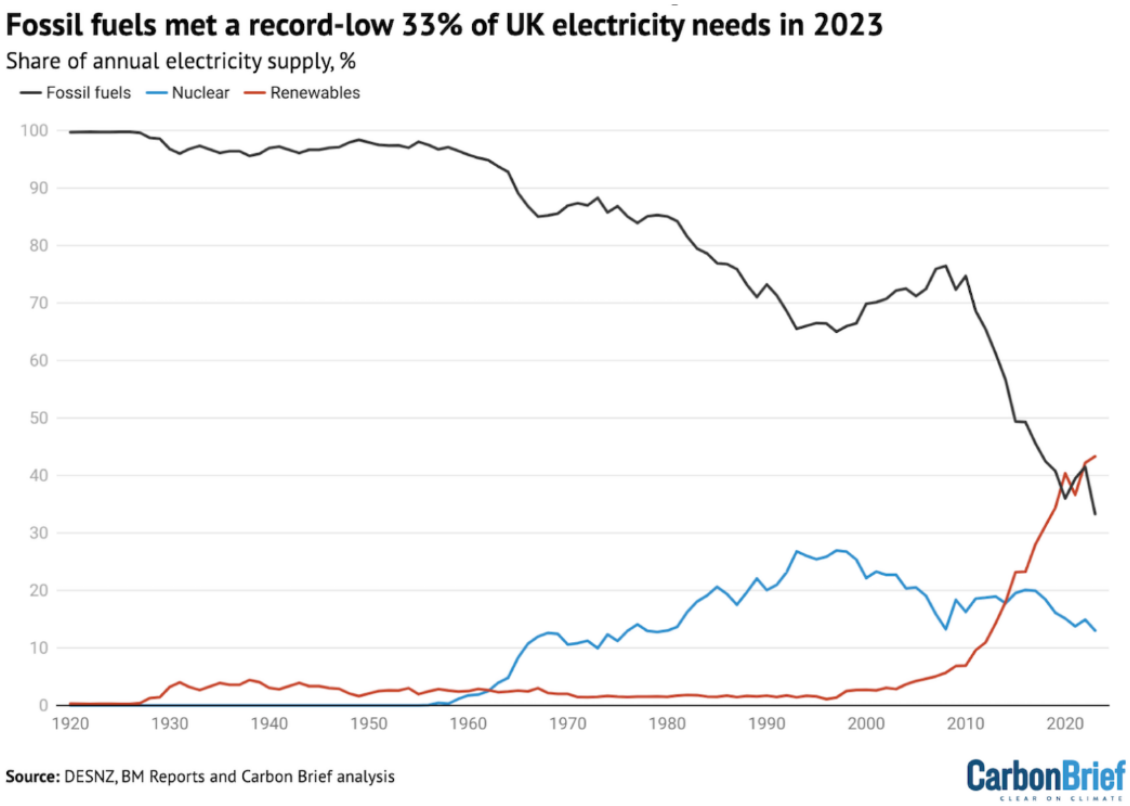

Figure 4: Share of electricity generation from fossil fuels (Evans, 2024).

Source: Carbon Brief Clear on Climate. (https://www.carbonbrief.org/analysis-uk-electricity-from-fossil-fuels-drops-to-lowest-level-since-1957/)

Demand for gas has also declined by 10% in 2023 compared to 2022, reaching its lowest level since 1992. This was caused by decreased demand for gas from customers and power generation. Like 2022, consumers in 2023 curtailed energy consumption due to rising costs and hot temperatures. Domestic and industrial usage decreased to levels not seen since the 1970s, when coal was the primary fuel. Domestic demand declined by 7.6%, while industrial demand decreased by 4.8% (Harris, 2024). Declining demand was observed in

several areas, including commercial and public structures (Harris, 2024). Gas consumption for power generation decreased by 21% since 1996 due to lower demand and increasing imports. Similar declines were recorded throughout the year, with demand in the fourth quarter of 2023 down 8.6% compared till Q4 2022. During the same period, final consumer demand decreased by 2.1% and electrical generation by 23%.

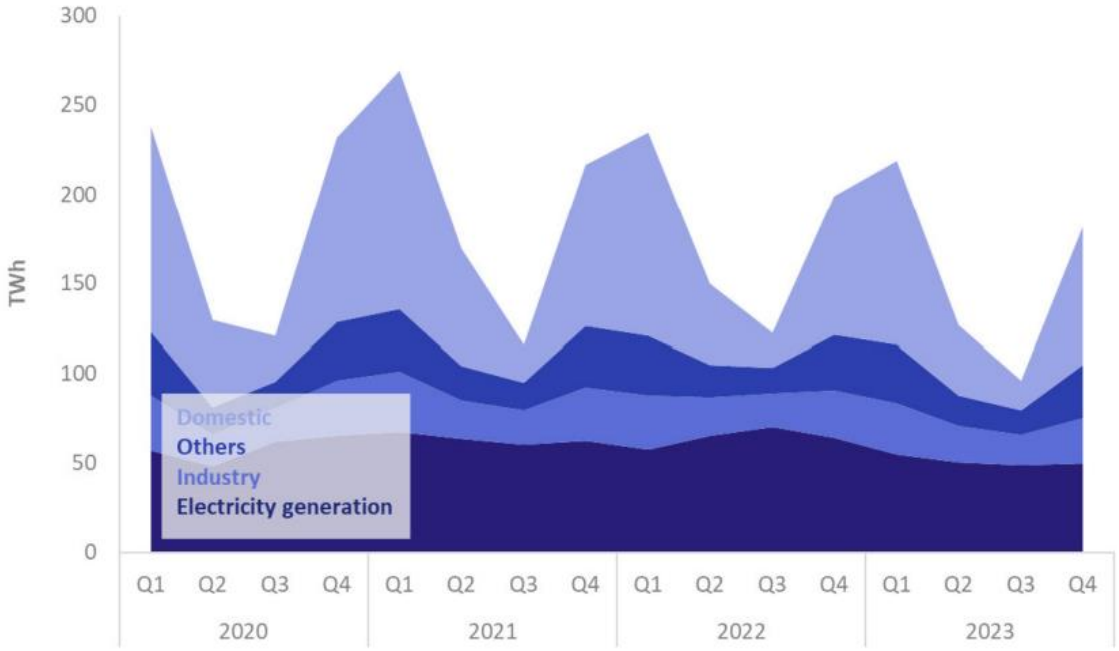

Figure 5: Demand for Natural Gas in UK

Source: Department for energy security and & Net Zero (https://assets.publishing.service.gov.uk/media/660431e0e8c442001a22038d/Energy_Trends_March_2024.pdf)

We can see from Figure 6 that compared to the all-time highs reached in 2022 the year the UK backed European attempts to remove itself from Russian

gas imports and exports decreased in 2023. Imports decreased by 20% to reach average yearly levels. Exports decreased by 32% but were still significant (and at record highs prior to 2022). By 2023, significant exports were made possible by the lower UK demand as opposed to the higher imports in 2022. The UK's gas production in 2023 was equal to more than half of the demand, with imports covering the remaining amount. In 2022, gas production had decreased by 10%. For more than ten years, indigenous output has been half of demand. In 2023, this percentage remained at 54%, even though production decreased because of lower-than-average demand. Throughout the year, similar patterns were seen, with imports dropping 21% and exports down 55% from Quarter 4 2022 to Quarter 4 2023. The quarter saw a 15% decrease in production (Harris, 2024).

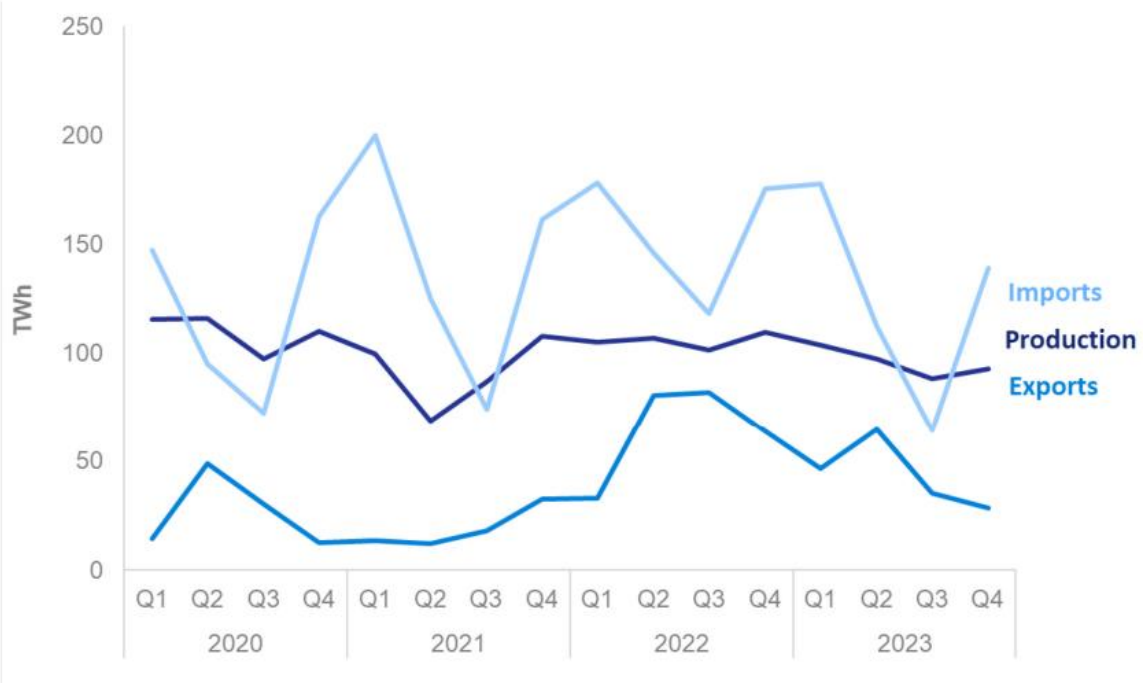

Figure 6: Production and trade of Natural Gas

Source: Department for energy security and & Net Zero (https://assets.publishing.service.gov.uk/media/660431e0e8c442001a22038d/Energy_Trends_March_2024.pdf)

Trends in Wholesale Prices

When it comes to energy costs, wholesale energy prices are the largest and most variable component. These components, along with other components of the wholesale cost allowance, account for 51% of the Q1 2024 cap; however, when wholesale prices decline, this percentage will drop to 45% of the Q2 2024 limit. Therefore, there are 55 changes in wholesale prices mostly determine whether household bills increase or decrease. By far the biggest factor influencing the higher costs that consumers paid was an increase in wholesale pricing. Globally and in the UK, wholesale energy prices spiked starting in mid-2021. Since gas is usually the "marginal fuel," meaning that gas generation costs control the wholesale price for gas, gas led the price increase during the "energy crisis," but electricity prices have since followed (Paul Bolton, 2024).

The day Russia began its full-scale invasion of Ukraine, February 24, 2022, saw a 50% spike in gas prices throughout Europe. Prices in early March were around ten times higher than they were a year earlier. In 2022, prices declined once more in the spring and then rose during the summer before declining once more in the fall. Early in December 2022, there was a large rise, and then prices started to decline again. A more thorough examination of

wholesale pricing trends and their reasons can be depended on the market volatility like Russia-Ukraine war or the Covid or the OPEC cutting down on its Production. (Paul Bolton, 2024). The least turbulent time since late spring 2021 has been from late December 2022 and onward. However, the second half of 2023 saw a general increase in prices and price volatility, followed by lower, more stable prices starting in mid-December 2023. Figure 7 describes how volatile the market is during this period.

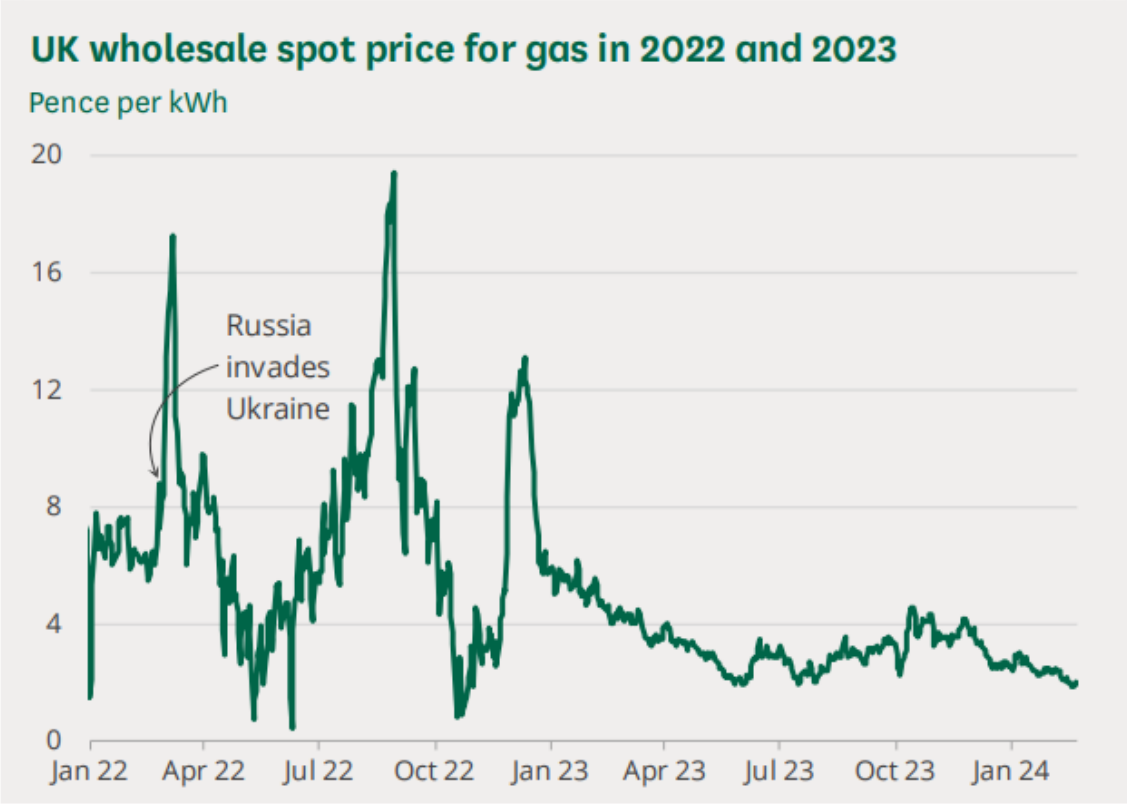

Figure 7: UK Wholesale spot price for gas in 2023

Source: Gas and electricity prices during the ‘energy Crisis' and beyond.

(https://commonslibrary.parliament.uk/research-briefings/cbp-9714/)

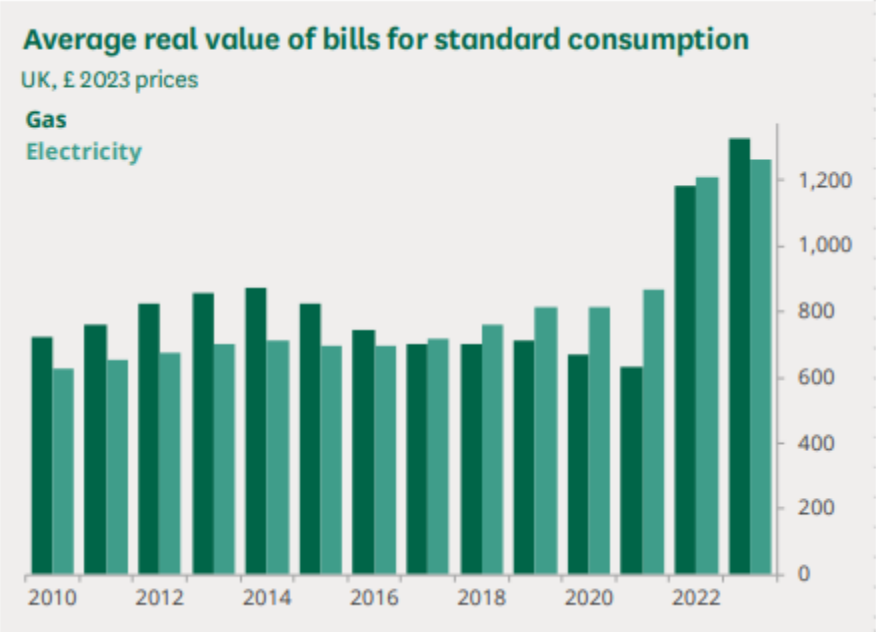

Figure 8: Average Gas & Electricity prices in 2023

Source: Gas and electricity prices during the ‘energy Crisis' and beyond (Denz, 2024). (https://www.gov.uk/government/statistical-data-sets/annual-domestic-energy-price-statistics)

Statistics on gas and electricity bills are released annually by the Department for Energy Security and Net Zero (DESNZ). They multiply the average unit prices by the standard consumption levels. To create annual bills, this is added to the average annual fixed costs, also known as standing charges. These details include every payment option. DESNZ assumes that typical consumption levels are 13,600 kWh for gas and 3,600 kWh for electricity. Compared to the OFGEM consumption levels these are significantly higher. While the DESNZ consumption levels are reviewed and adjusted on a regular basis, time series data maintains constant consumption levels, so bill figures only

show price changes rather than changes in consumption (Grobman & Carey, 2001).

Since they use average prices for the year, price increases in 2022 are only partially considered in the 2022 figure. For example, this data is examined in real terms in table 3 between the previous peak in 2014 and 2021. This shows that the average gas bill decreased by 27%. In real terms, the price increases in 2022 and 2023 raised prices to 52% above those in 2014. Real electricity bills rose in all but two of the years that are covered here. In real terms, their 2023 level was 101% higher than 2010. In 2023, the average combined bill for gas and electricity was £2,560, a £1,260 increase in just two years. Since higher levels of consumption are assumed in the official statistics from DESNZ, these annual bills are higher than those provided by OFGEM (OFGEM, 2023). The prices of both natural gas & electricity were high but with the help of the price cap system the consumers could buy them at a discounted price which is being paid by the government.

Table 3: Average UK domestic gas and electricity bills for consumption

Average UK domestic gas and electricity bills for 'standard' consumption

£ per year

	Gas (13,600 kWh per year)				Electricity (3,600 kWh per year)			
	Direct debit	Standard credit	Prepayment	**All**	Direct debit	Standard credit	Prepayment	**All**
Cash prices								
2010	503	541	541	**520**	431	470	481	**451**
2011	551	594	589	**569**	469	509	517	**489**
2012	610	664	655	**632**	497	539	541	**516**
2013	644	705	697	**670**	531	574	577	**550**
2014	661	731	728	**691**	542	589	593	**564**
2015	624	698	699	**655**	531	585	588	**555**
2016	564	646	654	**597**	533	595	594	**558**
2017	561	638	582	**581**	576	642	592	**593**
2018	580	659	571	**593**	628	695	621	**641**
2019	591	659	634	**610**	682	753	699	**698**
2020	558	639	620	**581**	688	755	721	**705**
2021	550	601	587	**564**	754	821	779	**769**
2022	1,086	1,266	1,217	**1,134**	1,151	1,226	1,122	**1,160**
2023	1,308	1,381	1,372	**1,328**	1,254	1,311	1,255	**1,264**
2023 prices								
2010	701	754	754	**725**	601	654	671	**629**
2011	739	797	790	**763**	630	683	693	**656**
2012	798	868	857	**827**	650	705	708	**676**
2013	823	901	891	**857**	678	733	737	**704**
2014	833	922	918	**871**	683	743	747	**710**
2015	784	876	878	**822**	667	735	738	**697**
2016	701	803	813	**742**	662	740	738	**694**
2017	680	773	705	**704**	698	778	717	**719**
2018	687	781	676	**702**	744	824	736	**759**
2019	688	768	738	**711**	794	877	815	**813**
2020	643	737	715	**670**	793	871	831	**813**
2021	619	676	660	**635**	849	923	877	**865**
2022	1,132	1,319	1,269	**1,181**	1,200	1,278	1,169	**1,209**
2023	1,308	1,381	1,372	**1,328**	1,254	1,311	1,255	**1,264**

Note: Prices adjusted to 2023 values using the all-items CPIH (to November 2023)

Source: Gas and electricity prices during the ‘Energy Crisis' and beyond (Denz, 2024).

(https://www.gov.uk/government/statistical-data-sets/annual-domestic-energy-price-statistics)

Question 2: What are the economic implications of people spending on energy caps and subsidizing household energy bills?

Demand of Electricity And Natural Gas

Over the previous 20 years, there has been an overall decline in domestic use of gas and electricity. There is proof that in 2022, this downward tendency picked up speed. The amount of home power used fell to its lowest level due to higher rates. The lowest level of domestic gas use since the early 1980s and in the early 1990s. Demand is affected by a variety of variables, such as variations in household and population sizes, costs, energy efficiency, and weather (particularly regarding gas). Due to restrictions on leisure activities and the fact that many individuals worked and studied from home, the pandemic increased demand from the household sector. As soon as the Covid limits were removed, this impact started to reverse. Demand changes that have occurred since April 2022 thus represent a combination of reasons and a return to "normal" pre-pandemic demand (Paul Bolton, 2024).

As mentioned in Figure 9, during the epidemic domestic electricity use rose; but, starting in mid-2021, it began to decline. These declines persisted through September 2023 and into 2022, with increases in October and

November. The 2022 total was the lowest since the early 1990s and was 10% less than the total 2021. In 2022, the average household's electricity use decreased by 7%, or 6% when temperature was considered.

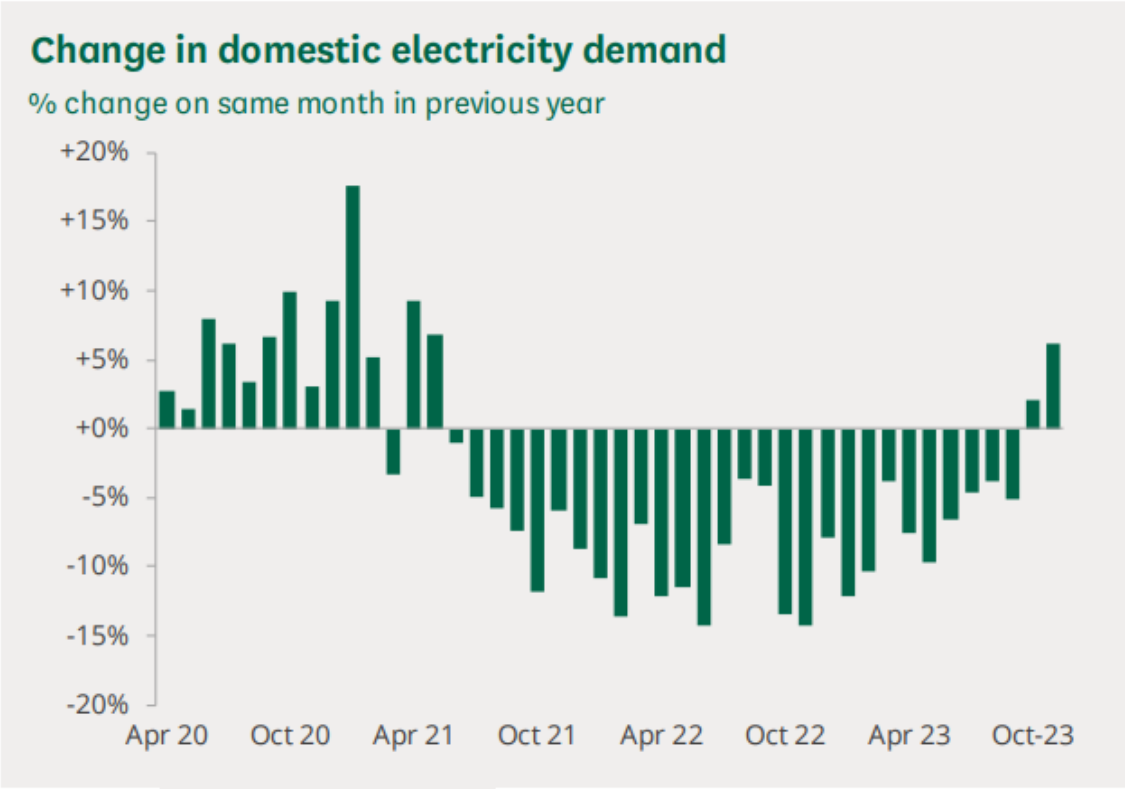

Figure 9: Change in domestic electricity demand.

Source: Gas and electricity prices during the ‘energy crisis’ and beyond.

(https://commonslibrary.parliament.uk/research-briefings/cbp-9714/)

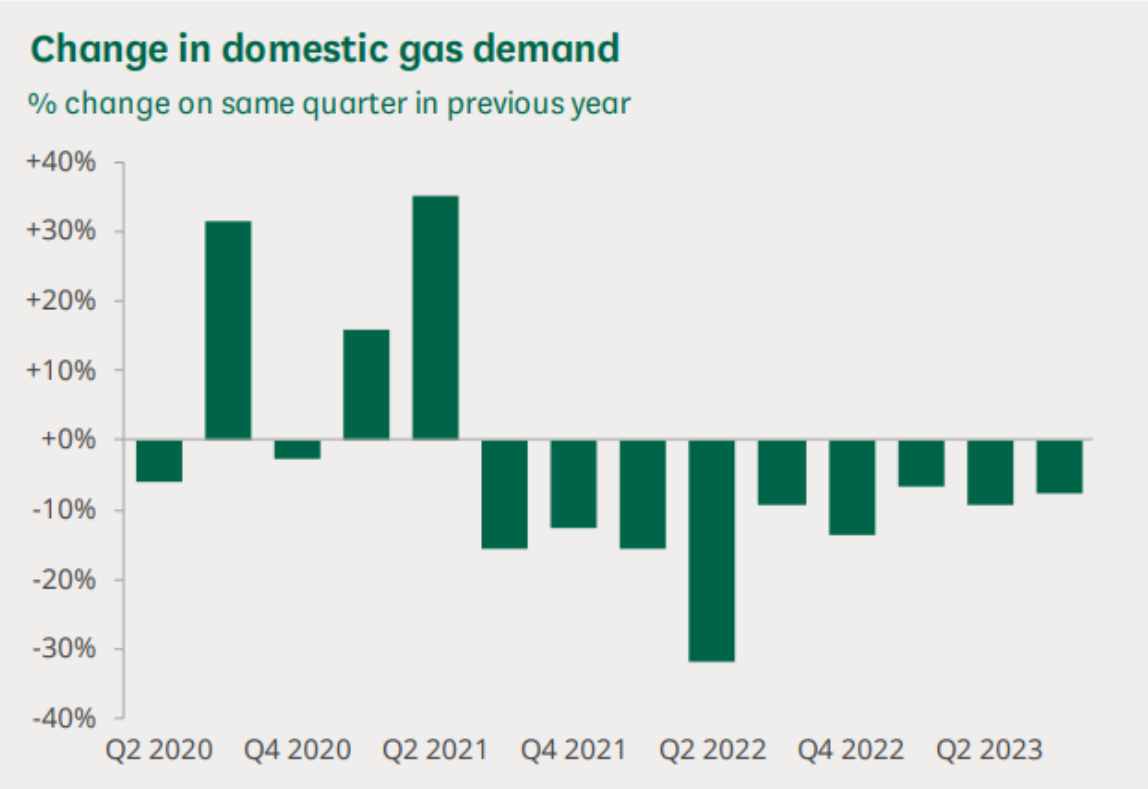

Figure 10: Change in domestic gas demand.

Source: Gas and electricity prices during the ‘energy crisis’ and beyond.

(https://commonslibrary.parliament.uk/research-briefings/cbp-9714/)

The Office for Budget Responsibility calculated in March 2023 that, after accounting for weather variations, household gas use in winter 2022–2023 was around 15% less than in the two years prior to Russia's full-scale invasion of Ukraine. Over this period, the price of domestic gas grew by around 200%, which brought the observed change in demand closer to their estimated demand elasticity. They continued by saying that, if all other things were the same, they would anticipate an increase in this demand reaction over time.

At the consumer level spending on energy varies by income. In figure 10 we can see how energy spending rises with income, with the 10% of households with the lowest incomes paying £23 per week in 2021–22, and the 10% of households with the greatest incomes spending £32 per week. Nevertheless, compared to other spending categories, energy costs are less dependent on income. The graph in figure 11 illustrates this, with energy expenditures represented as a percentage of overall spending. People with lowest income pay the highest percentage of the money on energy expenditure (Iona Stewart, 2024).

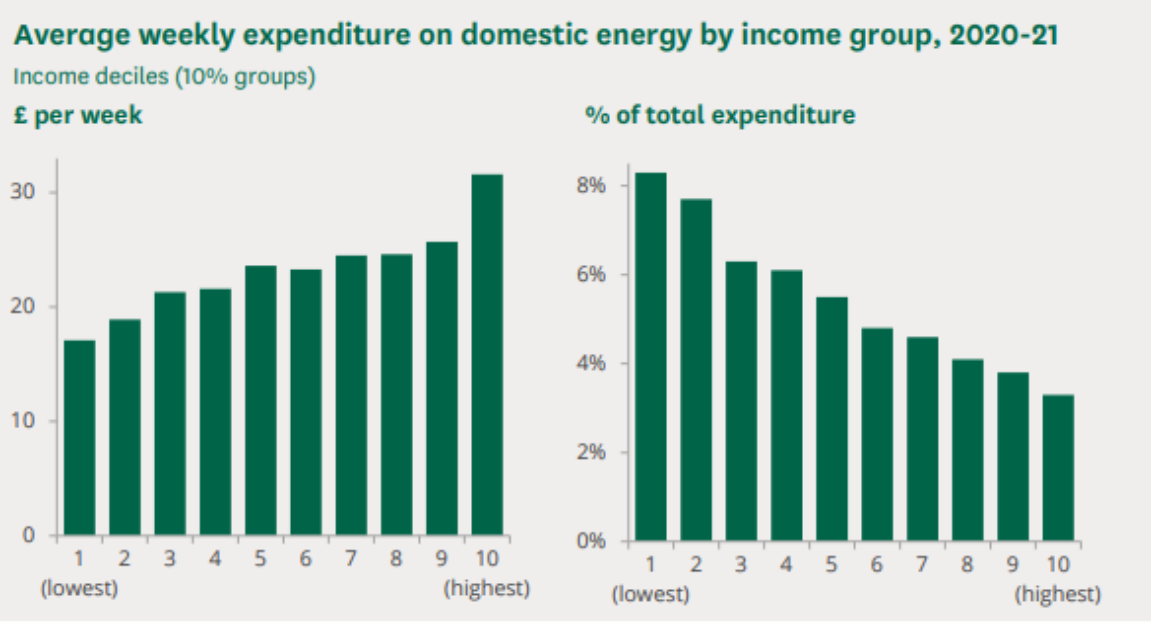

Figure 11: Average weekly expenditure on domestic energy by income

Source: Domestic Energy Prices

(https://researchbriefings.files.parliament.uk/documents/CBP-9491/CBP-9491.pdf

CHAPTER FIVE

DISCUSSION, AREAS FOR FURTHER STUDY, AND CONCLUSION

Chapter 5 will address the facts acquired in chapter 4, discuss the findings, offer a conclusion, and suggest areas for further study.

Discussion And Area for further study

Question 1 focused on the impacts of electricity prices in the context of natural gas prices. From figure 4 we can understand that the dependence on natural gas is reducing gradually and from Evans report (Evans, 2024), the UK is moving toward a low-carbon economy, with fossil fuels providing a smaller portion of the country's electricity. From figure 5 we can understand that the imports of natural gas decreased by 20% compared to 2022 which indicated the lower demand of natural gas in the UK. From figure 7 we can understand that natural gas prices are affected by various market conditions like war, pandemic like COVID-19. From figure 8 and table 3 we can understand that the electricity and gas prices are interconnected, even though dependency on natural gas is reducing when the natural gas prices are fluctuating due to several market conditions the electricity prices rose proportionally compared to the natural gas prices. This is where the energy price cap system helped system helped the

consumers to buy energy at a discounted price which was funded by the government.

An area of further study can be conducted considering another factor like renewable energy. The dependency on renewable energy to generate electricity is increasing year by year. The question, how electricity prices are impacted by renewable energy. The same Culminating Experience Project can be conducted comparing the energy price cap system implemented in various other countries.

Question 2 focused on economic implications and the shift in demand while subsidizing household energy bills. Even after subsidizing household energy bills people's spending on energy has gone down significantly. Figure 9 and Figure 10 show how the demand for electricity and natural gas has gone down in 2023. Even though consumers are benefiting from the energy price cap, the low-income households are being affected the most. Figure 11 explains average weekly expenditure on domestic energy by income group. Low-income households are being affected as a greater percentage of their income is being spent on energy bills. This explains even subsidizing household energy bills through energy price caps has negative implications on people spending. Areas for further studies can be conducted in how to protect low-income households from high energy prices.

Conclusion

In conclusion, the Culminating Experience Project focused on the prices, demand and consumer spending on electricity and natural gases in the UK. The Culminating Experience Project provides answers to the two proposed research Questions and discovered areas for further study. The Culminating Experience Project highlights that the reduced dependency on fossil fuels is helping to reduce the cost of generating electricity, thereby decreasing the electricity cost. It also highlights the fact that even though the government is trying to help its consumers with high electricity and gas prices, there is a difference between low-income households and high-income households and who is benefiting from this. Finally, the limitation of this Culminating Experience Project is that it primarily focuses on the UK. It also concentrates on gas and electricity. The limitations are many other factors involved. Therefore, the findings and recommendations of this study are not widely applicable to other research studies.

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