A WWF-IVM REPORT

WEATHERING THE STORM: CLIMATEFLATION & FOSSILFLATION IN BELGIUM

JUNE 2025

FOREWORD

The climate crisis is no longer a distant threat, it is a present-day reality that is reshaping our societies, our economies, and the very systems we depend upon. The need for decisive action has never been more urgent. At WWF-Belgium, we believe that safeguarding our future - our safety, our health, and our economic resilience – requires confronting this crisis head-on through both mitigation and adaptation.

This new study, commissioned by WWF-Belgium and conducted by the Institute for Environmental Studies at the Vrije Universiteit Amsterdam, provides critical insights into the economic consequences of climate change and our continued dependence on fossil fuels. It shows that climate change is not just an environmental issue, it is an economic one. The links between extreme weather, rising prices, and fossil fuel dependency are growing clearer by the day. Belgium's own experience with climate-induced disasters, such as the 2021 floods which caused 41 deaths and more than € 2 billion worth of damages, illustrates how deeply intertwined environmental and economic vulnerabilities have become.

The findings are a stark reminder that we can no longer treat inflation, energy security, climate action and nature destruction as separate issues. Fossilflation and climateflation, as examined in this report, are not abstract concepts, they are already impacting households, businesses, and industries across Belgium and the EU.

That is why we urgently need to invest more in renewable energy, decarbonize our economy, stop subsidizing the use of fossil fuels, reform our fiscal policy to promote solutions and green the financial system to make sure that sustainable investments, such as low emission public transport, get the funding they need.

Nature remains our most powerful ally in the fight against climate change. Investing in nature-based solutions and large-scale ecological restoration, such as the restoration of wetlands and natural river basins or greening our cities, is not only the most effective way to adapt to a

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changing climate – it is also essential to building a more secure, healthy, and prosperous future.

We hope this study will inspire policymakers to pursue bold, integrated solutions that reduce our fossil fuel dependency, protect our environment, and reinforce the foundations of a fair and sustainable economy.

Caroline Tsilikounas
CEO, WWF-Belgium

LIST OF ABBREVIATIONS

CERAC	Climate Risk Assessment Center
CPI	Consumer Price Index
CPRI	Climate Physical Risk Index
EU-ETS	EU Emissions Trading System
ECB	European Central Bank
FPS	Federal Public Service
GDP	Gross Domestic Product
GHG	Greenhouse Gases
HICP	Harmonized Consumer Price Index
NBB	National Bank of Belgium
NECP	National Energy & Climate Plan
RRF	Recovery & Resilience Facility
VAT	Value Added Tax
VITO	Vlaamse Instelling voor Technologisch Onderzoek

EXECUTIVE SUMMARY

Today, inflation, rising prices and the overall cost of living are core concerns of citizens and industry in Belgium and the EU. Belgian (and EU) citizens view inflation and purchasing power as the top priority for policymakers to address (Eurobarometer, 2025). This seems to have come at the expense of public concern over climate change. In 2021, Belgian citizens by far considered 'climate change and the environment' as the most important issue Belgium and the EU were facing (Eurobarometer, 2021). But by 2025, action on climate change had significantly fallen behind other issues (such as migration, defense, poverty, and inflation) in their list of priorities.

Yet, these issues should not be disentangled. This joint WWF-IVM report examines the close connection between the two societal challenges of rising prices and climate change. Adding to the growing academic and policy debate on the question of how fossil fuel prices, climate change and inflation are all inter-related phenomena, **the study is the first to comprehensively explore the effects of climate change-related extreme weather events *and* fossil fuel prices on inflation in Belgium**. It proposes a set of policy recommendations that are relevant for both Belgian and EU policymakers that are seeking to address these two phenomena of ***climateflation*** and ***fossilflation***.

Climateflation refers to the impacts on economic activity and prices of natural disasters and extreme weather events. These disasters and events will become more frequent and intense as the climate crisis worsens. But climate change and its associated physical risks are already apparent in Belgium, Europe and globally. Indeed, the past ten years, 2015-2024, have been the ten warmest on record.

Fossilflation refers to the relationship between the rising costs of fossil fuels and price increases across an entire economy. In Belgium and the EU, this has become a visible problem since the beginning of the Russia-Ukraine conflict in February 2022. Russia's 'weaponization' of its fossil gas exports to the EU exposed the latter's dependency, resulting in security and financial vulnerabilities. This crisis led to record-breaking household (and industry) energy bills in the period 2021-23. Moreover, continued concerns over de-industrialisation in Belgium and the EU are often associated with structurally high (fossil) energy prices industry is faced with here.

"the study is the first to comprehensively explore the effects of climate change-related extreme weather events and fossil fuel prices on inflation in Belgium"

This WWF Belgium-commissioned study was carried out by the Institute for Environmental Studies (IVM) of the Vrije Universiteit Amsterdam, between January and May 2025. Data collection and analysis is based on a mixed-methods approach, combining quantitative and qualitative methods. To explore the inflationary pressures of climate change (climateflation) and fossil fuel prices (fossilflation), the study uses an ARIMAX method. Policy recommendations are formulated based on an extensive literature review, triangulated with data collected from a March 2025 expert stakeholder workshop, including 20 participants from academia, think tanks, NGOs and administration.

Key findings & recommendations

- **Historically, fossil fuel price shocks (notably oil price shocks) have contributed to inflation in both developing and advanced economies**, including the Euro area. As such, fossilflation, has been a source of concern since at least the first oil price shock in the 1970s. The recent energy crisis serves as a prime example of fossilflation.

- **There is growing evidence that (climate change-induced) extreme weather events are already causing inflation**, due to, for example, rising food costs associated with failed harvests as a consequence of droughts or floods. The study finds that, in Belgium, **the physical damage related to extreme climate events accelerates inflation rates up to 4 months following that event.**

- **Fossil fuel price shocks have a short-term inflationary impact in Belgium**, but their correlation and magnitude vary by fuel type and over time. Coal continues to affect inflation even indirectly, despite its declining role in the domestic energy mix.

- **In particular circumstances - and for both fossil fuel prices and climate events - the demand side effects** (i.e., reduced consumption) **can outweigh supply side effects** (i.e., reduced production) resulting in decreased inflation in Belgium.

- **Extreme high temperature days and extreme rainy days accelerate total inflation in Belgium**. The impact of extreme low temperature days and extreme dry days is not straightforward and requires further investigation.

"Coal continues to affect inflation even indirectly, despite its declining role in the domestic energy mix."

- **A variety of policy tools is available at the national level** (regional and federal) **and the EU-level to combat fossilflation and climateflation**.

- **Climate adaptation measures are central to addressing (and avoiding) climateflation**. Adaptation measures can, for example, shield the agricultural sector from (large-scale) yield losses in the case of extreme weather events, such as droughts.

- **Targeted fiscal measures based on clear means-tested income criteria, are key to alleviating upward inflationary pressures** due to fossil fuel price shocks (and climate-related extreme weather events).

- Because of their mandate, **central banks** (ECB, NBB & others) **are already, and will become increasingly important, stakeholders in addressing climateflation and fossilflation** in Belgium and the Eurozone.

- **Future research** is required to better grasp a) the effects of extreme weather events in third countries on trade patterns and inflation for a small, open economy such as the Belgian one; and b) the implications for domestic industry and manufacturing of climate- and fossilflation.

"Climate adaptation measures are central to addressing (and avoiding) climateflation."

1. INTRODUCTION

Inflation, rising prices, and the overall cost of living are among the most important and debated concerns of citizens and industry in Belgium and the EU. According to the European Parliament's Winter 2025 Survey (Eurobarometer, 2025), Belgian (and EU) citizens view inflation and purchasing power as the top priority for policymakers. They were also considered the most salient issues for voters during the 2024 regional and federal elections in Belgium (Michiels, 2024; Thomas, 2023). Further, many companies cite high costs and prices as major obstacles to economic growth. For example, according to the Draghi report on EU competitiveness, around half of European companies see persistently and comparatively high energy costs in the EU as a major impediment to investment (Draghi, 2024, p. 39).

This increased public and political focus on inflation and prices seems to have come at the expense of other topics that long sat at the top of policy agendas in Belgium and the EU; not in the least that of the climate crisis. Indeed, the urgency of the climate crisis seems to be receding - slowly but surely - from the public debate. Between 2021 and 2023, the percentage of Belgian citizens that considered climate change as a 'very serious problem', dropped five percentage points, from 82% to 77% (Eurobarometer, 2023).[1] According to more polling, in 2021, 34% of Belgian citizens ranked 'climate change and the environment' among the top two most important issues facing the country, dropping to only 18% by 2024 (Eurobarometer, 2021, 2024).

This stands in stark contrast with the reality of the climate crisis. The past ten years, 2015-2024, have been the ten warmest on record (Copernicus, 2025a). Moreover, 2024 was the warmest year on record globally, and it was the first since measurements began, to pass the 1.5°C warming target of the Paris Agreement. Since the 1980s, Europe has been warming twice as fast as the global average, becoming the fastest-warming continent (EEA, 2024, p. 62). As a consequence, we are already witnessing a rise in climate change-related extreme weather events and disasters (McSweeney and Tandon, 2024).

Among the main drivers behind this acceleration in warming are the record levels of global fossil fuel production and consumption. As a consequence, CO_2 emissions from fossil fuel-use stand at an all-time high (Global Carbon Project, 2024). This ever-growing reliance on fossil fuels not only exposes us to the dangers of an intensifying climate crisis, it also raises questions about energy affordability and security in those countries, including Belgium, that are reliant on (fossil) energy imports. For example, despite significant decarbonization efforts over the past decades, fossil fuels still make up the bulk of Belgian energy supply. In

"we are already witnessing a rise in climate change-related extreme weather events and disasters."

[1] Elsewhere in the world, this decline is even more pronounced. In the United States, for example, only 46% of people saw climate change as a 'very serious problem' in 2024; a decline from an all-time high of 56% in 2021 (Monmouth University, 2024).

2023, fossil fuels - oil, fossil gas and coal - provided just shy of 70% of total energy (IEA, 2025).

"Despite significant decarbonization efforts over the past decades, fossil fuels still make up the bulk of Belgian energy supply."

Despite inflation and climate change often being treated as separate (policy) challenges, there is now an emerging academic and policy debate that treats climate change, fossil fuel dependency, and overall inflation as three inter-related problems. **This report contributes to that debate and explores the connection between these phenomena, through a case study of Belgium.** The study focuses on the household-level, and not the impacts on and implications for industry. As such, the study builds on and adds to the growing research body that explores the financial and macroeconomic risks of climate change and (over-)reliance on fossil fuels. The report thus explores the Belgian economy's exposure to two very important, but so far under-studied phenomena, colloquially referred to as **climateflation** and **fossilflation**.

The first phenomenon is **climateflation**. As the climate crisis worsens, the frequency and intensity of natural disasters and extreme weather events also increases. Floods, storms, and droughts, for example, may damage properties, disrupt trade or lead to failed harvests. In turn, these shocks impact economic activity generally, put upward pressure on prices, and, thus, cause inflation. For example, a recent study found that the 2022 extreme summer heat increased food inflation in Europe by 0.43-0.93 percentage points. Under current warming trajectories, these levels of inflation could already be amplified with 30 to 50% by the year 2035 (Kotz et al., 2024).

In Belgium, the July 2021 floods in the Vesdre river basin as well as those in Flanders during the winter of 2023-24 are examples of how extreme weather events are, *already*, causing severe economic damage; although it should be noted that these specific events' impact on domestic inflation has not yet been established. Moreover, because of its open economy, Belgium may also be vulnerable to such events occurring elsewhere, either in other EU member states or beyond. Belgium is a major importer of edible vegetables from Spain. If droughts intensify and yields decline as a consequence of climate change, Belgian retailers and consumers will likely be faced with higher prices for vegetables.

"because of its open economy, Belgium may also be vulnerable to events occurring elsewhere."

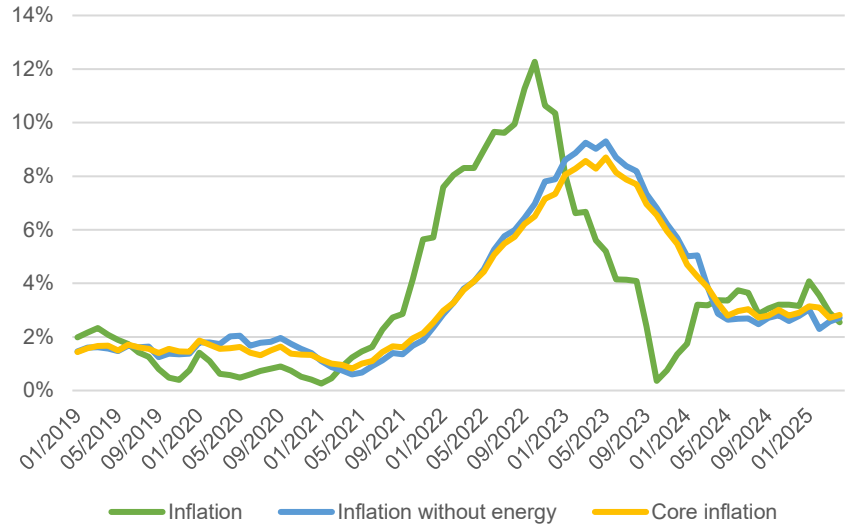
The second phenomenon is **fossilflation**, or the impact of rising costs for fossil fuels on prices across the entire economy. This became a major source of concern in the run-up to and in the first year of the Russia-Ukraine conflict and Russia's 'weaponisation' of its fossil gas exports to the EU (Kuzemko et al. 2022). The ensuing energy price crisis indeed seems to have been a major driver behind inflation in Belgium in recent years, as Fig. 1 below shows (see Fig. 2 for the Eurozone[2]).

[2] The currency union of now 20 EU member states that have adopted the Euro as their primary currency. We use the term 'euro area' interchangeably.

Compare, for example, the green line representing total inflation with the blue line, representing inflation without energy prices included (with the yellow line representing core inflation, excluding the more volatile components 'energy' and 'food'). Perhaps most importantly, as reported in *De Tijd*, no other EU country currently sees energy contributing to inflation as heavily as Belgium does (Dekock, 2025).

"no other EU country currently sees energy contributing to inflation as heavily as Belgium does"

Figure 1. Inflation, inflation without energy and core inflation in Belgium (January 2019 – April 2025)



Source: authors' creation, compiled with data from Statbel (2025).

Unsurprisingly then, concerns regarding de-industrialisation in Belgium (and the EU more broadly) are also often associated with persistently and comparatively high (fossil) energy prices for industry (Draghi, 2024). Although thus challenge is not only attributed to fossil fuel dependency, climate action is another factor that adds to making fossil fuels more expensive.[3]

The remainder of this report proceeds as follows: the next section provides an overview of the existing debates and research on climateflation and fossilflation. After an overview of our methodological approach, we discuss the results of the quantitative econometric analysis. Next, the policy recommendations section builds on an extensive literature review and an expert stakeholder workshop organised online in March 2025. The conclusion section reflects on the broader implications of the study, its limitations, and tentatively formulates a future research agenda.

[3] Under the EU Emissions Trading System (EU-ETS), installations and operators from the electricity and heat generation, industrial manufacturing, aviation, and maritime sectors pay for their greenhouse gas (GHG) emissions by purchasing emission allowances. The more (fossil) energy and GHG-intensive the activities, the higher the costs.

2. WHAT'S IN A NAME?

2.1. Introduction to key concepts

Defined as 'the sustained rise in the general price levels', inflation is mostly understood to be originating in a mismatch between overall supply and demand in a given economy. According to this definition, the price increase of a single item does necessarily cause total inflation. Yet, the energy supply-side shock before and after the start of the Russia-Ukraine conflict in early 2022 revealed that inflation *can* actually be primarily caused by one specific service or good, namely (large-scale reliance on) fossil fuels (Jackson, 2024).

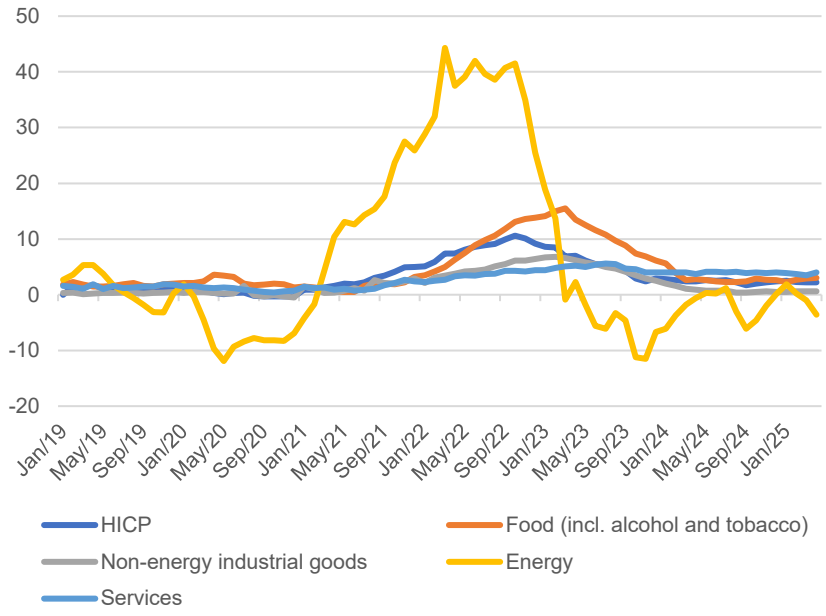
In this crisis environment, in March 2022, Isabel Schnabel, member of the Executive Board of the European Central Bank (ECB), gave a pivotal speech on 'the new age of energy inflation' (Schnabel, 2022). She argued that Eurozone inflation was driven by two independent, yet interrelated issues: the area's over-reliance on fossil fuels (primarily Russian fossil gas) and deteriorating climatic conditions. Her speech introduced the broader public to the concepts of **fossilflation** and **climateflation**.

"Eurozone inflation was driven by two independent, yet interrelated issues: the area's over-reliance on fossil fuels (primarily Russian fossil gas) and deteriorating climatic conditions"

Schnabel defined **fossilflation** as "the legacy cost of the dependency on fossil energy sources" which "ha[d] not been reduced forcefully enough over the past decades." To the contrary, in 2021, 45% of EU's fossil gas imports came from Russia; up from 31% in 2013, and even as 'little' as 25% in 2010 (European Parliament, 2015). As the energy crisis intensified and the 'energy war' between Russia and the EU (and its allies) further escalated throughout 2022-23, fossilflation remained high on political and public agendas. Fig. 2 shows how the energy component[4] in Eurozone inflation far outpaced others in the run-up to, and immediate aftermath of, the start of the Russia-Ukraine conflict. This shows how energy - and, primarily, fossil fuel - prices significantly contributed to the inflationary pressures in the period 2021-2023.

[4] The 'energy component' in the Eurozone's standard inflation index (the Harmonized Indices for Consumer Prices, or HICP) includes various energy-related products and services: electricity, gas, liquid fuels, solid fuels, heat energy, and fuels and lubricants for personal transport equipment (FRED, 2025).

Figure 2. Euro area annual inflation and its main components (%, April 2015 – April 2025)



Source: Authors' creation, compiled with data from Eurostat (2025)

Energy products directly contributed to more than half of the increase in the Eurozone's Consumer Price Index (CPI) in 2021 and throughout the first half of 2022. Additionally, as Ferreira et al. (2025, p. 106) note, "this trend only considers the *direct* contribution of energy prices to the evolution of the CPI, due to its weight in average household consumption." In other words, even after energy prices subsided in the second half of 2022, the initial price shock continued to reverberate and impact remaining prices in the economy, since energy products are a key input in most production processes (Ibid.).

Climateflation, in turn, refers to "the rising impact on economic activity and prices of natural disasters and severe weather events", which are becoming increasingly frequent and intense due to climate change.[5] There is already a large, but somewhat controversial, literature that studies the (potentially) devastating financial and economic effects of further temperature increases beyond the Paris Agreement targets (e.g. on global GDP) (Bilal & Känzig, 2024; Kahn et al., 2019; Tol, 2018). Climateflation, however, specifically refers to how, for example, failed harvests due to droughts or floods can directly lead to spikes in food prices and, ultimately, overall inflation. Climateflation has received

"failed harvests due to droughts or floods can directly lead to spikes in food prices and consequently lead to (food) inflation"

[5] Climateflation bears some resemblance with the former Bank of England Governor, and current Canadian Prime Minister, Mark Carney's concept of 'physical risks'; although the latter only entails the damage done to properties and financial assets by climate-related extreme weather events. Carney coined the term alongside 'transition risks' and 'liability risk' in his famous 2015 'Tragedy of the horizon' speech as key macro-financial risks associated with climate change and the energy transition (Carney, 2015).

considerably *less* attention than more general studies on the financial and macro-economic impacts of climate change.

Table 1 gives a brief overview of the channels through extreme weather-related disasters events and fossil fuel prices can directly affect inflation; these inflationary effects can be both upward or downward (i.e. deflationary).

Table 1. The (potential) inflationary effects of extreme weather-related disasters and increasing fossil fuel prices.

Shock Type	Extreme weather-related disaster(s)	Fossil fuel price shocks	Inflationary pressure
Negative supply shock	Destruction of crops, buildings, and infrastructure; disruption of supply chains.	Increased production costs in energy-intensive industries reduce output.	↑
Positive demand shock	Reconstruction boom following destruction of infrastructure and physical capital.	-	↑
Negative demand shock	Property and capital stock destruction lowers wealth and consumption.	Lower household purchasing power due to high fossil fuel prices reduces consumption.	↓

Source: authors' creation, based on Beirne et al. (2024)

Although it falls outside the scope of this study, Schnabel also introduced a third type of inflationary risk in her speech, namely **greenflation**. Greenflation refers to price increases if demand for the critical raw materials that form the backbone of low-carbon technologies (e.g. lithium, cobalt, nickel, etc.) outpaces supply. However, Schnabel noted that "greenflation has had much less of an impact on final consumer prices than fossilflation [and] it is therefore misleading to claim that the greening of our economies is to blame for the painful rise in energy prices." Her claims have been backed by subsequent studies (Neri et al. 2023; Arce et al. 2023). However, it cannot be excluded that this will happen in the future.

Greenflation often also refers to the increased costs of energy (or, more precisely, electricity) due to the increasing share of renewables, primarily intermittent wind and solar, in the energy mix. This has sparked political debate in many European countries. In the UK, for example, there is an ongoing (conservative) media and political campaign that attributes high electricity prices to the current Labour government's net-zero ambitions. However, in the UK, fossil gas sets wholesale electricity prices 98% of the time. With gas prices remaining three times more expensive than before the Russia-Ukraine conflict, fossil gas is primarily to blame for high electricity prices in the UK (Evans and Lempriere,

"With gas prices remaining three times more expensive than before the Russia-Ukraine conflict, fossil gas is primarily to blame for high electricity prices in the UK."

2015). A growing number of studies further suggest that the energy transition, and the increase in renewables in the energy mix actually has deflationary effects (Serrano et al. 2025; Zhang et al., 2024).

2.2. Literature overview

Of the two phenomena studied in this report, fossilflation has attracted considerably more research attention than climateflation. Concerns over the impact of fossil fuel price fluctuations go as far back as the oil price shocks of the 1970s. Indeed, historically, increases in fossil fuel (i.e. oil) prices have often led to higher inflation. A 2017 study analysed data from 72 advanced and developing economies for the period 1970-2015 (Choi et al. 2017). It found a modest positive correlation between global oil price inflation and domestic CPI; with the added caveat that variations in this relationship can occur based on factors such as a country's energy policies, the structure of its economy, and its level of energy diversification. For the Euro area in particular, there is limited historical scholarship on the relationship between oil price shocks and inflation (see, e.g., Cheikh et al., 2023).

When it comes to fossilflation in a more contemporary setting, Barrett (2022) shows that primarily energy, food, and transport prices contributed to rising inflation levels around the world in the aftermath of the Covid-19 pandemic. In a study on the Eurozone and the UK, researchers found that there is a strong correlation between countries' energy intensity and inflation, which puts into focus the primacy of (fossil) energy in driving inflation (Barmes and Schröder Bosch, 2024, pp. 8-9). Research from the *Banca d'Italia* confirmed that "shocks to energy prices have had both direct and indirect effects on [Eurozone] inflation" throughout the period 2021-2023 (Neri et al., 2023, p. 7).

"In a study on the Eurozone and the UK, researchers found that there is a strong correlation between countries' energy intensity and inflation"

A recent ECB study further noted that "price inflation in the euro area was mainly driven by large positive contributions of energy prices shocks between the second quarter of 2021 and the first quarter of 2023" (Arce et al. 2023, pp. 17-18). This was mainly due to strong energy demand as the economy re-opened post-pandemic, as well as other adverse supply-side effects, including supply chain bottlenecks and other distortions caused by the Russia-Ukraine conflict. Research from the *Nationale Bank van België – Banque Nationale de Belgique* (National Bank of Belgium, NBB) found that "a sequence of shocks to product shortage, energy and food components were the main reason behind the duration of recent high Belgian inflation" (de Walque and Lejeune, 2024). Yet, these central bank studies stop short of explicitly mentioning fossil fuels (primarily fossil gas) as drivers of the energy price hikes in the Eurozone (for a more explicit acknowledgement of this relationship, see ECIU, 2023; Krahé and Heilmann, 2023).

In other regions, this relationship is less pronounced. For the US, Bernanke and Blanchard (2023, p.25) found that "the contributions of

"A sequence of shocks to product shortage, energy and food components were the main reason behind the duration of recent high Belgian inflation" (de Walque and Lejeune, 2024).

food and (especially) energy price shocks to the pandemic-era inflation were large." Others have warned that volatile fossil fuel prices have been a key driver of overall inflation and have historically triggered recessions in the US (Melodia and Karlsson, 2022). Yet, one other study found that energy played a much smaller role in contributing to overall inflation levels in recent years (Weber et al., 2022). This may be caused by the fact that Eurozone inflation, in general, is much more vulnerable to geopolitical conflicts than the US economy (Cheikh et al., 2023). In addition, EU companies face electricity prices that are 2-3 times higher than those in the US, while fossil gas prices are 4-5 times higher (Draghi, 2024, p. 14).

Now, there is a growing research interest in climateflation, largely because the effects of climate change are becoming more and more tangible. Barmes and Schröder Bosch (2024, p. 12) found that "there is an emerging consensus that extreme weather events and rising temperatures cause negative supply-shocks that place upward pressure on inflation, primarily through their impact on food prices." Food inflation is thus likely to be impacted most. However, the ultimate effect on general (or, *headline*) inflation depends on multiple variables, so causation is more difficult to establish than for fossilflation. Nonetheless, it is more than reasonable to expect that climateflation will become a common and crucial concern for stakeholders as the intensity and frequency of extreme weather events increases in a warming world.

In general, the literature suggests that the effects of climate change on headline inflation is still uncertain and, at best, non-linear (De Sloover and Jacobs, 2024; see also Ciccarelli et al, 2024; Faccia et al. 2021). Some report a negative effect of positive temperature anomalies on CPI (Lucidi et al., 2024), while other indicate that positive temperature anomalies have a significant, upward effect on CPI (Beirne et al. 2024; Kotz et al., 2024; Mukherjee & Ouattara, 2021). A number of single-country studies have found that extreme weather events have indeed resulted in increases in food inflation in a number of European countries. For example, for Germany, Bremus et al. (2020, p. 211) have found that the prices of agricultural goods increase significantly in reaction to an extreme weather event; while the ECUI (2023) estimated that climate change added 5.3 percentage points to UK food inflation in 2023.

"A number of single-country studies have found that extreme weather events have indeed resulted in increases in food inflation in a number of European countries."

Consequently, concerns over climateflation are now being voiced at highest policy levels. Christine Lagarde (2022), President of the ECB, has said that climate change has "macroeconomic and financial implications and [has] consequences for our primary objective of price stability."

2.3. Exploring the Belgian context

Research on fossilflation and climateflation in the Belgian economy, specifically, remains limited. Because the impacts of climate change

already apparent here, that research is now long overdue. The five hottest years on record all happened in the period 2014-2023 (Statistiek Vlaanderen, 2024). In recent years, Belgium has experienced persistently mild winters, recurring drought episodes and a succession of hot summers. As a consequence, climate change is already affecting, *inter alia*, agricultural yields, mortality rates and labor productivity in Belgium (VITO, 2020). In Belgium, the Climate Risk Assessment Center (CERAC) is designated to evaluate domestic climate and environmental risks. Although they have not yet compiled a comprehensive overview for the whole of Belgium; the first conclusions are pending at the time of finalizing this report (May 2025).

Box 1. Climate & energy policy-making in Belgium

Climate and energy policy is shaped in a complex institutional system in Belgium, involving the EU, the federal government, and the three regions. This governance structure requires close coordination across all levels. Below is a very brief overview:

- The **EU** level sets overarching climate and energy targets (e.g., Green Deal), regulations (e.g., Effort Sharing Regulation, Renewable Energy Directive), and funding frameworks (e.g., Recovery and Resilience Facility). Belgium translates these EU-level commitments into national and regional actions through its Integrated National Energy and Climate Plan (NECP).
- The **federal government** holds responsibility for a variety of issues, including nuclear energy, offshore wind in the North Sea, electricity transmission, and aspects of international and EU climate diplomacy. Further ensures compliance with EU reporting and coordinates national targets.
- The **regional governments** (Flanders, Wallonia, and Brussels-Capital) hold primary responsibility for most climate and energy domains, including renewable energy, energy efficiency, transport, buildings, and spatial planning. Each region develops its own plans aligned with national and EU frameworks.
- The **National Climate Commission** consists of representatives of the federal and regional governments; it coordinates the preparation of Belgium's NECP and consolidates reports submitted to the EU. The updated version of this NECP should have been submitted June 2024 but it was still under development at the time of finalizing this report, May 2025 (Merckx, 2025a).
- The **Interministerial Conference on the Environment** is one of the permanent working groups of the Consultation Committee. It provides a political platform for intergovernmental alignment on climate policy.

One major example of how extreme weather events are already causing physical and financial damage is the July 2021 flooding event in the Vesdre valley, causing well above €2 billion in damages and claiming 41 lives (Assuralia, 2021).[6] While attribution of small-scale events remains challenging, research indicates that the heavy rainfall leading to the floodings can partly be linked to climate change (Tradowsky et al. 2023). A network analysis found that the floods had a strong negative impact on the performance of the flooded firms as well as those directly connected with them (Bijnens et al. 2025a; 2025b).

"One major example of how extreme weather events are already causing physical and financial damage is the July 2021 flooding in the Vesdre valley, causing well above €2 billion in damages and claiming 41 lives."

The financial and fiscal implications of fossil fuel dependence, as well as price swings, have also received policy and research attention. According to the latest inventory of the FPS finance and the FPS Health, Food Chain Safety and Environment (2024), direct federal fossil fuel consumption subsidies amounted to €12.1 billion in 2021, or 2.4% of GDP. Indirect subsidies amount to 0.5% of GDP, the main category being the tax regime for company cars. Note that these figures do not (yet) take into account the fiscal spending as a response to the energy crisis, coming into full force in 2022.

Indeed, the energy crisis came as major financial and inflationary shock in Belgium (Peersman et al., 2023). Capéau et al. (2022) have found that the energy price disproportionately hit lower-income households, although the compensatory measures provided relief for these socio-economic groups. This was mainly because of the temporary relaxation of the eligibility requirements for the 'social rate for energy (bills)'. As such, according to the think tank *Bruegel*, federal and regional governments' spending to shield households and firms from the energy crisis amounted to €9.4 billion, or 1.9% of GDP for the period September 2021 – January 2023 (Sgaravatti et al. 2023).

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Because of its remit to keep prices of goods and services as stable as possible (with an inflation target of 2%), the NBB has paid particular attention to fossilflation and climateflation. The NBB recently conducted a theoretical exercise on the inflationary repercussions of increases in average temperatures in Belgium. It expects that "[climate change] will have a moderate upward effect on food inflation, with a more pronounced impact during the summer months." Importantly, "lower-income households will be more vulnerable to rising food prices, as they allocate a larger share of their consumption basket to food compared to higher-income households" (De Sloover and Jacobs, 2024, p. 24).[7]

[6] This brings into view Mark Carney's concept of 'liability risk' (see footnote 5). This relates to the exposure of insurers toward parties who have suffered and seek compensation for loss or damage from the effects of climate change (i.e. extreme weather events).
[7] The NBB Governor, Pierre Wunsch, has long been publicly critical of the financial cost associated with the energy transition in Belgium, often implicitly referring to the notion of greenflation (Gordts, 2025).

Federal and regional policymakers' engagement with these concepts remains limited. However, it is noteworthy that in 2022 the current prime minister, Bart De Wever (N-VA), remarked that high energy prices were actually a result of energy transition policies, explicitly invoking the term 'greenflation' (Het Nieuwsblad, 2022). The 2024 federal coalition agreement does not explicitly mention fossilflation and climateflation, although inflation, cost of living and purchasing power figure prominently. Regarding fossilflation, the coalition agreement does refer to (fossil) energy prices and their impacts on the Belgian economy. The federal government explicitly acknowledges the competitive disadvantage of the domestic energy-intensive industry compared to other EU member states, as well as between the EU and the US. To address this, the federal government explicitly looks at the EU level; not only for intra-EU rulings on state support for industry. For households, the government proposes to mandate energy companies to reduce the required advances on household energy bills when a substantive reduction in wholesale prices occurs. This could reduce longer-term impacts of supply-side price shocks as soon as first signals of a cooling down in the wholesale market begins to occur.

"Fossil fuel subsidies are environmentally harmful, lead to overconsumption, and are economically regressive"

Another key measure that has long been discussed by civil society, academics and policymakers concerns the reform and phase-out of fossil fuel subsidies (FPS finance, May 2024). Such subsidies are environmentally harmful, lead to overconsumption, and are economically regressive. The coalition federal government will investigate which [fossil fuel] subsidies can be subject to a phase-out based on a 'realistic' timeline (Federaal regeerakkoord, 2025, p. 40). The regional governments in Belgium are also considering reforming fossil fuel subsidies. Both the Flemish and Walloon government confirmed in their respective coalition agreements that they will make an inventory of existing regional-level subsidies in view of their gradual reform and phase-out (Déclaration de politique régionale Wallonne, 2024; WWF, 2025).

"Nature-based adaptation solutions (e.g. the creation of wetlands) can help the agricultural sector prolonged periods of drought and avoid failed harvests"

Other proposed energy transition and climate policies could reduce long-term exposure to fossilflation and climateflation. First, they limit the share of fossil fuels in the domestic energy mix, their weight as a component of (headline) inflation, and thus exposure to fossil price shocks and fossilflation. Second, climate mitigation efforts reduce GHG emissions and, eventually, the occurrence of climate-related extreme weather events that come with runaway climate change. Third, climate adaptation policies can also help defend the economy to extreme weather events. Nature-based adaptation solutions (e.g. the creation of wetlands) can help the agricultural sector prolonged periods of drought and avoid failed harvests. For an overview and analysis of climate and energy transition policies under the current federal government, see: BBL (2025); Merckx (2025b); and Unizo (2025).

3. METHODS, DATA & RESULTS

3.1. Methods

This study makes use of the ARIMAX methodology to analyze the time series on inflation in Belgium. To do so, first monthly data for the 27 EU member states (EU-27) and the UK, for the period January 1999 - December 2024, were gathered. Subsequently, an ARIMAX model explaining Belgium's inflation rates was estimated. The ARIMAX model consists of the following elements:

- **AR** (AutoRegressive): uses past values to predict future values
- **I** (Integrated): Differencing is used to make the series stationary
- **MA** (Moving Average): Models the error term dependencies
- **X** (exogenous variables): External factors influencing the time series

The ARIMAX model explains Belgium's monthly inflation rate by simultaneously accounting for the inflation rate's past levels as well as external influences (i.e., the exogenous variables). First, the model explores how monthly inflation has changed over time; whether it follows a pattern, corresponds to past inflation rates, or is influenced by unexpected shocks in the monthly inflation rates. Second, the ARIMAX model considers key external factors that can explain inflation rates. In particular, this study assesses the impact of a) fossil fuel prices and b) climate change (i.e. 'extreme climate events'; Guo et al., 2024). Other external factors that the model controls for are, among others, interest and unemployment rates, and trade dependency. Controlling for these factors is necessary to ensure a clearer understanding of what truly drives inflation. By combining historical trends, economic shocks, and external factors, the ARIMAX model allows to gain insights into inflationary pressures.

The design of a robust ARIMAX model requires a stepwise approach. In a first step, a structured selection process was applied to identify relevant covariates i.e., possible explanatory variables of inflation different from the climate change or fossil fuel price-related variables. Following a literature review, 55 potential explanatory variables were considered for inclusion in the ARIMAX model (see below, 'Data'). For each of these variables, as well as the inflation time trends, the study allowed for a potential lagged response of inflation of up to four periods. Second, preliminary filtering removed highly correlated variables, reducing the set to 18 candidate explanatory variables. Third, ARIMAX models were estimated for the EU-27 and the UK. A cross-country significance test was conducted to identify variables that were consistently influential. The final set of significant variables was then used to estimate a multilevel autoregressive panel model, capturing both country-specific and broader macroeconomic effects on inflation. This

"The ARIMAX model explains Belgium's monthly inflation rate by simultaneously accounting for the inflation rate's past levels as well as external influences."

finally allowed to estimate a robust model with a focus on Belgium in particular.

3.2. Data

Inflation measures

Eurostat provides several measures for inflation. This study considers two inflation measures (for different purposes):

- **Total inflation:** Measured by the Harmonized Index of Consumer Prices (HICP), which provides the official measure of consumer price inflation in the Euro area and the EU, allows for comparison of the actual cost of living across the sample.
- **Core inflation:** Excludes the components 'energy' (see footnote 4) and 'unprocessed food' (i.e. fruit, vegetables, meat and fish) to provide a more stable measure of underlying inflation trends, filtering out short-term fluctuations and offering better insights into long-term inflationary pressures.

The analysis of climateflation makes use of HICP, i.e., the 'total inflation' measure, as the dependent variable. The HICP is selected as it best reflects the actual cost of living. In addition, this measure also best captures short-term fluctuations as it includes volatile elements such as unprocessed food and energy. This is interesting given the observation that climate change can have very sudden impacts such as extreme climate events.

In the context of fossilflation, in addition to the total cost of living measure expressed by HICP, the study also includes 'core inflation' as a dependent variable to further break down the impact of fossil fuel prices on other products' inflationary pressures.

Data for both of these inflation variables are collected from Eurostat, which includes monthly inflation data from January 1999 to December 2024. Although we collect monthly data, we can aggregate it into semi-annual measurements to conduct an analysis with two observations per year covering a period of 6 months instead of 1 month. The latter approach is particularly useful for fossilflation as that analysis excludes the short-term volatile elements linked to unprocessed food and fossil fuel prices**.**

Covariates – control variables

While this report studies the impact of climate change and fossil fuel prices on inflation, it is necessary to also consider other covariates, i.e. other variables which impact inflation. In total, a list of 55 possible covariates were considered as possible independent variables. That list was subsequently reduced to 18 variables by elimination of highly correlated variables. Table 2 presents the co-variates considered as explanatory variables.

Table 2. Control variables for ARIMAX estimation

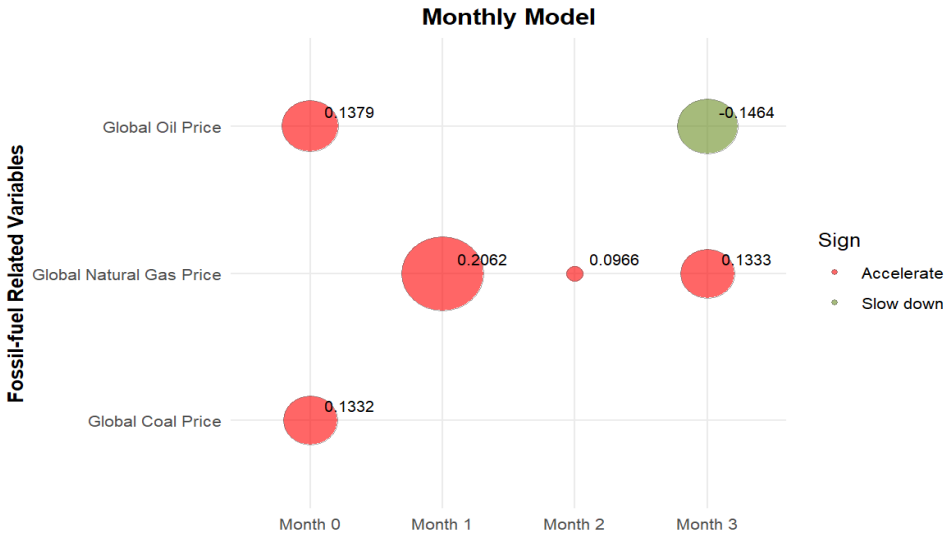
GDP growth	Imports	Exports
	Imports of consumption goods	Exports of consumption goods
	Imports of intermediate goods	Exports of intermediate goods
	Imports of capital goods	Exports of capital goods
Unemployment rates	**Industrial production (Main industrial grouping)**	**Interest rates**
Unemployment rates – Male	Capital goods	Interest rates – 1 month
Unemployment rates - female	Consumer goods	Interest rates – 3 months
Unemployment rates – below 25 years old	Durable consumer goods	Interest rates – 6 months
Unemployment rates – above 25 years old	Intermediate goods	

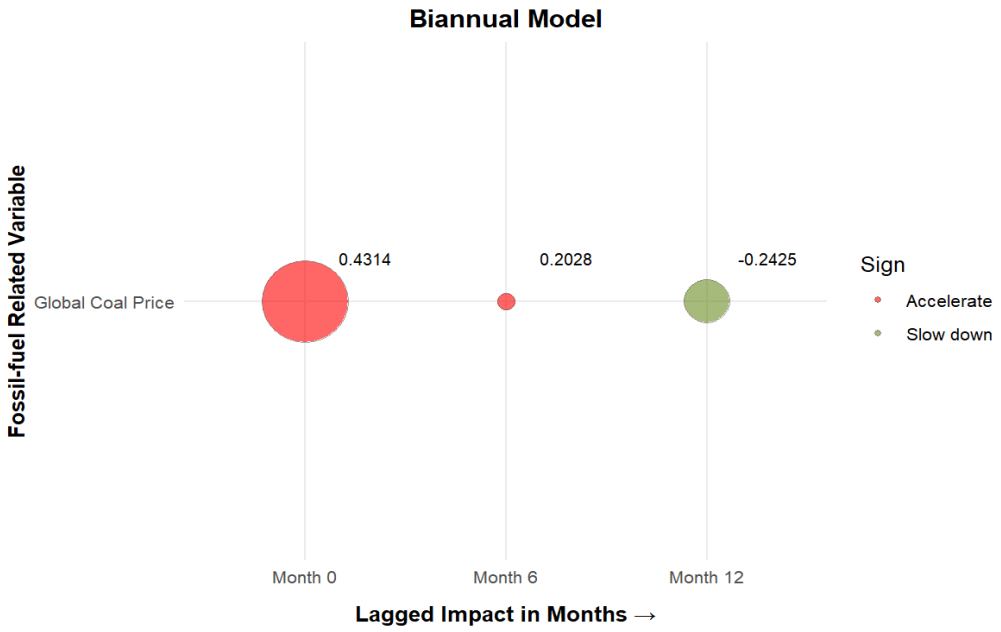
Source: Authors' creation

3.3. Fossilflation in Belgium

For fossilflation, the report investigates the pass-through of fossil fuel prices into total inflation in the Belgian economy using monthly and biannual data, to capture short-term dynamics and medium-term adjustments. Belgium, a small open economy, is highly dependent on fossil fuels since coal, oil and natural gas alone make up the 69.8% of the domestic energy mix, while the remaining 30.2% percent is captured by nuclear power and a small, but growing, share of renewables (IEA, 2025).

Figure 3. Lagged impact of fossil fuel-related variables on total inflation in Belgium (monthly and bi-annual analysis, 1999-2024).





Source: authors' creation. Only significant coefficients are included in the figures.

The bubbles' size in Fig. 3 reflects the impact strength for each month (tracked for up to three months following the fossil fuel price shock in the monthly model and 12 months in the biannual model). Red colored bubbles indicate that the fossil fuel variables tend to accelerate inflation (i.e. positive coefficient); green colored bubbles indicate that the variable tends to slow down inflation (i.e. negative coefficient); absent bubbles indicate that no significant impact (i.e. insignificant coefficient) was observed for that specific month-variable combination.

The coefficients reported in Fig. 3 show increases in percentage points, following a 1 unit increase in the concerned variable. For example, the coefficient for the impact of global oil price on inflation in the monthly model is 0.1379. The coefficient implies that if global oil price increases by 1%, Belgian inflation increased by 0.1379 percentage points. If inflation stands at 2% (the ECB inflation target), it would rise to 2.1379%. This is in line with Kalantzis et al. (2018) who find that such an increase in oil prices has an impact of 0.3 percentage points on the HICP for the euro area and 0.25 percentage points for France. In addition, Choi et al. (2017) found that a 1% increase of global oil prices leads to direct inflationary increases of up to 0.08 percentage points across advanced economies (slightly below the 0.1379 percentage points) (see also Cheikh et al., 2023) . The global coal price and global fossil gas price tend to increase Belgian inflation rate too. For gas, this effect starts with one month delay, lasting for three months.

"The coefficient implies that if global oil price increases by 1%, Belgian inflation increased by 0.1379 percentage points. If inflation stands at 2% (the ECB inflation target), it would rise to 2.1379%."

Coal prices are positively associated with total inflation also in the biannual model. The contemporaneous impact is quite strong, suggesting that coal price shocks may trigger broader cost pressures across the economy. However, some negative lagged effects emerge too, potentially reflecting medium-term adjustments such as efficiency gains and fuel substitution. While the last coal-fired power plant in Belgium shut down in 2016 and coal currently represents only 5% of Belgium's energy mix (IEA, 2025), its prices may still trigger the economy through indirect channels, including import prices and industrial inputs (e.g. steel production). Furthermore, it should be noted that the results are based on a *historical* coverage of the data included in our analysis (starting in 1999). For example, between 2000-2005 coal accounted for approximately 10% of the Belgian energy mix (IEA, nd.). Hence, the estimated effects likely reflect higher coal dependency in the past.

Fossil gas prices positively affect total inflation in the monthly model with the effect being persistent and positively significant. Fossil gas price coefficients are not significant in the biannual model, implying that their effects vanish over time, and are thus 'transitory'. This is supported by ECB research (2023). Moreover, the results support the hypothesis that fossil gas inflation impacts occur quickly but can fade equally fast due to fiscal interventions and fixed-price contracts. This also happened during the energy crisis of 2021-2023 (Sgaravatti et al., 2023; see also Section 4).

"the oil price shock might decrease purchasing power, shrinking consumption and investment, leading to deflation"

Finally, contemporaneous oil prices shock positively affects total inflation. This result is consistent with extensive literature on oil price shocks (Choi et al., 2017). However, the model also captures some negative lagged effects in the monthly model, which then fade away in the medium-term model. The recent empirical literature on the effects of oil price shock on inflation is, as a matter of fact, mixed (Ge and Sun, 2024). On the one hand, rising oil prices affect the supply side and so producers' costs, since oil is an input in the production process; as a result, consumers' price on the demand increases, since oil products are also consumption goods. On the other hand, the oil price shock might decrease purchasing power, shrinking consumption and investment, leading to deflation (Edelstein and Kilian, 2009).

Thus, the net effect of fossil prices on inflation depends on which channel prevails, e.g., demand-side or supply-side driven. To conclude, although there are methodological and data limitations to this exploratory analysis, the Belgian economy appears to be vulnerable to fossil prices shocks, primarily in the short run.

3.4. Climateflation in Belgium

Climate change manifests itself in various ways. This analysis makes use of the Climate Physical Risk Index (CPRI) developed by Guo et al. (2024) to capture the various ways in which climate change impacts the economy. The CPRI makes use of the daily observations from meteorological stations across 170 countries to calculate measures for four extreme climate events: 1) extreme low temperature days; 2) extreme high temperature days; 3) extreme rainfall days; and 4) extreme drought days.

Following Guo et al.'s (2024) rationale, 1) and 2) represent the number of days colder (or hotter) than the lowest (or highest) 10% of historical temperatures measured over time for a specific month in Belgium. As the interest lies squarely with exceptional situations, monthly mean temperatures are also controlled for. Accordingly, the extreme rainfall days represent the days with more rain than 95% of past rainy days for that specific month. Finally, the extreme drought days are the days drier (i.e., with lower humidity) than 95% of past dry days within that specific month in Belgium.

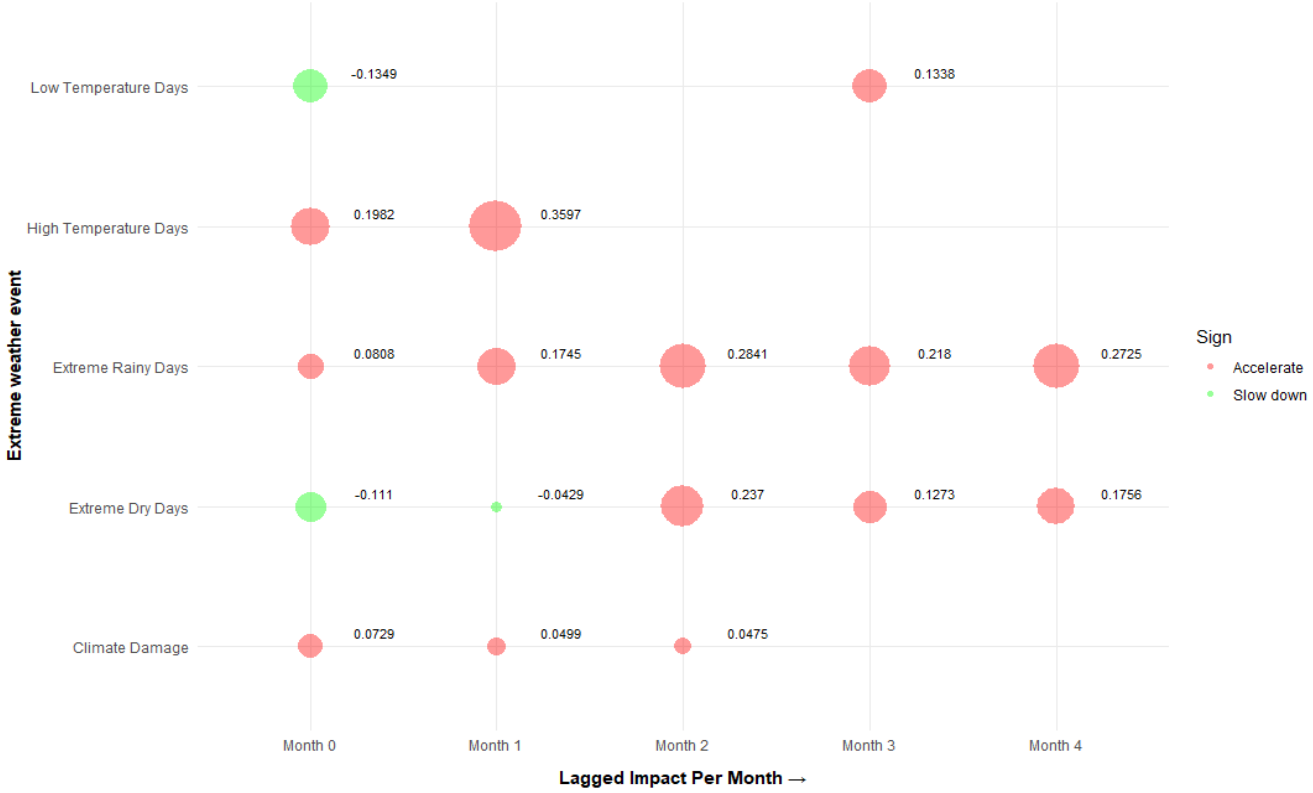
While the four types of extreme circumstances measured in the CPRI framework are important, they do not necessarily reflect physical damage. Hence, one additional explanatory variable is added to the ARIMAX analysis to capture the physical damage associated with extreme climate events. This additional variable helps to account for one-off extreme events that, despite their short duration (e.g., one or two days of unusual intense rainfall) can have a disproportionately large impact. Without such adjustment, these events would receive limited weight in the analysis. The information on physical damage related to extreme climate events is obtained from the '*Klimaatschademonitor*' developed by Assuralia (2025), the Belgian insurance sector organization. This online platform presents monthly data (starting from 2015) on the physical damage caused to buildings and their contents by extreme climate conditions such as floods and storms, as well as damage to vehicles caused by natural forces. Due to limited data availability, this analysis focuses on the Belgian total inflation rate from January 2015 to December 2024.

"inflation also tends to accelerate in case extreme climate events cause physical damage to houses, home contents, and vehicles"

The ARIMAX model includes the five extreme climate variables to further investigate Belgian inflation rates. Fig. 4 presents the impact of each variable (y-axis) on inflation, allowing for a lagged response of up to four months after the month of observation (x-axis). The bubbles' size reflects the impact strength for each month, tracked for up to four months following the extreme climate event. Red colored bubbles indicate that the extreme climate event or the physical damage tends to accelerate inflation (i.e., positive coefficient). Green colored bubbles indicate that the variable tends to slow down inflation (i.e., negative coefficient).

Absent bubbles indicate that no significant impact (i.e., insignificant coefficient) was observed for that specific month-variable combination. E.g., the extreme 'high temperature days' variable does not have inflationary impacts in the second, third and fourth month following the observation of extreme high temperature days.

Figure 4. Lagged impact of extreme climate events on total inflation in Belgium (monthly analysis, 2015-2024).



Source: Authors' creation

The findings reveal a complex and nuanced picture. While the impact of some variables is straightforward, the analysis shows heterogeneous effects for others. Physical damage, the occurrence of extreme rainy days, and the occurrence of extreme high temperature days all accelerate total inflation. The coefficients are displayed in the figure and indicate the impact of the respective variables on total inflation in Belgium in percentage points. E.g., one additional extreme temperature day for a given month will increase inflation in that same month 0 by about 0.1982 percentage points, all other factors remaining constant. If, for example, total inflation is 2% (the ECB inflation target), extreme hot days increase total inflation from 2% to 2.1982%. These findings confirm the recent analysis by Beirne et al. (2024) who find that "headline

"Physical damage, the occurrence of extreme rainy days, and the occurrence of extreme high temperature days all accelerate total inflation"

inflation in euro area countries significantly increases by 0.2 percentage points right after an extreme climate event takes place", followed by diminishing lagged response in the subsequent three months.

The duration of impacts also varies according to the variable. For example, total inflation tends to accelerate during months marked by several extreme high temperature days. This impact increases during the subsequent month but disappears entirely afterwards. Extreme rainfall also tends to accelerate inflation within the same month of the event itself. However, this impact is more persistent, gradually increases over time and lasts up to four months after the extreme rainfall. Finally, inflation also tends to accelerate in case extreme climate events cause physical damage to houses, home contents, and vehicles. The impact is highest in the month the extreme climate event occurs, then diminishes over the next two months before disappearing entirely.

The impact of extreme low temperature days and extreme dry days is rather ambiguous. Both extreme climate events appear to slow down inflation at first stage, only to accelerate inflation at later stage: in month 3 for extreme low temperature days; in month 3, 4 and 5 for extreme dry days). It might appear counterintuitive that both phenomena first slow down and subsequently accelerate inflation. However, it only highlights the distinct demand-side and supply-side channels through which climate change can differently impact inflation (Beirne et al., 2024; see also table 1). If extreme climate events lead to negative supply shocks (e.g. because of lost production or reduced production capacity), it is likely to increase inflation. Conversely, if disasters result in negative demand-shocks (e.g., decreased consumer spending) this might slow down inflation. De Sloover and Jacobs (2024) also add the financial channel as possible transmission route of the impact of climate change on inflation, which we did not further consider in this study.

Therefore, the net effect of climate change on inflation depends on whether the supply or the demand shock dominates, respectively leading to accelerated or slowed down inflation. For this reason, the results above should be interpreted with caution. It is not possible to determine whether the insignificant coefficients are the result of either very weak transmission channels for extreme low temperature days or, instead, whether the supply and demand effects offset each other.

"droughts in Southern European countries can increase food prices of food exported by those countries to Belgium"

Further analysis is required to fully capture the impact of those extreme climate events on inflation. Such analysis can also address some of the additional limitations of the present study, including, for example, the neglect of climate policies implemented by the Belgian government, or the underrepresentation of imported inflation driven by climate change (e.g., rising prices due to extreme climate events *outside of* Belgium). A small open economy such as that of Belgium can, for example, import inflation indirectly via increased prices of imported raw materials. Those

increased prices are subsequently transmitted to producer prices and then to inflation (Dedola et al., 2024). In addition, Belgium can import inflation via products which more directly impact the cost of living such as food products or energy (Gautier et al., 2024). To be more concrete, droughts in Southern European countries can for example increase food prices in that region in a first instance; in a later stage, it will also increase the prices of food exported by those countries to Belgium.

4. DISCUSSION & POLICY RECOMMENDATIONS

4.1. Discussion

The policy recommendations in the next section are compiled through 1) a literature review on fossilflation and climateflation; and 2) an expert stakeholder workshop organized on 17 March 2025 with a group of 20 individuals from academia, administration, think tanks and NGOs. Based on a preliminary literature review, a list of policy interventions had been identified prior to the workshop. These were shared with participants prior to the workshop and discussed throughout in smaller focus groups. Before turning to the recommendations, we raise several important points that were discussed throughout the workshop.

First, proposed policy interventions often come with tensions and trade-offs. For example, in an acute phase of fossil fuel price spikes - with tangible risks of fossilflation - it may be the case that certain fiscal support measures can help mitigate the inflationary effects (e.g. through direct financial support to energy-intensive industries, cutting excise duties or, (temporarily) reducing VAT rates on certain fossil energy products). In turn, however, this also reduces the price incentive for actors - households and business - to actually change their behaviour and reduce fossil fuel consumption. Excessive fossil fuel consumption leads to higher emissions, and further down the line, higher risks of exposure to extreme weather events and climateflation. As the ECB (2024) has noted with regards to the energy crisis response in the Eurozone, some fiscal measures "incentivize the use of fossil fuels, such as price caps or reductions in energy taxes, [and] are assessed as being detrimental to the green transition."

Second, in Belgium, policymakers operate in a complex institutional landscape where different levels of government have distinct and sometimes shared responsibilities (see Box 1). For example, domestic discussions on fossil fuel subsidies, for example, are mostly focused on the federal level, as the bulk of the subsidies are located here. The Flemish government has only recently decided to map, for the first time, regional fossil fuel consumption subsidies (Depraetere, 2024). Moreover, climate and energy regulations set at EU level have repercussions for the federal and regional governments in Belgium.

Third, further adding to this complexity, maintaining price stability is a key responsibility of central banks. In the Eurozone, this is the ECB's mandate, supported by the national banks of Euro area countries. The primary objective of the ECB's monetary policy is to ensure that inflation remains low, stable and predictable at 2%. But central banks are also responsible for ensuring financial stability and the supervision of the financial system. Within their remit, central banks, the ECB in particular, should create space to address issues of fossilflation and climateflation.

"In Belgium, policymakers operate in a complex institutional landscape where different levels of government have distinct and sometimes shared responsibilities"

"Within their remit, central banks, the ECB in particular, should create space to address issues of fossilflation and climateflation"

However, central banks remain reluctant to act because of their purported 'neutrality'.[8] There is a growing chorus of academics, civil society and policymakers that see the need for central banks and other macroeconomic authorities to update their toolkits and strengthen their institutional and policy coordination to navigate supply constraints and shocks driven by climate change and volatile fossil fuel prices. As Barmes and Schröder Bosch have noted (2024, p. 19), "while the justification for central banks to incorporate environmental considerations into their analyses and operations has typically focused on financial stability and support for government policy priorities, fossilflation and climateflation show the growing relevance of environmental pressures for price stability mandates."

"fossilflation and climateflation show the growing relevance of environmental pressures for price stability mandates"

Fourth, the findings of the study highlight that the upward inflationary pressures of extreme weather events and fossil fuel price spikes vary widely and are transitory. In other words, the inflationary effects start to wear off and are absorbed after a few months. This also means that immediate (emergency) policy interventions do not always need to be rolled out (e.g. temporary targeted fiscal measures, see below). The large-scale impact and persistence of the energy crisis certainly warranted emergency measures; yet a crisis event of this magnitude remains, of course, rare.

Finally, some stakeholders argued that high fossil fuel prices in and of themselves are not necessarily 'bad' for the transition; to the contrary, they offer a crucial price incentive for households (and companies) to switch from fossil fuels to renewables and other low-carbon technologies. This is also the rationale behind the carbon pricing approaches that have come to dominate climate and energy transition policies in Belgium and the EU. Note, however, that this does not necessarily apply to sudden and high-impact *shocks* to fossil fuel prices. Moreover, as workshop participants flagged, this price-based approach also needs to complemented with corresponding flanking measures that address potentially negative distributional impacts, in turn allowing for a truly 'just transition'.[9]

4.2. Policy recommendations

Table 3 provides an overview of a number of potential key policy interventions identified through the literature review and workshop. They are categorized based on the following parameters: a) which level of government has primary responsibility for the type of policy intervention in question; b) whether it entails a measure to deal with fossilflation and climateflation on a direct, emergency basis, or whether it constitutes

[8]Although an in-depth discussion on this purported 'central bank neutrality' falls outside the scope of this study, the principle is increasingly challenged, particularly when it comes to central banks' role in addressing the climate crisis (Blondeel et al., 2024; Shears et al., 2025).

[9] Muth (2024) has studied how relief measures are crucial to alleviate concerns about the negative distributional impact of the carbon pricing policies in the specific case of Ireland.

interventions that reduce these risks in the longer term. Note that the proposed policy interventions can be situated on a spectrum. On the one far end, there are direct emergency measures to immediately tackle inflationary pressures. On the other, we find more structural measures that help address climateflation and fossilflation in the longer term.

Table 3. Overview of available policy interventions (EU, federal and regional level)

	Emergency, short-term interventions	Structural, long-term interventions
EU/Eurozone level		(Fossil) energy supply diversification. Reform energy taxation directive. Electricity market reform & integration. Reform EU fiscal rules. Green monetary policy.
National level: federal & regional	Targeted fiscal measures based on means-tested criteria. Impose windfall taxes (e.g. through 'soft' price caps)	Maintain automatic indexation. Climate adaptation. Structural reform of fiscal energy policy. Decrease the Belgian economy's internal and external footprint. Incentivize demand-side flexibility.

Source: authors' creation, based on Sgaravatti et al. (2023)

General

- **Accelerate the pace of the energy transition.** This can address both fossilflation & climateflation and applies to *all* policy levels explored in this report. Recent research has shown that scaling-up renewable energy sources leads to lower and more stable electricity prices (Americo et al. 2023; Krahé and Heilmann, 2023; Melodia and Karlsson, 2022). A growing number of studies further suggest that the energy transition, and the increase in renewables in the energy mix has deflationary effects (Serrano et al. 2025; Zhang et al., 2024). In other words, decarbonizing the economy is not only a crucial step in mitigating climate change (and reducing exposure to climateflation), it also reduces fossil fuel dependency and potential exposure to fossilflation.

Regional and federal-level structural, longer-term interventions:

- **Maintain general automatic wage indexation.** This system automatically adjusts wages across all sectors in line with the cost of

living (Federal Planning Bureau, nd.). It is the instrument that most effectively absorbs any loss of purchasing power - be it through climateflation or fossilflation - as it allows for an automatic increase in wages (and benefits) once a certain threshold is passed. According to an analysis of Capéau et al. (2022, p. 2) of the energy crisis in Belgium, the automatic indexation "significantly compensated the loss of purchasing power" due to inflation.

Three additional remarks are in place. First, the federal government De Wever I is currently introducing reforms to the system, which could prove detrimental to households' ability to absorb upward inflationary pressures from fossil price increases and extreme weather events. Second, as Peersman et al. (2023) note, due to the architecture of the Belgian indexation mechanism, some households were over-compensated in the first phases of the crisis and under-compensated in subsequent stages. Their recommendation is to use actual household energy bills (of existing energy contracts) to calculate the consumer price index, rather than only including new energy contracts. Third, and related to the previous one, automatic indexation has some regressive distributive effects; since it compensates households with high incomes more than households with low incomes (Capéau et al., 2022, p.4; see also the discussion on targeted measures below). However, a wider discussion on the benefits and downsides of the system of automatic wage indexation falls outside the scope of this study.

"the automatic indexation 'significantly compensated the loss of purchasing power' due to inflation"

- **Make adaptation a key climate action measure.** The analysis showed the impact of high temperatures, excessive rainfall and climate damages on inflation in Belgium. Taking into account current warming trajectories climate adaptation measures will become key in addressing climateflation. Although we could not find significant results for inflationary impacts of droughts, the Blue Deal, initiated under the previous Flemish government offers a prime example of how such adaptation measures can help remedy the more general economic impacts of droughts (Merckx, 2025c). A recent study by VITO and WWF (Liekens and Dufrêne, 2025) has found that investments in nature-based solutions are among the more cost-efficient and effective measures for adaptation. The Flemish government acknowledged cost-efficiency in its 2023 '*Vlaams klimaatadaptatieplan*' (Vlaamse overheid, 2023). Moreover, investing in nature restoration has additional advantages for climate mitigation (e.g. carbon sequestration potential and the elimination of emissions from current degraded landscapes), adaptation (flood control, water retention etc.), and health.

"Taking into account current warming trajectories climate adaptation measures will become key in addressing climateflation."

- **Structurally reform fiscal energy policy**. For this, multiple policy interventions are possible. First, a rapid yet managed phase-out of

direct and indirect fossil fuel consumption subsidies will lead to reduction in (excessive) fossil fuel consumption, reducing GHG emissions and less exposure to fossil price spikes. According to the latest inventory of the federal FPS finance and the FPS Health, Food Chain Safety and Environment (2024), direct federal fossil fuel consumption subsidies amounted to €12.1 billion in 2021, or 2.4% of GDP. Indirect subsidies amount to €2.6 billion, or 0.5% of GDP, the main category being the tax regime for company cars. However, as highlighted in the beginning of this section, these reforms come with (political) trade-offs. If these reforms are not organized according to principles of a 'just transition', they may lead to popular backlash, such as the '*Gilets Jaunes'* movement in France.

"a rapid yet managed phase-out of direct and indirect fossil fuel consumption subsidies will lead to reduction in (excessive) fossil fuel consumption, reducing GHG emissions and less exposure to fossil price spikes"

As second option is a 'tax shift' from electricity to fossil fuels (namely gas). Electricity is taxed higher than fossil gas at the household and small business level (Heussaff, 2024). For example, in the buildings sector, the higher excise duties on electricity compared to fossil fuels create price ratios that prevent the uptake of heat pumps (FPS Health, Food Chain Safety and Environment, 2024). High levels of heating through gas expose end-consumers to fossil fuel price spikes.

- **Decrease the Belgian economy's internal *and* external carbon footprint**. Domestic economic activities have a relatively large external carbon footprint outside territory. A key example is deforestation. According to a recent NGO report, 8,1% of the EU's total deforestation exposure is linked to Belgium's imports (mainly for cacao) (Titley, 2024). In 2019 – 2021, Belgian's average deforestation exposure was 12.000 hectares (both numbers after re-adjusting for re-exports). Europe is the 2nd biggest importer of tropical deforestation in the world. Deforestation and reconversion of nature is an important source of carbon emissions and therefore a driver of climate change. This means that activities funded by Belgian companies are co-responsible for driving climateflation. Belgium should take measures to stop the import of deforestation products, as required by the EU Deforestation Regulation (EUDR):
    - Establishing a robust and transparent monitoring and enforcement framework to ensure that all imported products covered by the EUDR are fully traceable and compliant.
    - Allocating adequate resources to customs and regulatory authorities to verify due diligence statements and penalize non-compliance.
    - Supporting companies, especially small and medium enterprises, with clear guidance and technical tools.
    - Providing financial assistance to producer countries to help them with EUDR requirements.

Domestic environmentally harmful activities are still rampant. The destruction of natural dune systems, forests and wetland ecosystems is detrimental to biodiversity and ecosystems' ability to withstand climate extremes (and, therefore, climateflation). In Flanders alone, 75% of wetlands were lost in the last 60 years (VMM, nd.). The relevant governments should work on eliminating subsidies for harmful activities within *and* outside the country. To give a concrete example: this can be done by adapting the re-insurance policy rules of institutions such as the official Belgian export credit agency, *Credendo*, to the 'Do No Significant Harm' principle of the EU taxonomy for sustainable activities. In effect, the broader financial sector will require further regulation at national level. NGO research has shed light on the link between Belgian banks financing deforestation abroad (Ruig and Van de Sype, 2025). Currently, regulations that prevent Belgian financial streams flowing to destructive activities is almost non-existent. Governments should intervene, both in Belgium and at the EU level, to halt the financial sector funding deforestation and to give priority to sustainable investments.

"Currently, regulation that prevents Belgian money flowing to destructive activities is almost non-existent."

- **Incentivize demand-side flexibility.** Policies that expose consumers to real-time prices can encourage efficient demand-side behaviour. Consumers can be incentivized to use and store electricity in times of abundance, and to reduce demand during periods of supply scarcity (Heussaff, 2024). Moreover, this flexibility has the potential to provide a direct revenue stream for consumers in exchange for reducing demand in times of system stress, making investments in technologies such as electric cars and heat pumps more attractive.

"flexibility has the potential to provide a direct revenue stream for consumers in exchange for reducing demand in times of system stress"

Regional and federal-level emergency, short-term interventions:

- **Implement targeted fiscal measures based on clear means-tested income criteria.** The response to the energy crisis in the Euro area mainly included compensation measures targeting retail prices, such as energy price caps, and other measures that broadly benefited all households or firms. In Belgium, as discussed above, the general automatic wage indexation was a key lever. More targeted measures, such as transfers to low-income households, can help remedy both the regressive distributional effects of 'non-discriminatory' measures and limit the overall fiscal cost for governments. For Belgium, Capéau et al. (2022) found that the expansion of eligibility conditions for the social rate for energy has been incredibly effective in helping lower-income households deal with the effects of the energy shock. Such targeted measures will also be perceived as fairer by citizens.

"More targeted measures, such as transfers to low-income households, can help remedy both the regressive distributional effects of 'non-discriminatory' measures and limit the overall fiscal cost for governments."

However, the vast majority of fiscal measures in the Euro area were non-targeted (ECB, 2024). In the future, there should be a greater balance between targeted and untargeted measures.

- **Impose windfall taxes (e.g. through 'soft' price caps).** Research suggests that a corporate tax on windfall profits in the energy sector that are transferred to workers is effective in reducing inflation (Wildauer et al., 2023), while according to Krebs and Weber (2024), price controls would buy time to deal with bottlenecks that continue as long as a negative supply shock endures. Several EU countries have, at the height of the energy crisis, introduced windfall taxes for companies profiting from fossilflation. These tax revenues, in turn, could be used to mitigate inflationary pressures for households and other companies. Italy, Spain and the UK are among the countries that implemented such measures (Amaglobeli et al., 2023). In Belgium, several power generators realized windfall profits at the height of the energy crisis (Pauwels, 2022). The 2022 EU Regulation on 'Emergency Intervention to Address High Energy Prices' introduced several measures to reduce energy costs for consumers and businesses, including a temporary revenue cap on electricity producers (€180/MWh), as well as a mandatory solidarity contribution from the fossil fuel sector. The 'soft' price cap refers to all additional revenues above a certain threshold being considered 'windfall profits' and that are taxed at 100%. Importantly, the translation of the revenue cap into Belgian federal legislation (to €130/MWh) was challenged before the constitutional court in Belgium (Steel, 2023).

"(windfall) tax revenues could be used to mitigate inflationary pressures for households and other companies."

EU-level structural, long-term interventions:

- **Diversify (fossil) energy supplies.** The energy price crisis in the EU has shown that the bloc was overly reliant on Russian energy imports, specifically Russian fossil gas. Diversification of energy supply is a key measure to avoid concentration of power over supplies that, in turn, can be easily weaponized in terms of conflict or confrontation. Avoiding concentration of supplies in other sectors can also be crucial in limiting exposure to climateflation. For example, to avoid price impacts of failed harvests due to extreme weather events, countries should seek to diversify suppliers of certain agricultural or food imports. Note that this study did not explore the impact of such 'external' events and dependencies in the case of climateflation in Belgium. This is identified as an avenue for future research.

- **Energy taxation reform.** The current EU Energy Taxation Directive sets minimum excise duty rates for energy and formulates a minimum rate for electricity at similar levels as fossil fuels, such as fossil gas. In practice, however, in many European countries (as is the case in Belgium), electricity is taxed more than fossil fuels. Already proposed

back in 2021 by the European Commission, a revised Energy Taxation Directive should align the taxation of energy products with EU energy and climate policies and remove outdated exemptions and reduced rates that currently encourage the use of fossil fuels. This discourages wasteful fossil fuel consumption (leading, for example, to less emissions and lower exposure to climateflation further in the future).

"Grid integration and interconnection can help shield off price spikes in a specific country and can help avoid fossilflation."

- **Further integrate the EU electricity grid as part of electricity market reforms**. Due to the merit order principle in electricity markets, high spikes in fossil fuel prices (especially fossil gas) can cause a steep increase in electricity prices (Gasparella et al. 2023). This has been one of the major drivers of the energy crisis. In May 2024, a new EU regulation on the electricity market reform was adopted by the European Council in order to avoid excessive impacts of fossil fuel price spikes (European Council, 2024). These reforms should be complemented with deeper European electricity system integration that takes advantage of geographical and spatial differences in electricity supply and demand across the EU. This will involve the implementation of institutional arrangements and long-term investment coordination, as well as building more physical grid infrastructure between European countries (Committee on Industry, Research and Energy, 2025; Heussaff, 2024). In November 2023, the European Commission already published a Grid Action Plan to accelerate the expansion, modernisation and digitalisation of grids, which should lead to a European Grids Package by the end of 2025. Grid integration and interconnection can help shield off price spikes in a specific country and can help avoid fossilflation.

"Allowing for exceptional state aid interventions during crisis events can be done by making several provisions under the Temporary Crisis and Transition Framework permanent"

- **Reform EU fiscal rules and allow for exceptional state aid interventions during crisis events.** The energy transition will require major green investments. However, under current EU fiscal rules all investments are treated equally and indiscriminately as a cost for the state budget. Therefore, the EU fiscal rules should be reformed in multiple ways. Examples include: 1) introduce a 'green golden rule' into the fiscal rules, so that green investments can be financed through budget deficits; 2) make the Recovery and Resilience Facility (RRF), the centrepiece of *NextGenerationEU*, a permanent instrument. Through the RRF, the Commission collectively raises funds by borrowing on the capital markets (issuing bonds on behalf of the EU). These funds are then made available to Member States. Additionally, issuing (more) 'Eurobonds' is crucial for the greening of the economy and decreasing exposure to fossilflation.

  Allowing for exceptional state aid interventions during crisis events can be done by making several provisions under the Temporary Crisis and Transition Framework permanent. In March 2022, the European

Commission adopted a Temporary Crisis Framework to enable EU countries to support the economy in the context of the Russia-Ukraine war. This was followed by the adoption of a Temporary Crisis and Transition Framework to foster support measures in sectors which are key for the transition to a net-zero economy (European Commission, nd.). State aid can help remedy the increased energy costs in case of exceptional (fossil) energy price shocks. State aid can also be crucial as part of a green industrial policy strategy that seeks to support clean industries as the EU must strategically navigate the changing geopolitical and geo-economic landscape, as proposed in the recent Draghi report and the Commission's Green Industrial Deal.

- **Greening monetary policy**. ECB research has found that "unconventional fiscal policy measures helped to substantially compress these [2021-22] inflation differentials across households" (Pallotti et al., 2024), highlighting the importance of (national-level) *fiscal* policy, rather than Eurozone-wide *monetary* policy, as a response to country-specific dynamics. That does not mean central banks cannot or should not address fossilflation and climateflation. At the very least, they should start incorporating environmental considerations into their inflation forecasting and macroeconomic models (Boneva and Ferrucci, 2022). Although challenges remain, we call upon the ECB, the NBB and others to include climate-related shocks and trends in the models used for their policy analysis and forecasting. This will help them refine their approaches to fossil fuel price-related inflationary shocks. After all, the key policy tool the ECB has at its disposal - raising interest rates - works counterproductively in the case of transitory fossilflation (Van Doorslaer, 2023).

"the key policy tool the ECB has at its disposal – raising interest rates – works counterproductively in the case of transitory fossilflation"

As the report has shown, there is now growing central interest in exploring the effects of climate change on monetary and financial stability, as evidenced by growing research by, for example the NBB and the ECB. However, the ECB still stops short from explicitly engaging with climate and environmental issues through other policy tools at its disposal, such as collateral frameworks (Dafermos et al. 2022), asset purchase programmes (also referred to as 'green quantitative easing' – see Ferrari and Nispi Landi, 2023), targeted lending schemes (Colesanti Senni et al., 2023), or dual interest rates (with a lower interest rates attributed for green projects) (Van Eyck, 2024). Taken together, these interventions could accelerate the energy transition, lowering the eurozone's exposure to high levels of fossil dependence. Ultimately, they also help lower emissions and thus limit longer-term exposure to climate change and climateflation.

"these interventions could accelerate the energy transition, lowering the eurozone's exposure to high levels of fossil dependence and limiting longer-term exposure to climate change and climateflation."

5. CONCLUSIONS

This report started with the observation that inflation, cost of living and high prices have overtaken all other issues as the key concerns among households, voters and businesses in Belgium and the EU. This seems to have come at the expense of public and political attention to climate change. However, this stands in stark contrast with the reality of the climate crisis itself. 2025 is now on course to be the second consecutive year in which average global temperatures surpass the 1.5°C target of the Paris Agreement (Copernicus, 2025b), as the world continues to burn record amounts of fossil fuels.

But one should not see these phenomena as distinct from each other. To the contrary, this study has shown that climate change, fossil fuel dependence (and prices), and inflation should all be understood as inter-related challenges. Indeed, fossilflation and climateflation are problems that citizens, businesses, governments and other stakeholders in Belgium are already faced with.

"This study has shown that climate change, fossil fuel dependence (and prices), and inflation should all be understood as inter-related challenges."

Current developments make the report very timely. As key stakeholders in Belgium and the EU continue to call for deregulation - often citing their supposed negative impacts on the economy, prices, and competitiveness of climate and environmental regulations - this report offers the insight that inflation can, at least in part, be attributed to our dependence on fossil fuels and extreme weather events. Particularly climateflation risks becoming an ever-greater challenge in Belgium, as others have also warned (De Sloover & Jacobs, 2024). If we collectively succeed in managing a successful and just transition away from a fossil-fuelled economy to a renewables-based on, future risks of fossilflation, as we have seen during the recent energy crisis, should dissipate.

The report invites policymakers, civil society, business and other stakeholders to jointly reflect on novel, or at least so-far under-discussed, financial and macro-economic challenges associated with the climate crisis. That also means jointly reflecting on the policy solutions that have been formulated in this report. It also serves as an invitation to the research community to further explore issues that were not covered here. One avenue for future research relates to the question of the exposure of a relatively small and open (i.e. import-dependent) economy, such as that of Belgium, to climate-induced negative supply shocks. For example, what could be the inflationary impacts for Belgium of failed harvests in countries from which we import food? And, how can we address potential vulnerabilities?

"What could be the inflationary impacts for Belgium of failed harvests in countries from which we import food? And, how can we address potential vulnerabilities?"

Another important avenue for future research is the exploration of the implications of fossilflation and climateflation for industry in Belgium; as this report focused on the household-level. As the 2024 Draghi report has spelled out in detail, high (fossil) energy prices are a key impediment

for corporate investments in the EU. As extreme weather events further intensify and become more frequent, companies might (or, *should*) also be adapting their investment strategies based on climateflation risks.

It is clear that much has changed since Isabel Schnabel first introduced us to the concepts of fossilflation and climateflation in 2022. New, pressing issues such as the Russia-Ukraine conflict, trade wars, renewed great power competition and other geopolitical upheaval have come to the fore. In an age of such 'polycrisis', climate change should, however, continuously be treated as a major challenge in Belgium, the EU and around the world.

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