Comparative case study between the Nuclear Energy Policies of the Netherlands and Belgium

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Master's Thesis for the Environment and Society Studies programme

Nijmegen School of Management

Radboud University

November 2025

Radboud University

Colophon

Title:	Comparative case study between the Nuclear Energy Policies of the Netherlands and Belgium
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Degree:	MSc Environment and Society Studies
Specialisation:	Global Environment and Sustainability
Faculty:	Nijmegen School of Management
University:	Radboud University
Date of Submission:	28-11-2025
Word Count:	24.665
Supervisor:	dr. ir. J.D. Liefferink
Second Reader:	dr. M. Chan
Internship:	Milieudefensie (Friends of the Earth)
Cover Image:	https://pixabay.com/nl/photos/kerncentrale-rijn-stromen-4535760/

Summary

The aim of this thesis is to explain the different nuclear strategies of the Netherlands and Belgium. While the Netherlands has historically been hesitant to invest in nuclear energy, recent governments have announced plans to construct multiple new nuclear power plants. In contrast, Belgium has a long-standing history of nuclear engagement, with seven reactors in operation since 1985. Nevertheless, in 2003, Belgium adopted a law that prohibits the construction of new reactors and mandates the phase-out of existing reactors between 2015 and 2025. This thesis seeks to understand these divergent policy choices, particularly given that they face comparable challenges and have a similar geographical location.

To explain these different policy outcomes, this thesis applies Kingdon's Multiple Streams Framework, which analyses agenda-setting and decision-making through three different streams, the problem-, policy-, and political streams. In addition, the framework highlights the role of policy entrepreneurs and policy windows in advancing policy proposals. This thesis conducts a comparative case study and employs process tracing to examine the nuclear energy debates and policy developments in both countries.

The findings show that in the Netherlands, the alignment of all three streams created favourable conditions for policy change. Rising energy prices, increasing dependency on energy imports, and the need for diversification strengthened the case for nuclear investment. Moreover, growing public- and political support enabled the two most recent governments to adopt policy proposals for the construction of new nuclear power plants, confirming the country's nuclear phase-in.

Belgium has a different nuclear history, as it already had seven operational nuclear reactors by 1985, making nuclear energy a core part of its energy system. While problem indicators and policy solutions also created momentum for reconsidering nuclear energy in Belgium, the political stream did not align. The presence of the Green parties in government, and their continued commitment to the 2003 phase-out law, prevented major policy changes in favour of nuclear energy. As a result, Belgium has only committed to extending the phase-out timeline.

Keywords: Nuclear energy policy, Multiple Streams Framework, Netherlands, Belgium, Phase-in vs. Phase-out, Decision-making, Agenda-setting, Policy window, Energy transition.

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List of Abbreviations and Acronyms

ACF	Advocacy Coalition Framework
BMD	Brede Maatschappelijke Discussie (Broad Societal Discussion)
CDA	Christen-Democratisch Appèl (Christian Democratic Appeal)
EPZ	Elektriciteits-Produktiemaatschappij Zuid-Nederland (Electricity Production Company South Netherlands)
EU	European Union
FOD	Federale OverheidsDienst (Belgium Federal Public Service)
FOM	Stichting Fundamenteel Onderzoek der Materie (Foundation For Fundamental Research On Matter)
JTF	Just Transition Fund
KGG	Klimaat en Groene Groei (Climate Policy and Green Growth)
KW	KiloWatt
MSF	Multiple Streams Framework
MW	MegaWatt
NPE	Nationaal Plan Energiesysteem (National Energy System Plan)
NRG	Nuclear Research and consultancy Group
N-VA	Nieuw-Vlaamse Alliantie (New Flemish Alliance)
PET	Punctuated Equilibrium Theory
RCN	Reactor Centrum Nederland (Reactor Centre Netherlands)
RID	Reactor Instituut Delft (Reactor Institute Delft)
SMR	Small Modular Reactor
TNO	Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek (The Netherlands Organisation for Applied Scientific Research)
VVD	Volkspartij voor Vrijheid en Democratie (People's Party for Freedom and Democracy)
UN	United Nations
USA	United States of America
WISE	World Information Service On Energy

1. Introduction

1.1 Topic Outline

Nuclear energy is a complex and multifaceted topic that covers a diverse range of opinions, characterised by shifts in societal attitudes and changes in the political landscape. The nuclear debate includes environmental, economic, technological and safety considerations. Furthermore, questions about the security of energy supply, diversification, dependence, and sustainability play an important role. Countries face a variety of policy options, such as expanding nuclear capacity, phasing-out existing reactors, maintaining current levels, or investing in alternative energy sources. Decisions are influenced not only by public opinion and political priorities, but also by the interests groups, industry actors, environmental organisations, and media reporting.

Historically, opponents of nuclear energy often argue that there are safety risks, referring to Chernobyl and Fukushima. Additionally, nuclear waste is frequently seen as a significant problem, since it would burden future generations with radioactive materials. Supporters of nuclear energy often emphasise the need for energy security and diversification. Economic considerations, such as cost-benefit analyses, alongside safety and security concerns, shape the feasibility and attractiveness of different policy pathways. The Russo-Ukrainian war has also intensified concerns about energy security, forcing countries to reduce their dependence on Russian gas and oil, and introducing new strategic considerations into nuclear energy policy decisions. All these factors combined, result in varied national approaches to nuclear energy, which are at the centre of this thesis.

1.2 Problem Statement & Research Question

The Netherlands has historically maintained a cautious stance on nuclear energy. In its ambition to shift away from fossil fuels, the Netherlands constructed its first nuclear power plant in Dodewaard in 1965. This was an experimental boiling water reactor of 50 MegaWatts (MW), and it was connected to the grid in 1969 (Aarts & Arentsen, 2017). As of today, this power plant in is no longer active and being prepared for dismantling. In 1969, a second nuclear power plant of 450 MW, was build in Borssele. The nuclear power plant in Borssele was connected to the grid in 1973 and is still operational providing 3% of the electricity consumed annually in the Netherlands (Ministerie van Economische Zaken en Klimaat, n.d.).

The 1970s and 1980s in the Netherlands were marked by intense debate over nuclear energy, with a strong emerging anti-nuclear movement, fuelled by the Chernobyl nuclear disaster in 1986. The government halted its nuclear ambitions in 1993 and decided in 1994 that the Dodewaard nuclear power plant should close in 1997, and the Borssele plant would need to be shut down in 2003. The latter has been postponed multiple times, as it is still operational today. The nuclear debate regained some momentum in the context of climate change. However, a lack of political and societal support, together with the Fukushima nuclear disaster in 2011, has halted the Netherlands from investing in nuclear energy, until more recently (Aarts & Arentsen, 2017). When the Rutte-IV government took office in 2022, there was a political majority to invest in nuclear energy. The government decided to invest in building two new nuclear power plants (Ministerie van Economische Zaken en Klimaat, n.d.). The new Schoof cabinet, which took office on July 2, 2024, decided to go even further and agreed in a coalition agreement to build four new nuclear power plants (PVV, VVD, NSC, & BBB, 2024).

In Belgium, the history of the government's nuclear energy policy has looked much different. Belgium's engagement with nuclear energy began in the 1960s, with its first small pressurised water reactor commissioned in 1962, in Mol (World Nuclear Association, n.d.-a). In 1966, the Chooz A prototype, a joint Franco-Belgian project, was commissioned in France. Following this, Belgium decided to construct the Doel 1 and 2 reactors, and another Franco-Belgian project with the Tihange 1 reactor. Subsequently, the Belgian government ordered the construction of four more reactors, also to be built at the sites of Doel and Tihange. In the end, seven nuclear reactors were constructed in Belgium, with four reactors located in Doel and three in Tihange. At its peak, nuclear energy accounted for 60% of Belgium's electricity generation, today it still provides around 40%.

However, the political momentum around nuclear energy in Belgium shifted, as successive governments became more wary of safety issues. In 2003, the Belgian federal Parliament adopted legislation that banned the construction of new nuclear reactors for commercial electricity generation and restricted the operation lifetime of existing reactors to a maximum of 40 years (International Atomic Energy Agency, n.d.). Under this law, nuclear energy was scheduled to be gradually and completely phased out between 2015 and 2025. In light of energy security concerns and the need to meet climate reduction targets, successive governments amended the law and extended the operational lifetime of certain reactors. Nowadays, Belgium still has three operational nuclear reactors: Doel 2, Doel 4, and Tihange 3.

The problem statement addressed in this thesis lies in the fact that two countries with a similar geographical location, that are facing comparable challenges, such as managing energy security, diversification, and dependence, particularly in light of the Russia-Ukraine war, have nonetheless adopted very different policy choices in the field of nuclear energy. The Netherlands, for a long time, pursued a cautious approach to nuclear energy, but has recently decided to invest in the construction of new nuclear power plants. In contrast, Belgium has a long history of nuclear policy but is now in the process of phasing out its nuclear capacity. This thesis aims to investigate and explain the reasons behind these divergent approaches.

Altogether, this leads to the central research question that this thesis will aim to answer:

- *How can the differences in nuclear energy policy choices between the Netherlands and Belgium be explained?*

1.3 Aims, Objectives & Research Design

The aim of this thesis is to conduct an in-depth study of the nuclear energy policies of the Netherlands and Belgium. By conducting a comparative case study, this thesis investigates the different policy choices made in both countries and seeks to understand the circumstances under which they have arrived at different nuclear energy strategies. The central objective is to identify and analyse the underlying factors that have shaped these contrasting policy outcomes. A comparative case study design is particularly suitable here, as it allows for a systematic comparison of two countries that face similar energy challenges and are in close proximity of each other, yet have adopted contrasting nuclear energy strategies. Since the start of this thesis dates back to 2024, and political developments in both countries evolve rapidly, the cut-off point for the data collection is set at the end of 2024. Political events and decisions occurring beyond this point remain important for future research but fall outside the scope of this thesis.

To carry out this research, this thesis applies the Multiple Streams Framework (MSF) developed by Kingdon (2014). The MSF conceptualises the policy process as taking place across three separate streams: the problem stream, the policy stream, and the politics stream. When a window of opportunity opens, a policy entrepreneur may capitalise on this opportunity by coupling the streams, which can ultimately result in policy change (Herweg, Zahariadis, & Zohlnhöfer, 2023). The MSF thus offers a good theoretical lens to analyse the process of agenda-setting and decision-making. Moreover, by separating the policy process into different streams and emphasising the role of policy windows, the framework helps to explain when and under what conditions policy change occurs. As such, providing insights into how each country

arrived at contrasting policy outcomes, by examining the underlying factors within the streams, explaining why the Netherlands is pursuing a nuclear phase-in while Belgium is phasing out.

This thesis conducts a comparative case study and applies the method of process tracing to examine the policy dynamics surrounding nuclear energy in the Netherlands and Belgium. To strengthen the validity of the findings through triangulation, the research analyses the nuclear energy discourse by reviewing scientific literature, news articles, policy papers, government decisions, campaigns by interest groups, and party programmes. In addition, interviews are conducted with representatives of the Dutch and Belgian governments, as well as with a research institute involved in the nuclear energy debate.

1.4 Scientific- and Societal Relevance

The scientific relevance of this thesis lies in its application of the MSF to the field of nuclear energy policy in a comparative European context. The MSF has been widely applied to study agenda-setting and decision-making processes across a variety of policy domains, including within the context of energy policy. As such, the case of the German Energiewende was studied, where nuclear energy formed part of the broader energy system being analysed (Derwort, Jager, & Newig, 2022). However, to the best of my knowledge, the MSF has not yet been applied specifically to the policy domain of nuclear energy. By analysing the divergent policy trajectories of the Netherlands and Belgium, this research contributes to the broader literature by demonstrating how the framework can be used to explain variation in policy outcomes in two cases. Moreover, the thesis tests the explanatory power of the MSF on a complex and new policy topic.

When studying nuclear energy policies, the usual suspects are often France and Germany. France, because it is so heavily reliant on its nuclear reactors, which account for around 75% of its electricity demand, being the highest in the whole of Europe (Kunsch & Friesewinkel, 2014). Germany, on the other hand, because it was also dependent on 17 nuclear reactors, which accounted for about 25% of the country's electricity demand, but has since completely phased out nuclear energy in the wake of the Chernobyl and Fukushima nuclear disasters (World Nuclear Association, n.d.-b). Both cases make for an interesting comparison in light of their contrasting policy decisions, and several studies were conducted in the past (Bern & Winkel, 2013; Wiliarty, 2013; Nelkin & Pollak, 1980). Nevertheless, Belgium also presents an interesting case with its nuclear phase-out policy, but has historically been understudied. Recent developments in the Netherlands also further highlight its relevance as a case study.

Moreover, a comparative analysis of the Netherlands's and Belgium's nuclear energy policies has, to date, only been conducted in the form of a master's thesis (Snier, 2021), highlighting a clear gap in the scientific literature that this thesis seeks to address. While Snier (2021) primarily conducted a historical comparison, focussing on discourses, this thesis aims to contribute a stronger theoretical perspective and incorporates more recent developments in the nuclear debates of both countries. There is, however, substantial literature available on the nuclear energy policies of the Netherlands and Belgium individually. This thesis will make use of and reflect upon the existing literature. A literature review of the most relevant contributions can be found in section 2.4 of this thesis 'Nuclear Energy Literature'.

Nuclear energy is a highly relevant topic, playing a part in the political and societal debates of many countries. Understanding the dynamics behind policy decisions on nuclear energy is therefore of considerable societal importance. Furthermore, concerns about energy security and the safety of nuclear energy have direct implications for the general public. This thesis provides an in-depth analysis of the policy choices made by the Netherlands and Belgium, aiming to explain the underlying reasons for their divergent approaches. By examining the three streams of the MSF in detail, this research also incorporates the roles of public opinion, political parties, interest groups, and media reporting. These factors are highly relevant for society, as they influence policy outcomes and shape the broader energy debate. Policymakers, interest groups, and political actors can benefit from the insights provided by this study, gaining a clearer understanding of the dynamics that lead to particular policy choices.

1.5 Thesis Outline

The next chapter of this thesis is the theoretical framework, which will first draw upon the MSF and explain its core concepts. This is followed by an overview of the relevant literature and applications of the MSF, as well as a discussion of its justification and limitations. The third chapter is the methodology and will firstly elaborate on the research paradigm, then it will explain the methods used in this thesis and set out the case selection and approaches for data collection. The methodological chapter will conclude with an operationalisation of the core concepts of this thesis. The fourth chapter will present the empirical research results, beginning with an in-depth analysis of nuclear energy policies in the Netherlands through the lens of the MSF, followed by an analysis of the nuclear energy policies in Belgium. The final part of the analysis is a comparison of both cases. The fifth and final chapter will draw conclusions from this research and end with a discussion and recommendations for future research.

2. Theoretical Framework

This chapter presents the theoretical foundation for this thesis by outlining the MSF and its applications. Firstly, this chapter will provide an overview of the MSF's key concepts. This is followed by a discussion of how the framework has been applied in the fields of agenda setting, decision making, and comparative policy analysis. The chapter then addresses the justifications and limitations of applying the MSF in this research. Next, a literature review of relevant studies on nuclear energy in the Netherlands and Belgium is presented. Finally, the chapter draws upon the MFS's theoretical expectations for this thesis, in the specific policy domain of nuclear energy.

2.1 Multiple Streams Framework – Key Concepts

2.1.1 General Outline

John Kingdon developed the Multiple Streams Framework (MSF) in 1984 to analyse the process of policymaking and agenda-setting, to understand how shifts in policies come about (Kingdon, 2014). The MSF identifies three independent streams that are at the core of the policy process: policy problems, policy solutions, and political conditions (Herweg, Zahariadis, & Zohlnhöfer, 2023). These three streams have their own individual dynamics and are not always connected to each other. Occasionally, a window of opportunity opens up, and a policy entrepreneur can seize the opportunity to try and couple the three streams. When the streams are aligned, policy change can occur. The core concepts of the MSF will be further discussed in the next sections.

2.1.2 Problem Stream

In the problem stream, the process through which problems gain relevance and appear on the political agenda takes place. It starts with the way in which societal issues are identified, interpreted, and subsequently framed by policymakers. According to Kingdon (2014) "*Problems are not simply the conditions or external events themselves; there is also a perceptual, interpretive element* (pp. 109-110)." Problems consist of social and political constructs and are subject to the interpretation of certain conditions (Herweg, Zahariadis, & Zohlnhöfer, 2023). Conditions turn into problems through advocacy efforts, indicators, focusing events, and feedback loops. Moreover, problems do not gain importance, nor do they automatically rise to the agenda, just by existing. By successfully framing conditions in a way

that suggests they require attention, conditions become problems, and people perceive them as requiring intervention from the government.

Policy makers become aware of problems through specific indicators, focusing events, and feedback loops. Examples of indicators that gives salience to certain conditions can be statistics about crime, deaths, and infant mortality, or unemployment figures and new information on budgets and finances (Herweg, Zahariadis, & Zohlnhöfer, 2023). When changes in such data appear, or when new studies come out that reveal new information about specific problems, public awareness goes up, and it becomes more apparent to decision-makers that the condition must be addressed. New studies or data being published might also lead people to perceive the situation in a new context, reinterpreting the condition as a problem. Additionality, if people discover that other countries are handling certain condition's more effectively, something that we considered to be normal may begin to seem problematic. This in itself will not open up a problem policy window, but policy makers can utilise the indicator to start and define the conditions as problems through effective framing and integrating it into a broader policy narrative. This way, problems can become part of the political agenda.

Focusing events can also drive attention towards a certain problem, when a crisis or a disaster occurs. Crises or disasters, like plain crashes, natural disasters, or terrorist attacks, can shift the perception of both the public and policy makers, and give prominence to conditions, opening up a problem window potentially leading to agenda change (Herweg, Zahariadis, & Zohlnhöfer, 2023). Focusing events can also happen in a more subtle way, for instance through policy makers' personal experiences. When an influential policy maker has a personal experience that marks the significance of a problem to them, they might choose to bring it to the political agenda (Kingdon, 2014). Another type of focusing event that can help highlighting a problem is a powerful symbol. Symbols tied to political events, policy initiatives, or problems can effectively convey the core meaning of an issue, directing public attention toward it. Kingdon (2014) does note that personal experiences and symbols often act as reinforcement factors of problems that are already rising to the agenda, rather than being the primary source of agenda setting.

Finally, specific conditions can also attract attention through feedback. When policy makers receive feedback on governmental programmes, or bottlenecks in implementation, this may put new problems on their radar (Herweg, Zahariadis, & Zohlnhöfer, 2023). For example, new information about skyrocketing costs, adverse effects, or a programme failing to achieve its

objectives might come to light. When the public or policy makers get a hold of this information, it becomes more apparent to address these issues. Feedback can be given by both the government itself as well as by civil society actors.

Since policy makers have to deal with a variety of problems at the same time, not all of them can be addressed. Policymakers must assess which problems are most important to address, and they do so partly based on how politically relevant a particular issue is (Herweg, Zahariadis, & Zohlnhöfer, 2023). Moreover, policy makers are also worried about their re-election, and their judgement is therefore also influenced by the electoral relevance of an issue.

Problems are thus not mere objective facts, but the MSF views them as social constructs. Herweg, Zahariadis, and Zohlnhöfer (2023, p. 33) state that "*the framing of a problem is of utter importance because how a problem is defined substantially affects the solutions that can be coupled to it*." Consequently, once a problem reaches the agenda, the way in which it is perceived by the public and the range of solutions considered viable are strongly shaped by how policymakers and politicians frame that problem.

2.1.3 Policy Stream

The policy stream consists of policy communities that generate policy ideas and alternatives. Policy communities consist of civil servants, policy experts, consultants, civil society actors, interest groups, academics, and researchers. These policy communities discuss policy ideas, advocate for alternatives, and come up with new proposals. Kingdon (2014) refers to this set of policy ideas, proposals, and alternatives as floating around in a 'primeval soup', a concept borrowed from biological sciences. In this primeval soup, members of the policy community engage in discussions, making adjustments and blending different ideas that float around. The outcome of this process that Kingdon refers to as 'softening-up' is a viable set of policy ideas supported by the policy community, that can seriously be considered (Herweg, Zahariadis, & Zohlnhöfer, 2023).

Which proposals survive the softening-up process in the primeval soup is depended on the structure of the policy community. The places policymakers turn to for solutions, as well as how new ideas emerge in the primeval soup are influenced by the level of connectedness among community members (Herweg, Zahariadis, & Zohlnhöfer, 2023). Moreover, sometimes policy solutions float around and wait to be coupled with a policy problem, instead of the other way around. In sum, the policy process is rather fluid. Furthermore, Kingdon (2014, pp. 19-20) refers

to several survival criteria that enhance the chances of survival in the primeval soup: "*the proposals that survive to the status of serious consideration meet several criteria, including their technical feasibility, their fit with dominant values and the current national mood, their budgetary workability, and the political support or opposition they might experience.*"

If a policy proposal does not meet these criteria, it is unlikely to survive the softening-up process. Proposals that do meet the criteria, however, can gain serious consideration and may be linked to a policy problem. The policy stream becomes ripe for coupling when a policy alternative both survives the softening-up process and fits the problem at hand. In this case, the policy alternative can progress onto the policy agenda.

2.1.4 Politics Stream

Kingdon (2014) describes three core elements that make up the politics stream: the national mood, organised political forces, and the government. The national mood refers to the common sentiment shared by the majority of people within a country. The national mood encompasses the general political climate, attitudes towards the government, but also the dominant public opinion on policy areas or specific proposals. Because this mood shifts over time, such changes create opportunities for government officials to advance particular ideas, which in turn shape policy agendas and influence policy outcomes (Herweg, Zahariadis, & Zohlnhöfer, 2023). Kingdon (2014, p. 147) describes this national mood as: "*whether there is fertile ground or an initial receptivity to the ideas*".

Secondly, the politics stream looks at organised political forces, referring mainly to interests groups. Such interest groups can lobby either in favour or against specific policy ideas. The larger the reach of an interest group and the more influential it is, the greater its impact on which policy proposals make it onto the policy agenda (Herweg, Zahariadis, & Zohlnhöfer, 2023). As such, interest groups can shape public opinion with their campaigning activities. However, representatives of interest groups can also be part of policy communities and therefore have different ways of influencing the policy process. Within these policy communities, interest groups can put forward their own policy ideas and participate in the softening-up process, affecting which proposals ultimately survive. Nevertheless, the latter is part of the policy stream and needs to be taken into account separately from the campaigning aspect of interest groups that takes place in the political stream.

The third component of the political stream is the government, consisting of elected officials, their political parties, bureaucrats, and administrators. The most important factor of the government component in the political stream is the change of its composition, that comes with a change of political priorities (Herweg, Zahariadis, & Zohlnhöfer, 2023). Changes in administrations can lead to significant shifts in the policy agenda. Likewise, when a parliament's composition changes, resulting in some parties gaining seats while others lose them, certain proposals may be promoted while others are sidelined. Political parties have contrasting ideologies, putting forward different policy agendas.

Determining when the political stream is ripe for coupling is not always straightforward. For a policy proposal to become viable, full support from all three components of the political stream is not required, although this would increase the likelihood of policy change. The most important component is that of the government, since the government ultimately has the agenda-setting ability and the political power to adopt or reject a policy proposal (Herweg, Zahariadis, & Zohlnhöfer, 2023). Nevertheless, the position of the government is often influenced by the national mood and by interest groups, illustrating that the three are often intertwined. However, as long as the government actively supports a policy idea and holds a political majority to sustain it, the political stream may still be ripe for coupling, even when this goes against the national mood or the preferences of interest groups.

2.1.5 Policy Window

"*The policy window is an opportunity for advocates of proposals to push their pet solutions, or to push attention to their special problems*" (Kingdon, 2014, p. 165). On infrequent occasions, a policy window opens up, and the three separate streams are aligned and all ripe for coupling. This policy window normally remains open for a limited time and should be quickly taken advantage of by a policy entrepreneur. At times, policy entrepreneurs can anticipate the opening of a policy window, such as after elections. At other times, however, windows open more unpredictable, requiring entrepreneurs to remain on standby and ready to act before the window passes.

A policy window can open in either the problem- or in the political stream (Herweg, Zahariadis, & Zohlnhöfer, 2023). A policy window can open in the problem stream when indicators raise the awareness of a specific problem to policy makers or to the general public. Furthermore, focusing events can also drive attention towards a certain problem, opening a policy window. In the politics stream, policy windows often open when the composition of the government

changes, after elections when shifts in administrations and political majorities take place. A policy window can also open in the politics stream when the national mood on something suddenly shifts. Whether a policy window will open up in the problem- or in the politics stream, changes the way in which the process of coupling the streams is taking place.

If a policy window opens in the problem stream, the time to act is shorter than if a policy window opens in the political stream, since the problem needs immediate addressing (Herweg, Zahariadis, & Zohlnhöfer, 2023). Furthermore, it is important to link the problem to a solution and a policy proposal that effectively deals with the apparent problem that opened the policy window. Since there is limited time, this means that in practice the problem should be coupled to one of the policy proposals already floating around in the primeval soup. On the contrary, when a policy window opens up in the political stream, a problem should be sought to couple to an existing policy proposal. As new administrations and political majorities are likely to put forward new policy ideas, the government has to find problems for which their policy ideas can serve as solutions.

The problem stream is ready for coupling when a problem attracts the attention of the public and can successfully be framed to fit with a policy alternative or solution. The policy stream is ready for coupling when the policy community backs a policy proposal that survives the softening-up process and can be coupled with the policy problem at hand. The politics stream is ready for coupling when the government, including a political majority, is ready to support the respective policy proposal. When a policy window emerges, and the three streams align, a policy entrepreneur can seize this opportunity to advance a policy proposal. When successful, the initiative can enter the policy agenda and potentially result in policy change.

2.1.6 Policy Entrepreneur

Kingdon (2014, p. 179) describes policy entrepreneurs as: "*advocates who are willing to invest their resources – time, energy, reputation, money – to promote a position in return for anticipated future gain in the form of material, purposive, or solidary benefits*". Policy entrepreneurs can be a variety of individuals, like politicians, policymakers, academics, journalists, interest groups, or corporate actors (Herweg, Zahariadis, & Zohlnhöfer, 2023). Policy entrepreneurs lobby for their preferential proposals in the policy stream and try to find support amongst the policy community in order for their proposals to survive the softening-up process. If they are successful, they have to link their proposals with the problem- and politics stream, as soon as a policy window opens up. They have to link policy proposals, or solutions,

to problems, and match them with the right politicians and political momentum to back them up when necessary. When a policy entrepreneur is successful in coupling the three streams, the likelihood of agenda change and potential policy change increases.

A policy entrepreneur is more than an advocate for their preferred policy proposals, they need a specific set of skills at their disposal for the successful coupling of the streams. Policy entrepreneurs are more successful when they possess certain 'entrepreneurial qualities'. Kingdon (2014) names three main qualities that make a policy entrepreneur successful: expertise, political connections or negotiation skills, and persistence. Furthermore, Herweg, Zahariadis, and Zohlnhöfer (2023) add access to resources such as time, money, and energy, as well as access to policymakers and the ability to successfully frame to the list. When these qualities and resources are combined, policy entrepreneurs are more likely to successfully push their pet proposals and couple the streams.

2.2 Multiple Streams Framework – Applications

Originally, the MSF was designed to study the process of agenda setting, specifically in the United States of America (USA) in the areas of health and transport. However, the MSF has since been applied to several stages of the policy cycle and a broad range of policy domains (Herweg, Zahariadis, & Zohlnhöfer, 2023). The next section will give an overview of the different MSF applications.

2.2.1 Agenda Setting

The MSF was first developed and applied in Kingdon's (1984) first edition of 'Agendas, Alternatives, and Public Policies', studying agenda setting in the American health and transport sectors. Agenda setting is understood as the phase where multiple actors are pushing for a variety of policy proposals to become part of the policy agenda, whereas the decision-making phase is all about gathering a political majority for the policy proposal at hand to accomplish policy change (Herweg, Zahariadis, & Zohlnhöfer, 2023).

Several scholars have since studied the agenda setting phase in a variety of policy domains by applying the MSF. Examples of this are Sanjurjo (2020) who studied the agenda-setting of gun control policies in Latin America, or Maltby (2013) that studied agenda setting on energy security in the European Union (EU), or Leppänen and Liefferink (2022) studying both agenda setting and policy formulation in the case of the EU's Just Transition Fund (JTF). Furthermore, Richardson (2005) uses the MSF to understand how educational reform came on the agenda in

Mexico. Similarly, Mills (2007) studied how structural changes in the higher education system in the USA rose to the policy agenda by applying the MSF. The MSF has also been applied to agenda-setting in the case of Australian housing policy (Tiernan & Burke, 2002).

2.2.2 Decision Making

The MSF can be applied across a wide range of policy domains without requiring modifications to the framework. However, when the focus shifts from agenda setting to decision-making, fewer actors are typically involved and the role of relevant institutions becomes more important (Herweg, Zahariadis, & Zohlnhöfer, 2023). Therefore, the framework requires certain adaptations before it can be meaningfully applied to the decision-making process, as is the case in this thesis. Herweg, Huß, and Zohlnhöfer's (2015) developed some changes to the framework, leaving its operating structure intact while incorporating decision-making and the policy output into the explanatory power of the MSF.

The main adaptation for the new model is that there are two coupling processes that take place after each other, one focusing on the agenda setting, and one focusing on the decision-making process (Herweg, Huß, and Zohlnhöfer, 2015). Subsequently, coupling processes have their own policy window, the first is labelled as the 'agenda window' and the second as the 'decision window'. The second phase of the new model begins once the first coupling process is successful and the policy proposal at hand is on the agenda. This then in turn opens the decision window, where the streams need to be coupled once again to result into de adoption of the policy proposal. The main focus during the coupling of the decision phase is the political stream, where the required political majority should be gathered to adopt the policy proposal. This majority can be gathered by so called 'political entrepreneurs'.

Leppänen and Liefferink (2022) applied these two coupling processes in their study of the agenda setting and policy formulation of the EU's JTF. Their main finding was that there was not as clear of a distinction between the agenda setting and the policy formulation phases as one might think beforehand. Especially the framing that takes place in the agenda-setting phase has an important spillover effect into the policy formulation phase. The institutional setting of the EU allows for consistency between both phases, frames set out in the agenda setting phase are still dominant in the policy formulation phase. Moreover, entrepreneurship in the agenda setting phase can carry on in the policy formulation phase, it was mostly a change of arena, rather than of key players.

There have been multiple studies where the MSF has already been applied to study decision-making. A couple of examples of this are Zohlnhöfer (2016), that tries to explain German labour market reforms by analysing the decision-making process through the MSF. De Wals, Espinoza-Moya, and Béland (2019) applied the MSF to study the decision-making process of publicly funded immunisation programmes. Harcourt, Christou, and Simpson (2020) used the MSF to study the decision-making process within standard-developing organisations. In addition, the MSF was also already earlier applied to analyse decision-making processes. For example, Zahariadis (1992) conducted a comparative case study on telecommunications policy in Britain and France, where Britain opted for privatisation and France did not.

Some reflections from these applications are that the MSF does a good job at capturing both political and technical factors when evaluating the decision-making process (De Wals, Espinoza-Moya, & Béland, 2019). Since technical considerations are also part of the nuclear energy debate, this makes the MSF well suited for this thesis. Zohlnhöfer (2016) finds that for proposals to survive the softening-up process in the primeval soup, they do not need broad political support right away. Zohlnhöfer (2016) underscores the distinction made by Herweg, Huß, and Zohlnhöfer (2015) between the agenda-coupling and decision-coupling, as he finds a difference in the political stream. During agenda-coupling, it is not necessary to have a full political majority, as long as a proposal is supported by a few key officials. In contrast, during decision-coupling, securing a political majority becomes essential to ensure the proposal can be adopted. Additionally, Zahariadis (1992) finds that the government can have an impact on the structure of policy communities, as it can cherry-pick whom to listen to based on its own preferences.

2.2.3 Comparative Applications

The MSF has since its original application to the USA by Kingdon (1984) been applied to many different countries all over the world, including parliamentary systems in Europe. Examples of this are Belgium (Vanhercke, 2009), Germany (Storch & Winkel 2013; Zohlnhöfer, 2016), and Italy (Natali, 2004). Although these parliamentary systems differ from the presidential system in the USA, the framework remains applicable without major changes (Herweg, Zahariadis, & Zohlnhöfer, 2023). It mainly requires some more attention to political parties, as they play a bigger part in parliamentary systems. They are not only part of the political stream, but their policy experts are often part of the policy community and also play their part in the policy stream, by proposing policies and participating in the softening-up process.

Zahariadis (2003) goes deeper into some of the fundamental differences between the presidential system in the USA and parliamentary systems in Europe, suggesting some adaptations to the MSF. In European parliamentary systems, there is more emphasis on political parties and institutions, and policymaking is more coalition driven. Ministers and party leaders are also often the ones acting as policy entrepreneurs. Furthermore, the streams are more interdependent, and policy windows are more institutionally structured, often arising from coalition negotiations and cabinet reshuffles, rather than from hearings or congressional procedures as emphasised in the USA. In European parliamentary systems, the politics stream is dominated by party politics, coalition agreements, and cabinet dynamics, which makes it a bit more straightforward. The priorities of political parties, along with coalition agreements, play a key role in filtering which problems and solutions reach the policy agenda. Zahariadis (1992) also emphasises the importance of the coalition in parliamentary systems for setting the agenda and shaping policy outcomes.

As for the applicability of the MSF to comparative case studies, several scholars have already successfully done this in the past. For instance, Liu and Jayakar (2011) did a comparative case study on the telecommunication policies of China and India. Zahariadis and Allen (1995) conducted a comparison on how privatisation in Great Britain and Germany evolved, and Cherlet and Venot (2013) carried out a comparative case study on reforms in the area of water policy in Burkina Faso and Mali. All in all, the MSF is well suited for conducting a comparative case study, and the nuclear energy policies of the Netherlands and Belgium provide an excellent context for applying the framework.

2.3 Multiple Streams Framework – Justification & Limitations

2.3.1 Justification

As discussed above, the MSF has been applied to European parliamentary systems, to decision-making processes, allowing for the examination of policy outputs, and is also suitable for comparative case studies, which makes it a strong fit for this thesis in comparing the nuclear energy strategies of the Netherlands and Belgium. Rawat and Morris (2016) underscore the model's applicability across different national contexts, as well as its relevance to multiple policy areas and stages of policy development as a key strength of the MSF. Furthermore, the MSF is best suited for qualitative case studies that study policies over a longer period of time, all of which is the case in this thesis. Overall, the MSF is very broadly applicable, but still proofs to have a valid explanatory power.

Moreover, the MSF is particularly effective in analysing decision-making within complex environments, as it distinguishes between the three independent streams of problems, policies, and politics (Rawat & Morris, 2016). Additionally, the focus on the opening of policy windows further increases its explanatory power by making the timing and conditions under which policy change occurs more clear. These elements are particularly useful for this thesis, as the different streams provide deep insights into where exactly the divergences in policy choices between the Netherlands and Belgium occur. By unravelling how each country frames its energy problem, develops policy alternatives, and navigates its political context, the MSF enables a comparative analysis that highlights why the Netherlands is moving toward a nuclear phase-in, while Belgium has committed to a nuclear phase-out.

2.3.2 Limitations

Since the MSF requires in-depth analysis of its five key concepts, testing it in medium- or large-N studies is extremely time-consuming. To date, only a handful of quantitative MSF applications exist, and the framework appears to lend itself best to small-N case studies (Herweg, Zahariadis, & Zohlnhöfer, 2023). However, it would be valuable to apply the MSF in more quantitative settings to assess whether the results can be translated to a larger set of cases. Nevertheless, in this thesis the MSF is applied in a qualitative manner through a comparative case study. Therefore, a limitation of this approach is that the research findings will not be easily generalisable to a larger number of cases.

Scholars have also criticised the MSF for having somewhat vague key concepts, which makes them widely applicable across many cases, but also introduces a degree of ambiguity and limitation in their application (Rawat & Morris, 2016). Moreover, some scholars argue that issues can rise and become part of the government agenda without all three streams having to come together. Similarly, the concept of stream independence has been questioned, as some scholars argue that the streams are interdependent (Herweg, Zahariadis, & Zohlnhöfer, 2023; Mucciaroni, 2013; Robinson and Eller, 2010). They suggest that shifts within one stream can influence developments in another steam. For instance, a sudden focusing event in the problem steam, such as a terrorist attack, can significantly affect the national mood in the politics stream. Nevertheless, the independence of the streams also offers the advantage of enabling a policy area to be examined from three separate angles, allowing for a more comprehensive understanding of the policy process.

Another point of criticism is that the MSF lacks certain elements that are relevant to the policy process, such as political institutions, path dependence, and the mass media (Herweg, Zahariadis, & Zohlnhöfer, 2023; Mucciaroni, 2013). Political institutions shape how policy communities are structured and determine whose support is needed for a policy proposal in the decision coupling phase. Path dependency can be seen as one of the survival criteria in the primeval soup that influences whether a proposal is likely to emerge as a feasible policy option. Furthermore, the reporting of the mass media, in particular the topics they choose to cover and the issues they neglect, can have an impact on which problems come to light as well as on the political agenda. Fortunately, the MSF does allow for these elements to be integrated into the framework.

2.3.3 Alternatives

The MSF provides the best theoretical lens for this comparative case study, as it captures the dynamics of policy change and decision-making by examining various relevant elements that are divided into three distinct streams, effectively reflecting the core aspects of the nuclear energy debate. However, alternative theoretical frameworks could also have been employed, both the Advocacy Coalition Framework (ACF) and the Punctuated Equilibrium Theory (PET) present plausible alternatives. This section will give a brief description of the other frameworks and justify why the MSF is the best suitable option for this thesis.

The ACF was invented by Sabatier (1988) to analyse policymaking over a longer period of time. The conceptual framework thereby focusses on the role of the different advocacy coalitions and their belief system within the broader policy subsystem, to understand changes in policy output. Sabatier builds his framework upon the early work of Heclo (1974), who interpreted policy change as a result of large scale social-, economic-, and political- changes, together with the strategic engagement of individuals in a policy community, including the competition for influence and the pursuit of more informed methods to tackle the policy issue. This way, the ACF focusses on policy communities and subsystems, specifically the political elites that interact within them and the way they respond to evolving socioeconomic and political circumstances. Moreover, the ACF studies policy-oriented learning through studying the shifting belief systems of different advocacy coalitions involved in the process of policy change over time.

The ACF is primarily used to explain policy change as a long-term process, driven by the gradual evolution of belief systems, policy preferences, and coalition dynamics (Schlager &

Blomquist, 1996). Because of this long-term focus, the ACF is less effective in accounting for sudden or event-driven shifts in policies. In the Netherlands, for instance, a long-standing absence in nuclear energy was followed by a sudden policy shift, marked by the government's decision to reinvest in nuclear power and propose the construction of four new nuclear power plants. Such abrupt shifts are more likely the result of external shocks, crises, or opportunistic political responses, rather than the gradual processes that the ACF describes. These kinds of short-term dynamics are better explained by the MSF, focusing on policy windows and focusing events, while the ACF encounters more problems dealing with such contextual factors.

The PET was developed to use in political sciences by Baumgartner and Jones (1993). The model explains policy development as a process characterised by long periods of stability that are occasionally disrupted by short and significant changes. PET entails both of the elements of policy stability and policy change, by studying both political institutions and the process of rational decision-making (Baumgartner, Jones, & Mortensen, 2018). The PET understands the policy process as twofold, how are issues defined, and how do they rise to the agenda. Public debates shape how issues are seen and how important they become. This can either reinforce current policies or call them into question. When the latter happens, this opens the opportunity for significant policy changes.

Admittedly, the PET could also be a suitable fit for this analysis. Nevertheless, PET places a strong emphasis on issue framing, while paying less attention to the process itself. While the PET offers a reliable framework to study macro-level policy dynamics, it operates at a relatively high level of abstraction (Green-Pedersen & Princen, 2025). Its broad concepts limit the ability to capture context-specific details, therefore limiting the depth of individual case studies. Given that this thesis aims to understand the differences between the nuclear energy strategies of the Netherlands and Belgium through a comparative case study, the MSF is more suitable, as it enables a more in-depth, case-specific analysis and encompasses a broader range of conceptual elements that can focus better on the process of decision-making. Therefore, it will be easier to draw upon the case specific differences that could explain the nature of the different national outcomes in nuclear energy policies.

2.4 Nuclear Energy Literature

As mentioned in the introduction, the cases of France and Germany have historically received a lot of attention, while Belgium has remained relatively understudied in the field of nuclear energy research. Nevertheless, both Belgium and the Netherlands have been examined

previously, albeit not in a comparative way. This section will review some of the work that has already been conducted. In the case of the Netherlands, some studies on nuclear energy have been carried out. Aarts and Arentsen (2017) studied the influence of politics and public opinion on nuclear energy policies in the Netherlands. They concluded that public opinion only had a very limited effect on shaping the countries' nuclear energy policies, whereas the Chernobyl and Fukushima nuclear disasters halted the countries' nuclear ambitions at the time. Furthermore, they discuss the role of path dependency and the discovery of natural gas supplies in the 1960s as reasons for not committing to more nuclear power plants. Moreover, they conclude that in consensus democracies like the Netherlands, where coalition governments are the norm, policy continuity is often maintained because at least one party typically remains in power, preventing radical policy shifts such as a complete turnaround on nuclear energy.

Mulder (2018) also studied the dynamics of the public opinion about nuclear energy in the Netherlands. He focusses on how public attitudes are formed towards the construction of nuclear power plants in the 1970s and 1980s, but analyses a broader timeline from 1974 to 2006. The study suggests that shifts in public opinion on nuclear energy in Western countries are mainly linked to the way governments interact with their citizens. Namely, transparent decision-making that allows for meaningful stakeholder engagement. It is also important how the topic of nuclear energy is linked to wider societal problems, because it shapes the way in which people perceive nuclear energy. Moreover, a growing energy demand and the limited availability of fossil fuels can be seen as driving factors behind the introduction of nuclear energy and societal support in the 1960s. However, a shift occurred after the Chernobyl nuclear disaster and safety issues shaped the public opinion together with distrust in the government to properly manage these safety concerns.

An early study on public opinion by Vleeming (1985) examined what factors shape attitudes towards nuclear energy in the Netherlands. A couple of the findings from this study are that people that lived in close proximity to a power plant where more critical and more actively outspoken against nuclear energy. Furthermore, women were more wary of safety issues and risks regarding nuclear energy than man, and left-wing voters were more critical about nuclear energy than right-wing voters.

Vossen (2020) studied how Dutch media reported and framed the topic of nuclear energy by analysing news articles in 2018. Her findings are that nuclear energy is only rarely framed in the context of climate change, older and more traditional frames still dominate media coverage

by framing nuclear energy as a safety issue in the context of nuclear disasters. Overall, the narrative around nuclear energy was negative and the study suggest that the framing process is influenced by broader cultural and societal dynamics, which tend to steer journalists toward conventional narratives instead of using new frames to describe nuclear energy.

Arentsen (2006) showcases how nuclear energy has been contested in the Netherlands from the very beginning. Nevertheless, the electricity sector and the government had clear nuclear ambitions and were very decisive at first, despite clear reservations from society. Protests and opposition against nuclear energy was mitigated by a national energy debate, but when the results were negative that did not stop the government's intentions to build two more nuclear reactors. However, the Chernobyl catastrophe immediately put a halt to these plans and completely stopped the nuclear ambitions of both the Dutch government and the energy sector. Twenty years later, Arentsen (2006) notes that the nuclear debate has re-opened and the option to build more nuclear reactors is again on the table. Only this time, there are no companies with clear nuclear ambitions, and the general consensus is still not in favour of nuclear energy.

An older study by Zijlstra (1978) examines Dutch nuclear policy by exploring how various actors within the policy field are connected and interact with one another. Dutch nuclear policy involved many different actors and lacked a single central authority to coordinate decisions. The government promoted nuclear energy but played a facilitating rather than a leading role, enabling stakeholders to exchange information and influence policy. In this network, engineering and electricity companies were in the strongest positions, as they were involved in both project implementation and advisory- and research boards, giving them strong influence in the governmental decisions-making process.

In Belgium, some of the literature has focused on the countries' nuclear energy policy after the Fukushima catastrophe (Kunsch & Friesewinkel, 2014). This study focusses on Belgium's nuclear phase-out law, and what problems the energy system will face if it shuts down the seven nuclear power plants that provided over 50% of Belgium's electricity. They determine that Belgium's electricity system will face urgent problems in phasing out nuclear energy because of an absence in solid capacity-replacement plans. The article shows that phasing out nuclear energy too quickly does not promote renewable energy adoption or energy efficiency. Instead, it mainly leads to increased usage of fossil fuels, leading to issues such as supply insecurity, reliance on foreign energy sources, price fluctuations, and greater CO2 emissions.

Verbruggen (2013) also examines Belgium's nuclear phase-out and the extension of operating periods for some of the reactors. Verbruggen examines the political debate and decision-making around the 2003 phase-out law and how discussions about environmental impact, nuclear rents, and finances emerged. The article also studies the structure of Belgium's electricity sector. After deciding to phase out nuclear energy, the government spent too little time on developing and implementing robust alternatives to cover for the loss of energy that is provided by the nuclear power plants. Politicians argued for amending the 2003 phase-out law by mainly focusing on issues such as climate change, the economic losses caused by shutting down reactors, and the risk that the countries' electricity demand cannot be met without nuclear energy because of a lack of alternatives. Thus, the key finding is that amending the phase-out law by extending the operation of nuclear plants occurred because there were no valid alternatives to replace nuclear energy.

Latré, Thijssen, and Perko (2019) studied Belgium's party politics regarding the subject of nuclear energy and the public opinion on the matter. They do so by means of a survey to study the public opinion on nuclear energy in Belgium in 2015. Results show that party politics only slightly influence the public opinion about nuclear energy, more important are factors like trust, and people's perception of the risks and benefits of nuclear energy. The effect is greater amongst voters that affiliate with a party that is either very much outspoken against or in favour of nuclear energy, and more active in the public debate. These voters have taken stronger positions in the nuclear energy debate, in correspondence with their political party of preference. Therefore, the authors conclude that party politics polarises the public opinion on nuclear energy in Belgium. Another finding is that those who are more outspoken, knowledgeable, and involved in the nuclear energy debate are more susceptible by party politics.

Another case study on public opinion in Belgium on nuclear energy is conducted by Perko, Turcanu, and Greenen (2012). They study the role of media reporting and how the public opinion changed after the Fukushima nuclear disaster. Press coverage of nuclear energy was huge in the first weeks after the Fukushima disaster and then started to decrease over time. The media often reported on the Fukushima incident in light of the nuclear disaster in Chernobyl, and articles where mostly neutral, showcasing different and conflicting opinions. However, in April 2011, 25 years after the Chernobyl disaster, media coverage was overwhelmingly negative. Shifts in public opinion were also observed after the incident, mainly leading to people having more negative opinions about nuclear energy.

2.5 Theoretical Expectations

Building upon the MSF, this thesis expects that the divergent nuclear energy policies of the Netherlands and Belgium can be explained by how the three different streams, problems, policies, and politics, have evolved within each national context. According to the MSF, policy change occurs when the streams align and are ready for coupling, and a policy window opens up (Kingdon, 2014; Herweg, Zahariadis, & Zohlnhöfer, 2023). This process is often facilitated by policy entrepreneurs who successfully couple the streams to advance a preferred policy solution. The framework therefore suggests that there should be a difference in one or several of the streams between the two countries, making them ripe for coupling in one but unripe in the other. The variation in the streams should account for the different national policy outcomes.

For the Netherlands, since they opted for a nuclear phase-in after a longstanding period of absence in nuclear energy, the theoretical expectation is that all three streams were ripe for coupling. The coupling of the three streams likely explains the Netherlands' recent phase-in approach, and therefore the change in policy. Elements that will possibly play an important role and have contributed to the opening of a policy window for renewed nuclear investment is the energy crisis following Russia's invasion of Ukraine as a focusing event (Salomons, 2021; Hensen, 2021; Straver, 2022; Timmer, 2023). Furthermore, a shift in government after elections probably made the political stream ripe for coupling, with more political parties getting behind the idea of investing in nuclear energy (Stellinga, 2023).

In contrast, the Belgian context is expected to show a different pattern where the streams are not ready for coupling to in turn lead to policy change. Despite facing similar external pressures related to energy security and diversification, there might be differences in the political stream. It is important to note that the baseline in Belgium is different, since it has a long history of nuclear involvement and is therefore already depended upon nuclear energy. Moreover, the policy stream has been constrained by the existing 2003 phase-out legislation. These factors are expected to have prevented the opening of a new policy window and the coupling of the streams, reinforcing the continuation of the phase-out trajectory, albeit with extensions to the operation lifetimes of some reactors (Verbruggen, 2013). Thus, the MSF predicts that the divergent nuclear energy trajectories is a result of cross-national differences in stream alignment.

3. Methodology

This chapter will provide the methods and operationalisation for this thesis. The first section will elaborate on the research paradigm and the ontological and epistemological considerations made. The second section will outline the research design and methods used in this thesis, and sheds light on the case selection and the approaches to data collection employed in this study. The third section will operationalise the key concepts that are central to this thesis.

3.1 Research Paradigm

This section will draw upon the ontological and epistemological considerations for this thesis. A research paradigm can be defined as a fundamental set of beliefs that shape how we see and interpret the world. It reflects our assumptions about what reality is, how we can understand it, and the methods we use to study it (Guba & Lincoln, 1994). This research is grounded in a constructivist paradigm, and aligns with my background in the social sciences, and more specifically political science. Here, the focus lies on understanding meaning, interpretation, and context in human and institutional behaviour and interaction.

Within this constructivist paradigm, the ontological assumption is relativist, implying that multiple realities exist and they are socially constructed rather than mere objective facts (Guba & Lincoln, 1994). What is considered real depends on the perspectives and interactions of individuals and groups within specific contexts. The epistemological stance is transactional and subjectivist, meaning that knowledge is created through the dynamic relationship between the researcher and the subject of research. Reality is thus mutually shaped, as both the researcher and the subject of research influence one another.

3.2 Research Design & Methods

3.2.1 Research Design

This study conducts a qualitative, comparative case study to analyse the divergent nuclear energy policies of the Netherlands and Belgium through the lens of the MSF. The research aims to explore the three different streams in both national contexts to identify the differences and to examine whether a window of opportunity occurs and the streams are ripe for coupling. In this way, the thesis seeks to understand the different policy outcomes on nuclear energy and to explain the factors that lie at the core of these differences. A comparative case study design was chosen to enable systematic comparison between the two countries that share similar structural and external conditions, yet have come to divergent policy outcomes. A comparative case study

involves the systematic analysis of a small number of cases to identify similarities and differences that help explain a broader phenomenon (Gerring, 2004). This approach allows researchers to develop and adjust theoretical insights by examining how causal mechanisms operate across different contexts.

3.2.2 Case Selection

As previously mentioned, the cases of the Netherlands and Belgium were selected because they are relatively understudied in the existing literature on nuclear energy policy. Moreover, a comparative case study of these two countries can lead to valuable insights, as both have made fundamentally different policy choices regarding nuclear energy, despite facing similar external conditions. This makes the comparison particularly interesting and raises the question of what specific factors account for these differences. In addition, these cases are well suited to assess the explanatory power of the MSF, since nuclear energy policy is influenced by a wide range of factors that are effectively captured by the various elements and concepts within the MSF.

3.2.3 Research Methods

This thesis will conduct a process tracing. According to Beach and Pedersen (2019), process tracing is a qualitative research method used to identify and examine the causal mechanisms that link specific conditions or events to observed outcomes. It allows researchers to reveal the specific steps, decisions, and interactions that led to a particular outcome. More specifically, this thesis will employ the method of 'explaining outcome process tracing' (Beach & Pedersen, 2019, p. 18). Explaining outcome process tracing is particularly suitable for research that centres around qualitative case studies that are focussed on the case rather than the theory, trying to find explanations for specific puzzling outcomes. The aim is not to demonstrate that a theory is universally correct, but rather to show its usefulness in offering an explanation for specific characteristics of the individual case being studied. This fits well with the research design of this thesis, which tries to explain the policy outcomes of two different cases, by studying the process of decision-making in the realm of nuclear energy policies over time.

In explaining outcome process tracing, the researcher can employ causal mechanisms derived from existing theories, such as the MSF in this thesis. Empirical evidence is then collected and assessed to verify whether each step in the proposed causal mechanism can be supported by the data (Beach & Pedersen, 2019). This will be achieved by examining the three separate streams alongside the opening of policy windows and the coupling process of the streams, as outlined in the MSF. This approach allows for a precise reconstruction of how and why a specific policy

outcome unfolded. This way, the process tracing will help in finding a coherent and plausible explanation of the divergent nuclear energy policy outcomes in the Netherlands and Belgium.

3.2.4 Data Collection

The data is collected in several manners, making sure to crosscheck the data in order to perform a reliable and valid process tracing. The primary source of data will be a comprehensive literature review. This involves the analysis of scientific literature, news articles, government decisions, policy documents, research reports, political party positions, and other relevant publications related to nuclear energy in the Netherlands and Belgium. Given the large amount of available secondary literature, this thesis primarily focuses on the analysis of such sources. Additionally, a couple of interviews were conducted with government officials and representatives from research institutes in the Netherlands and Belgium.

These interviews serve as a supplementary source of data, intended to confirm findings from the literature and to provide additional insights where relevant. Three interviews were conducted for this thesis. First, interviews were held with representatives from both the Belgian and Dutch governments, specifically with the departments responsible for nuclear energy policy. In the Netherlands I spoke to two officials at the same time, one policy officer and one team lead on nuclear energy. In Belgium I interviewed one policy advisor on nuclear energy. These interviews are valuable because government officials from both countries can provide insight into the specific developments and considerations that shaped the national nuclear energy policies. In addition, I conducted one interview with the Dutch research institute TNO, which is frequently asked by the government to write reports on nuclear energy. I also attempted to arrange such an interview with a Belgian research institute, but unfortunately no one was willing to participate.

For the interview method, I conducted semi-structured interviews. This approach uses a flexible interview guide with open-ended questions, allowing for both consistency across interviews and the opportunity to explore topics in greater depth based on participants' responses (Adeoye-Olatunde & Olenik, 2021). The main advantage of this method lies in its ability to generate detailed data while keeping enough structure for comparison. Due to the limited number of interviews, the data has been analysed qualitatively, guided by the operationalisation outlined later in this chapter. The interviews were conducted in Dutch, and the quotes have been translated to English by me for the purpose of this thesis. The original Dutch quotes have been added to Appendix 1.

3.2.5 Validity & Reliability

It is however also important to acknowledge the limitations of this thesis, as its findings cannot be generalised to a large number of cases due to its focus on a specific phenomenon. As argued by Voltolini and Eising (2017), generalisations are constrained by the specific contextual factors, temporal scope, and cultural influences that form the particular case. Nonetheless, case studies and process tracing methods offer advantages in terms of their high internal- and ecological validity. The strength of internal validity lies in the fact that, unlike statistical studies, process tracing minimises the risk of a correlation-causation fallacy by enabling the identification of causal mechanisms and the examination of direct causal relationships. The depth and comprehensive contextualisation offered by case studies contribute to the ecological validity of the research. To ensure the reliability of the study, triangulation is employed, whereby data is gathered from multiple sources and is cross verified. Additionally, this thesis allows for theoretical generalisations by applying the MSF in a comparative context, offering insights that may be transferable to other decision-making cases within parliamentary systems, even beyond the specific policy domain of nuclear energy.

3.3 Operationalisation

In this section, the core concepts of the MSF are operationalised, meaning that the concepts of the problem stream, policy stream, politics stream, policy window, and policy entrepreneur are translated into more concrete analytical components and indicators. The concepts themselves are already broadly defined in chapter 2. This operationalisation will allow for a systematic comparison between the Dutch and Belgian nuclear energy cases through a process tracing to ultimately explain the different policy outcomes.

Table 1 provides a structured overview of the core theoretical concepts, their corresponding variables, and the specific indicators used to measure them. By translating the theoretical concepts into observable indicators, the table operationalises the MSF for empirical application, facilitating the systematic comparison between the two case studies. It is important to acknowledge that, given the qualitative nature of this research, the indicators serve more as sensitising concepts than as directly observable or concrete indicators.

Table 1: *Operationalisation of the core concepts of the Multiple Streams Framework* *

Theoretical Concepts	Variables	Indicators
Problem Stream	Focusing Events	Crises, Disasters, Personal Experiences, Powerful Symbols
	Indicators	Statistics, Figures, Reports, Studies
	Feedback Loops	New Information, Monitoring, Evaluation
Policy Stream	Policy Proposals	Technical Feasibility, National Mood, Budgetary Workability, Political Support
Politics Stream	National Mood	Public Opinion, Political Climate, Approval of Government
	Interest Groups	Campaigns, Lobbying
	Government	Elections, Cabinet Reshuffles, Coalitions, Political Parties
Policy Window	Problem Window	Problem Salience, Problem Urgency
	Politics Window	Elections, Shifts in Government, Changes in National Mood
Policy Entrepreneur	Entrepreneurial Qualities	Expertise, Political Connections, Negotiation Skills, Persistence
	Resources	Time, Money, Energy

** Own compilation on basis of relevant literature (Kingdon, 2014; Herweg, Zahariadis, & Zohlnhöfer, 2023).*

Looking at the defined concepts, variables, and indicators presented in Table 1, it becomes clear what concepts to study in the analysis. The table outlines what needs to be examined within each stream, serving as the analytical foundation for the empirical chapter that follows. To determine whether policy change can occur, it is essential to assess when the streams are ripe for coupling. The problem stream is ready for coupling when a condition gains public and

political attention and can be successfully framed to align with a viable policy solution. The policy stream is ripe when the policy community supports a proposal that has survived the softening-up process and can address the identified problem. The politics stream is considered ready when the government, and ideally a political majority, supports the policy proposal.

When a policy window opens, either in the problem stream or in the politics stream, the three streams can align and all be ripe for coupling. At that moment, a policy entrepreneur can seize the opportunity to couple the streams and move a preferred solution onto the agenda. Successful coupling also depends on the entrepreneur possessing key entrepreneurial qualities and the necessary resources. If all these conditions are met, coupling of the streams can occur and the proposal may enter the formal policy agenda and subsequently lead to policy change.

4. Empirical Analysis

In this chapter, the cases of the Netherlands and Belgium will be examined through the MSF. The chapter begins with the case of the Netherlands, firstly providing a brief historical overview of its nuclear energy policy, followed by an in-depth analysis of the three streams and then the role of policy windows and policy entrepreneurs. The same structure will then be applied to the Belgian case. Finally, the third section presents a comparison of both cases, highlighting the similarities and differences to explain the different national policy outcomes.

4.1 The Netherlands

4.1.1 Historical overview of Nuclear Energy Debate in the Netherlands

The origins of the public discourse on nuclear energy in the Netherlands can be traced back to 1946, with the establishment of Stichting Fundamental Onderzoek der Materie (FOM). This organisation was tasked with two nuclear research projects, focusing on the development of reactor technology and the enrichment of uranium (Zijlstra, 1978). This was followed by the establishment of the Reactor Centrum Nederland (RCN) in 1955, stimulated by the 'atoms for peace' program initiated by the United States (USA), sharing technical know-how with Western countries on the use of nuclear energy. The RCN was tasked with operating a research reactor bought from the USA.

The debate around nuclear energy attracted interest and the sentiment was optimistic, partly due to the United Nations (UN) conference on nuclear energy in 1955 and a shortage of fossil fuels caused by the Suez Crisis in 1956 (Zijlstra, 1978). However, the industry and electricity companies soon lost their interest because of delays in the development and other problems occurring along the way. Because of this, the financial burden of investing in nuclear energy became entirely the responsibility of the national government. Nevertheless, the Dutch government still had the ambition to shift away from fossil fuels towards nuclear energy. As such, the first nuclear power plant was built in Dodewaard in 1965, this was an experimental boiling water reactor of 50 MegaWatts (MW), and it was connected to the grid in 1969 (Aarts & Arentsen, 2017). As of today, this power plant in is no longer active and being prepared for dismantling.

Although the government was involved in nuclear research and technological development, it had not yet taken an active role in the commercial exploitation of nuclear energy. Together with the discovery of large natural gas fields in Groningen in 1959, this halted the country's nuclear

ambitions. Nevertheless, in 1969, a second nuclear power plant of 450 MW was purchased from the USA by a regional electricity company PZEM (later EPZ), not involving the national government or local electricity companies (Aarts & Arentsen, 2017). The commercial purchase of this nuclear power plant came as a shock to the government, which from that moment onwards started to take a more active stance in the nuclear energy debate. The nuclear power plant was connected to the grid in 1973 in Borssele and is still operational providing 3% of the electricity consumed annually in the Netherlands (Ministerie van Economische Zaken en Klimaat, n.d.).

In response to the first oil crisis, a white paper on energy policy was published by the Dutch government in 1974 (Aarts & Arentsen, 2017). The white paper included plans to build three new nuclear power plants, as a strategy to diversify dependence on specific energy sources. The 1970s and 1980s in the Netherlands were marked by intense debate over nuclear energy, with a strong emerging anti-nuclear movement. The Chernobyl nuclear disaster in 1986 fuelled the debate on nuclear energy, causing the opposition to grow significantly. Ultimately, this led the government to formally halt its ambitions for nuclear energy in 1993. In 1994, it decided that the Dodewaard nuclear power plant should close in 1997, and the Borssele plant would need to be shut down in 2003.

In the 2000s, the nuclear debate regained some momentum in the context of climate change. The decision to close the Borssele nuclear power plant was postponed several times, and the power plant is still operational today. Several nuclear scenarios were explored, but there was often a lack of political and societal support. Although the 2010 government coalition explored the option for a second nuclear power plant in Borssele, and initial reactions were positive, the Fukushima nuclear disaster in 2011 brought safety standards back to the core of the discussion, leading to the decision not to proceed with the construction of a new plant (Aarts & Arentsen, 2017).

However, nuclear energy has always remained part of the political and public debate, and when the Rutte-IV government took office in 2022, there was also a political majority. The government decided to invest in building two new nuclear power plants (Ministerie van Economische Zaken en Klimaat, n.d.). The new Schoof cabinet, which took office on July 2, 2024, decided to go even further and agreed in a coalition agreement to build four new nuclear power plants (PVV, VVD, NSC, & BBB, 2024).

4.1.2 Problem Stream – The Netherlands

To understand how nuclear energy reappeared on the Dutch political agenda, the problem stream offers insight into how the issue was identified, interpreted, and framed by policymakers. This section examines how focusing events, indicators, and feedback loops contributed to redefining nuclear energy in the Netherlands. Throughout history there have been several moments where the Dutch government seriously considered nuclear energy as part of its energy mix in light of diversifying energy sources and shifting away from fossil fuels (Aarts & Arentsen, 2017). Nevertheless, different focusing events have often prevented the government's nuclear ambitions.

The first major focusing event that impacted the Dutch nuclear energy debate was the nuclear disaster in Chernobyl in 1986. At a time when the Dutch government, led by Prime Minister Lubbers, was planning to push the construction of at least two new nuclear power plants through parliament, Chernobyl had a massive impact on the national nuclear energy debate (Giesen, 2018; Van Hengel, 2023). The disaster fuelled the national debate on nuclear energy and strengthened an already strongly emerging anti-nuclear movement. Safety issues and distrust in the government rose to the core of the nuclear discussion (Mulder, 2018). Altogether, the Chernobyl catastrophe immediately put a halt to the government's plans to build more nuclear power plants, and in 1993 the government formally halted its nuclear energy ambitions (Aarts & Arentsen, 2017; Arentsen, 2006). The interviewee from TNO (2025) also confirmed that, at the time, the Chernobyl disaster effectively marked the end of any intention to pursue the construction of new nuclear power plants. Chernobyl can be seen as a focusing event that effectively closed a problem window for nuclear energy, making the problem stream unripe for coupling.

At the beginning of the 21st century, nuclear energy began to attract renewed interest. Proponents of nuclear power shifted their focus to the climate, positioning it as a low-carbon solution. Just as nuclear energy began to regain momentum, another focus event occurred in 2011, the Fukushima power plant was hit by a tsunami. This immediately reopened the societal debate around nuclear energy and made clear just how sensitive and controversial the issue still was (Giesen, 2018). The 2010 government coalition was exploring the possibility to build another nuclear power plant in Borssele and initially received positive responses. However, after the Fukushima disaster unfolded, many nuclear ambitions across Europe were halted, including in the Netherlands, where nuclear energy once again became a highly contested issue

(Straver, 2016). Also in other countries, such as Germany, the Fukushima disaster had a severe impact on national energy policy. In Germany, the government decided to shut down all nuclear power plants in the aftermath of the disaster. In the Netherlands, Fukushima led the government to abandon plans for the construction of a second nuclear power plant (Aarts & Arentsen, 2017).

Nevertheless, a few years later, the nuclear energy debate in the Netherlands resurfaced. The interviewee from TNO (2025) stated that the Paris Agreement also had a notable impact on this renewed discussion. After the agreement was adopted in 2015, and with the European Commission's commitment to achieving climate neutrality by 2050, the debate around nuclear energy gradually re-emerged. Over time, nuclear energy was increasingly framed as a CO_2-free alternative capable of supporting long-term decarbonisation goals. This environmental argument was soon complemented by strategic considerations such as energy diversification, emphasising the importance of not relying solely on sources like wind and solar, but including nuclear energy as a stable and complementary energy source (Interviewee TNO, 2025).

Subsequently, the Netherlands negotiated a National Climate Agreement in 2018, which was formally concluded in 2019 (Ministerie van Economische Zaken en Klimaat, 2019). The agreement was organised around several so-called climate tables, each dedicated to a specific sector. Notably, nuclear energy was excluded from discussions at the electricity table, where key decisions about the future energy mix were made (Interviewee TNO, 2025). Klaas Dijkhoff, a politician from the Dutch liberal party VVD, emphasised that he found it odd that nuclear energy had not been addressed in the National Climate Agreement and called for it to be included in the debate. This eventually led, in 2020, to a parliamentary motion calling for a market consultation to assess under what conditions market parties would be willing to invest in nuclear power plants in the Netherlands, to examine what kind of public support would be required, and to explore which regions might be interested in hosting a nuclear power plant (Tweede Kamer der Staten-Generaal, 2020).

In turn, this motion led to a market consultation conducted by KPMG (2021). The interviewees from KGG (2025) indicated that this study, initiated in response to the motion, laid the groundwork for the Rutte-IV coalition agreement, in which the construction and preparation of two large nuclear power plants was announced (Ministerie van Economische Zaken en Klimaat, n.d.). Subsequently, this led to a study conducted by Witteveen+Bos (2022), as a follow-up to the market consultation carried out by KPMG (2021). This scenario study looks at what role nuclear energy could play in the potential future energy mix in the Netherlands between 2030

and 2050 and beyond. The report outlines several important conclusions. Current nuclear power plant projects in Europe are significantly more expensive than initially expected. If these higher costs are taken into account, system-level energy modelling shows that nuclear energy would not be cost-optimal. However, if large-scale nuclear power can be developed within budget and on time, and if Small Modular Reactors (SMRs) achieve their cost targets, nuclear energy could play a meaningful role in the Dutch energy system. The feasibility of this role strongly depends on assumptions about future costs and construction timelines. Without nuclear energy, the Netherlands would become more dependent on energy imports. Nuclear power also contributes to reducing reliance on rare-earth material imports and requires significantly less land area for electricity generation compared to other technologies. Importantly, the development of nuclear energy would require active involvement from the national government.

Altogether, this has led the government to decide to significantly diversify the Dutch energy mix in the National Plan Energy system (NPE), incorporating several nuclear power plants into it (Ministerie van Economische Zaken, 2023). This decision aligned closely with the narrative of the NPE, which aims for climate neutrality by 2050. The Dutch economy has to start by looking at the energy system, which will have to be climate neutral by 2040 or 2045 at the latest. To achieve this, all available options for saving and producing energy need to be used, including nuclear energy (Interviewees KGG, 2025). The Schoof cabinet, which took office on 2 July 2024, went a step further by agreeing in its coalition agreement to construct four new nuclear power plants (PVV, VVD, NSC, & BBB, 2024).

In sum, the problem stream illustrates the process through which issues gain political relevance and are recognised as requiring government attention. In the case of recent developments in the Netherlands, a series of reports and studies have functioned as key indicators and feedback loops. These reports and studies have introduced new information about the composition of the Dutch energy mix, and renewed attention to diversification strategies. Importantly, they have re-evaluated the feasibility and desirability of nuclear energy within a climate-neutral future. Together, these developments have placed nuclear energy back at the core of the Dutch policy- and political agenda.

Another key focusing event that has accelerated the discussion on nuclear energy in the Netherlands, was the Russian invasion of Ukraine. As Russian gas supplies were cut off, energy prices across Europe were rising, and the Netherlands was no exception (Lambregtse, 2022). The resulting energy crisis sparked a lively public and political debate about the country's

dependence on Russian oil and gas. Arguments for diversifying the Dutch energy mix moved to the forefront, reigniting interest in nuclear energy as a strategic option (Salomons, 2021; Hensen, 2021; Straver, 2022; Timmer, 2023). Investing in nuclear energy became an increasingly popular stance, to become less reliant on energy imports from other countries and as an effort to diversify the Dutch energy mix. The interviewees from KGG (2025) also confirmed that this development made the conversation about nuclear energy in the Netherlands significantly easier. This was partly because it became clear to everyone how much public money had been spent on price compensation during the energy crisis. Together with the extremely high energy prices, this could have been mitigated if the Netherlands would have had invested in nuclear power plants.

The Russian invasion of Ukraine and the resulting energy crisis in the Netherlands served as a powerful focusing event that brought the issue of energy security and diversification to the forefront of both public and political debates. As energy prices soared and dependency on Russian gas and oil became apparent, the urgency to find long-term and stable energy solutions became clear. This moment significantly accelerated the debate around nuclear energy. Altogether, all these different factors demonstrate that the problem stream was ripe for coupling, because the condition of energy security had gained sufficient public and political attention and was understood as requiring government action. Moreover, it was successfully framed in a way that aligned with the policy solution of nuclear energy. In contrast to earlier focusing events such as Chernobyl and Fukushima, that closed the window of opportunity for nuclear policy development, the war in Ukraine opened that window by reframing the energy problem and allowing nuclear power to emerge as policy solution and a way of diversifying the Dutch energy mix and becoming less dependent on energy imports such as Russian oil and gas.

4.1.3 Policy Stream – The Netherlands

Throughout the history of the Dutch nuclear energy debate, policy proposals for nuclear energy have been actively discussed. This section will discuss the technical feasibility, budgetary workability, national mood, and political support on nuclear energy policy proposals throughout history. Starting with technical feasibility, since the Netherlands has been operating the Borssele nuclear power plant since 1973, the knowledge and resources for nuclear energy are available. The plant is owned and operated by EPZ, an energy company with extensive experience in nuclear operations (Ministerie van Klimaat en Groene Groei & Ministerie van Infrastructuur en Waterstaat, n.d.). Additionally, the Netherlands has a long-standing tradition of nuclear

research. The Nuclear Research and Consultancy Group (NRG) operates the High Flux Reactor in Petten, which is used primarily for the production of medical radioisotopes. NRG also conducts nuclear safety research for both the government and industry. In the near future, the newly planned PALLAS reactor may replace the aging facility in Petten. Another key research facility is the Higher Education Reactor in Delft, operated by the Reactor Institute Delft (RID), part of Delft University of Technology. This reactor is used for both academic research and educational purposes (Autoriteit Nucleaire Veiligheid en Stralingsbescherming, n.d.).

Looking at budgetary workability, the affordability of nuclear energy remains a subject of ongoing debate in the Netherlands, "*There are about as many reports that say nuclear energy is cheaper as there are reports that say nuclear energy is more expensive*" (Interviewees KGG, 2025, quote 1). On the one side, there are people who argue that there is no good business case for nuclear energy, like Frederik (2024), who states that the costs of nuclear energy are extremely high compared to solar panels, where costs have drastically decreased over time. The opposite applies to nuclear energy, where costs have increased over the years. Portugal-Pereira et al. (2018) studied the construction of 380 nuclear power plants between 1965 and 2016, revealing that the average construction costs have roughly doubled since the 1970s. The construction of nuclear power plants is also constantly experiencing delays. Frederik (2024) provides several examples to illustrate the rising costs and construction times.

The Flamanville 3 nuclear power plant in France was supposed to open in 2012 and was estimated to cost 3 billion euros (1,840 euros per KW). The opening is delayed to 2025 with an estimated cost of 19 billion euros (11,656 euros per KW). Hinkley Point C in the United Kingdom had an original budget of 6,200 euros per KW, which increased to 16,441 euros per KW. Olkiluoto 3 in Finland went from 2,000 euros to 6,875 euros per KW. And Vogtle 3 & 4 in the United States started at 5,160 euros per KW and increased to 12,644 euros per KW. All recently built nuclear power plants in Europe, and the United States faced similar problems. Given these costs, nuclear energy is more expensive than gas and coal, and significantly more expensive than wind or solar energy (Frederik, 2024).

This view is also confirmed in the study by Profundo, commissioned by World Information Service On Energy (WISE). The report examines six recently constructed nuclear power plants to analyse average budget overruns and construction times (Walstra, 2024). Based on this analysis, it is expected that the two planned nuclear reactors in Borssele will face similar cost overruns and will therefore be considerably expensive. Furthermore, construction is highly

likely to be delayed, making it unlikely that the plants will be completed in time to contribute to CO_2-neutral electricity production in the Netherlands by 2035 or to the climate targets set for 2040.

Nevertheless, both the interviewees from KGG (2025) and TNO (2025) emphasise that the cost issue of nuclear energy must be approached at the system level, rather than being limited to the cost of electricity generated per KW. Both interviewees also state that the impact of nuclear energy on the overall cost of the energy system will be marginal: "*So at the system cost level, it is marginally cheaper or marginally more expensive, depending on the assumptions you apply. […] If the industry truly electrifies and stays here, nuclear energy will make the energy system cheaper. Will the Netherlands lose a large part of its industry? Will demand drop drastically? Then it might become more expensive. But that too is marginal."* (Interviewees KGG, 2025, quote 2).

The Witteveen+Bos (2022) study looked more at the prices of nuclear energy within the energy system as a whole, focusing on its contribution to overall system costs under different conditions and scenarios. Their findings indicate that the feasibility and cost-effectiveness of nuclear power are highly dependent on assumptions about future costs and construction timelines, but also about electricity demand, the availability of alternative low-carbon technologies, and broader system integration requirements. The impact of nuclear energy on the total energy system costs is relatively limited. Nuclear energy may still support stability and diversification under certain conditions, but it does not significantly reduce or increase the overall costs of the energy system.

Another more recent study on the costs of nuclear energy was conducted by TNO, this study explores scenarios in which nuclear energy is included in the Dutch electricity mix and estimates the impact on the costs of the overall energy system (Kooiman et al., 2025). The report emphasises that assumptions about the future scale and composition of industrial electricity demand are of critical importance to any system cost analysis. Nevertheless, across a range of scenarios, the advantage or disadvantage of including nuclear energy in the Dutch electricity mix tends to have only a marginal effect on the overall system costs. System cost effects must be interpreted within this broader context of societal, geopolitical, and economic trade-offs. This is in line what the interviewees from KGG (2025) mentioned, that cost alone should not be the decisive factor in supporting or opposing nuclear energy.

The report further outlines a couple of positive and negative remarks regarding nuclear energy. One of the key societal benefits of new nuclear power plants is the diversification of the energy mix, which contributes to spreading geopolitical and financial risks (Kooiman et al., 2025). Nuclear energy relies on different technologies, materials, and global supply chains compared to renewables such as wind and solar. As a result, it reduces the energy system's dependence on any single supply chain, even though dependencies on other countries will remain within each individual supply chain. Nuclear energy also offers technical advantages as it has a smaller spatial footprint than wind and solar, and is not weather-dependent. However, nuclear power produces radioactive waste, and the risk of accidents or deliberate attacks cannot be excluded. Moreover, such large-scale projects require the state to take considerable financial risk, as substantial public funding is always required.

All in all, policy proposals for nuclear energy meet the criterion of budgetary workability. While a definitive financial analysis remains difficult due to various uncertainties, it is plausible that the inclusion of nuclear energy will not significantly increase the overall costs of the energy system. As such, the decision in favour or against nuclear power is likely to come down to other considerations. The cost aspect of nuclear energy was therefore not considered a limiting factor in the policy stream.

Both the national mood and political support do not pose any obstacles in the policy stream. Both indicators will be examined more closely in the political stream, but with regard to their role in the policy stream, they have become increasingly fruitful as the political climate and public sentiment in the Netherlands have grown more positive towards nuclear energy (CBS, 2023; Stellinga, 2023). Altogether, policy proposals in support of nuclear energy meet the key criteria to survive the softening-up process. Moreover, nuclear power presents a fitting solution to the problem of energy security and can therefore advance onto the policy agenda. Thus, the problem stream was also ripe for coupling.

4.1.4 Politics Stream – The Netherlands

To study the politics steam, this section will look into the national mood, the government, and interest groups in the Netherlands. Public discourse on nuclear energy in the Netherlands has a long history and a broad range of opinions: "*What I personally find quite complicated is that, of all energy sources, nuclear energy is by far the most polarised, so to speak. The advantage of that is that everyone has an opinion about it. It's nice to also talk about it with other people. The main disadvantage is that the extreme proponents and the extreme opponents, they're not*

very large groups, but they are very vocal, and that doesn't really help in arriving at nuanced and good decision-making. The framing mostly happens at the extremes, both by Greenpeace and WISE, as well as by some of the proponents, particularly those on the more radical right." (Interviewees KGG, 2025, quote 3).

Historically, opponents of nuclear energy often argue that there are safety risks, referring to Chernobyl and Fukushima. Additionally, nuclear waste is frequently seen as a significant problem, since it would burden future generations with radioactive materials. Supporters of nuclear energy often emphasise the need for security of energy supply and diversification. The origins of the societal debate about nuclear energy in the Netherlands dates back to the 1970s. With the formation of the first Van Agt cabinet in 1977, a coalition of CDA and VVD, the political tide shifted in favour of nuclear power (Van Hengel, 2023). However, this stance was met with significant public opposition. In September 1977, a big protested against the construction of a nuclear plant in Kalkar took place, just across the German border. During the 1970s, resistance to nuclear energy grew rapidly, spurred in part by the way the Kalkar project was financed (Van Lieshout, 2006). Every citizen was required to contribute via a 3% levy on their energy bills, but many people refused to pay. The opposition against nuclear energy became so widespread that the government could no longer ignore it.

As a result, the Van Agt-I cabinet initiated a public consultation process known as the Broad Societal Discussion (Brede Maatschappelijke Discussie, BMD). In 1983, the BMD published its final report. While the conclusions were nuanced, they ultimately rejected the expansion of nuclear energy (Van Hengel, 2003). Nevertheless, the newly formed Lubbers-I cabinet, consisting of CDA and VVD, was in favour of nuclear energy. Prime Minister Lubbers was not particularly persuaded by the BMD findings. In 1985, just two years after the report's publication, the government announced plans to build ten new nuclear reactors. However, the Chernobyl disaster in 1986 changed everything, putting an end to the Dutch government's nuclear ambitions (Arentsen, 2006; Mulder, 2018). Both the Chernobyl and Fukushima nuclear disasters had a negative influence on the public perception of nuclear energy in the Netherlands at the time (Aarts & Arentsen, 2017).

In the 1970s and 1980s, nuclear energy featured more prominently in public debates than it does today, and the nature of the concerns has shifted over time (Weerdt et al., 2024). Whereas earlier debates focused on issues such as safety concerned due to nuclear accidents, nuclear waste disposal, fears of nuclear conflict, alongside concerns about economic growth, today's nuclear

debate is more influenced by climate change and energy costs. Public opinion on nuclear energy has recently been shifting in a more favourable direction. Statistics from CBS (2023) showcase that 36% of the adults in 2023 wants the Netherlands to invest more in nuclear energy, compared to 25% in 2020. A combined percentage of 27% of the adults in 2023 preferred either less nuclear energy or none at all, compared to 43% in 2020. A substantial part of adults, about 20%, does not have a clear opinion on the matter. Thus, support for nuclear energy in the Netherlands has increased significantly in recent years (Van de Ven, 2023). Another study on public attitudes towards nuclear energy, conducted by Ipsos in 2022, shows that 44% of Dutch citizens support the production of nuclear energy by nuclear power plants in the Netherlands, while 23% are opposed, and 33% hold a neutral stance (Krouwer et al., 2022).

Moreover, the improved perception of nuclear energy is also receiving increased support from the environmental movement, largely due to the ongoing search for clean and carbon-free energy sources (Timmer, 2023). A survey, which included 13,500 participants from countries such as the United States, the United Kingdom, France, Poland, and South Korea, revealed that even among members of environmental groups, who have traditionally opposed nuclear power, support now outweighs opposition. Also in the Netherlands, Greenpeace has stated that it is not currently campaigning against nuclear energy, as other issues are considered more pressing, along with scepticism about whether the construction of new power plants will actually take place.

This view is also confirmed by the interviewee from TNO (2025), who notes that there are still interest groups in the Netherlands, such as WISE, Greenpeace, and Nature & Environment, which position themselves against nuclear energy. However, their approach is less campaign-driven than it was twenty years ago. Their role in the debate has notably changed. The interviewee also indicated that, within the environmental movement, the debate is conducted on the basis of facts, in contrast to the lobbying efforts in favour of nuclear energy. The interviewees from KGG (2025) also pointed out that there have been continuous efforts from a pro-nuclear energy foundation to influence the debate: "*They have consistently advocated for nuclear energy. But yes, they did that before as well, and back then it didn't make a difference. So I think it really came from the political sphere."* (Interviewees KGG, 2025, quote 4).

Looking at the political sphere, nuclear energy has moved from a taboo to a mainstream election topic in the lead-up to the 2023 elections (NOS, 2023). Political support for nuclear energy has expanded. Whereas in the 2017 elections almost no political party included nuclear energy in

its party manifesto, by 2023 nearly all major parties had devoted a section to the topic. Notably, the political divide on the issue has diminished, with both D66 and the ChristenUnie shifting from opposing nuclear energy to supporting nuclear energy (Stellinga, 2023). In 2021, both parties were still opposed, but during the formation of the Rutte-IV cabinet, they changed their position. As a result, the list of political parties opposing nuclear energy has become smaller.

Although the composition of the coalition parties in the Rutte-III and Rutte-IV cabinets remained the same, the change in stance by D66 and ChristenUnie led the Rutte-IV government, which took office in 2022, to formally endorse nuclear energy. This coalition decided to invest in the construction of two new nuclear power plants (Ministerie van Economische Zaken en Klimaat, n.d.). The following government of Schoof, that took office in 2024, went even further by including the construction of four nuclear power plants in its coalition agreement (PVV, VVD, NSC, & BBB, 2024). In the newly elected House of Representatives as of 2025, nuclear energy now enjoys broad support, with 121 out of the 150 seats being in favour of nuclear energy (Stichting KernVisie, n.d.).

We can therefore conclude that nuclear energy enjoys broad support in the political stream, as one of the interviewees remarks: "*So yes, the traditional left–right divide, I believe we now have 121 seats in the House of Representatives that support nuclear energy, so it's becoming less and less bipartisan, it's increasingly becoming a broadly supported issue in Parliament and in politics.*" (Interviewees KGG, 2025, quote 5). All in all, the political stream was ripe for coupling, as successive governments, along with a political majority, support nuclear energy. The national mood is also increasingly favourable towards nuclear power, and interest groups do not pose an obstacle.

4.1.5 Policy Window & Policy Entrepreneur – The Netherlands

This section examines the policy entrepreneurs involved in advancing nuclear energy in the Netherlands, as well as the policy windows through which change became possible, and how the coupling process unfolded. Several policy entrepreneurs have played a role in shaping the Dutch nuclear energy debate. First, well-known, and popular TV presenter Arjen Lubach was one of the first to pull nuclear energy out of the taboo sphere, presenting it as the only viable way to stop global warming in time (Lubach, 2018; Giesen, 2018). Just a day later, VVD leader Klaas Dijkhoff advocated for the construction of new nuclear power plants. Both Lubach and Dijkhoff are also mentioned by the interviewee from TNO (2025) as individuals who significantly accelerated the public debate on nuclear energy. Dijkhoff was also the initiator

submitting the parliamentary motion that ultimately led to a market consultation, laying the groundwork for the Rutte-IV coalition agreement, which decided to invest in two nuclear power plants (Tweede Kamer der Staten-Generaal, 2020; KPMG, 2021 Ministerie van Economische Zaken en Klimaat, n.d.).

More in general, both the political parties VVD and CDA can be seen as policy entrepreneurs for nuclear energy: "*We mentioned the CDA, right, the VVD as well, and then yes, of course more parties on the right, but especially those two. And Bontenbal and Silvio Erkens, they were really the two energy spokespersons who were very actively involved with it.*" (Interviewee TNO, 2025, quote 6). The response of the interviewees from KGG to my question about what has reignited the nuclear energy debate in the Netherlands was as follows: "*That was kind of born, I think, mainly in politics, from the CDA and the VVD.*" (Interviewees KGG, 2025, quote 7). Thus, it can be stated that the most important policy entrepreneurs in advancing the policy idea of nuclear energy were the political parties VVD and CDA, along with their key spokespersons on the topic, such as Dijkhoff, Bontebal, and Erkens.

With regard to the policy windows, several factors explain why a policy window did not open until more recently. First, in response to the oil crisis, the government adopted a stance in favour of nuclear energy (Aarts & Arentsen, 2017). The oil crisis served as a focusing event that made the problem stream ripe for coupling, and since nuclear energy policy proposals were considered feasible, the policy stream was also ripe for coupling. Nevertheless, due to unrest within society, the government decided to open a public consultation process, the BMD. This process delayed the politics stream from becoming ripe for coupling, as it took time to properly carry out the BMD. After the consultation process ended and a new government came into office, the administration still intended to invest in nuclear energy, contrary to the outcome of the BMD report (Van Hengel, 2023). For a time, it appeared that the politics stream was also ripe for coupling, as the government was prepared to support nuclear energy. However, the Chernobyl disaster, serving as another focusing event, effectively closed the policy window for nuclear energy. The anti-nuclear movement grew much stronger, and the government proved to be reactive, abandoning its nuclear ambitions (Arentsen, 2006; Mulder, 2018).

Similarly, at the beginning of the 21st century, when nuclear energy attracted renewed interest, it appeared that all three streams would be ripe for coupling and that a policy window would open. As nuclear energy emerged as a low-carbon option that could help reduce CO_2 emissions, the problem and policy streams aligned well with each other and were ripe for coupling. Once

again, the politics stream also seemed ripe for coupling, as the 2010 government coalition was exploring the option to build another nuclear power plant in Borssele. Nevertheless, the 2011 Fukushima disaster, once again serving as a focusing event closing the policy window, led the government to abandon its nuclear energy ambitions in response to renewed safety concerns and societal debate (Aarts & Arentsen, 2017; Giesen, 2018).

More recently, a policy window did open up. The first opening occurred in the problem stream. As discussed in the policy stream section, the challenges posed by climate change and the energy transition turned attention towards the composition of the Dutch energy mix. Various reports and studies acted as key indicators and feedback loops, introducing new information and giving salience to nuclear energy as a feasible policy option. Moreover, the Russian invasion of Ukraine and the resulting energy crisis in the Netherlands served as a major focusing event. It brought concerns about energy security and diversification to both the public and the political debate, allowing nuclear energy to emerge as a viable policy solution. Nuclear energy became a way to diversify the Dutch energy mix and to reduce dependence on foreign energy sources such as Russian gas and oil. The agenda window occurred within the problem stream, as these developments opened a window of opportunity in which nuclear energy could advance on the policy agenda.

Subsequently, a decision window opened in the political stream. As more political parties shifted towards supporting nuclear energy, the conditions became more favourable for nuclear policy proposals to move forward in the decision-making phase. This political window was largely triggered by the transition from the Rutte-III to the Rutte-IV government, during which both D66 and ChristenUnie switched their position towards supporting nuclear energy. This shift resulted in a governing coalition that backed nuclear expansion. Ultimately, this led to a phase-in of nuclear energy, with the government deciding to invest in the construction of new nuclear power plants.

4.2 Belgium

4.2.1 Historical overview of Nuclear Energy Debate in Belgium

Belgium's engagement with nuclear energy can be traced back to the period of World War II. Because of Belgium's colonial history in Congo, it had access to one of the richest uranium mines in the world. In exchange for uranium, Belgium and the USA entered into a partnership as part of the USA's secret Manhattan Project to develop nuclear weapons (Verbruggen, 2013).

Belgium's contribution to the Manhattan Project, together with its access to uranium through Congo, are the reasons behind its early engagement with nuclear energy and a strong research and development programme (Schröder, Bergmans, & Laes, 2015). As part of this effort, a nuclear research centre was established in Mol in 1952. Ten years later, in 1962, Belgium bought Europe's first small pressurised water reactor from the USA, also to be located in Mol (World Nuclear Association, n.d.-a). After this, the Chooz A prototype, a joint Franco-Belgian project, was commissioned in France, in 1966.

The 1960s were marked by deliberate choices from the Belgium government to heavily invest in nuclear energy as energy demands were rising, and it became increasingly clear that fossil fuels alone could not meet the country's growing demand (Engie, n.d.). From 1968 onwards, this resulted in the authorization and construction of several nuclear reactors. It started with the decision to construct the Doel 1 and 2 reactors, and another Franco-Belgian project with the Tihange 1 reactor (World Nuclear Association, n.d.-a). Subsequently, the Belgian government ordered the construction of four more reactors in 1974, also to be built at the sites of Doel and Tihange. Both sites were selected partly because of their proximity to the Scheldt and Maas rivers, which could provide the water that was required for the cooling of the reactors (Engie, n.d.).

In the end, seven nuclear reactors were built on Belgian soil, four of which are located in Doel and three in Tihange. At its peak, nuclear energy accounted for more than 60% of Belgium's electricity generation, nowadays it still provides around 40%, with three reactors still connected to the grid as of today (World Nuclear Association, n.d.-a). Below is an overview of the different reactors, with the years that they became operational and if they are still operation as of today.

- Doel 1 – 1975, shutdown in 2025.
- Doel 2 – 1975, still operational, but planned to be shutdown by the end of 2025.
- Doel 3 – 1982, shutdown in 2022.
- Doel 4 – 1985, still operational, planned to shutdown in 2035.
- Tihange 1 – 1975, shutdown in 2025.
- Tihange 2 – 1983, shutdown in 2023.
- Tihange 3 – 1985, still operational, planned to shutdown in 2035.

After the commissioning of the seven nuclear reactors, the political momentum around nuclear energy in Belgium shifted, as successive government became more wary of safety issues. The first shift in public opinion and awareness about safety issues came about in 1986 after the

Chernobyl nuclear disaster. At the time, all seven of Belgium's nuclear reactors were already connected tot the grid and fully operational. However, proposals for new nuclear plants were abandoned, and discussions arose regarding the future of the reactors already in operation (Verbruggen, 2013). When Belgium's Green parties, Ecolo and Agalev (later Groen), entered the government's coalition from 1999 to 2003, they pushed for a nuclear phase-out. Subsequently, in 2003 the Belgian federal Parliament adopted legislation that banned the construction of new nuclear reactors for commercial electricity generation and restricted the operation of existing reactors to a maximum of 40 years (International Atomic Energy Agency, n.d.). Under this law, nuclear energy was scheduled to be gradually but completely phased out between 2015 and 2025.

In light of energy security concerns and the need to meet climate reduction targets, successive governments amended the law and extended the operational lifetime of certain reactors. In 2015 a provision to the 2003 phase-out law was overturned, as an agreement was reached to extend the lifetime of the Doel 1 and Doel 2 reactors with 10 years tot 2025 (World Nuclear Association, n.d.-a). More recently, in 2022, a major amendment to the 2003 phase-out law was approved, extending the operational lifetime of the Doel 4 and Tihange 3 reactors by 10 years, until 2035. To this day, the nuclear energy debate in Belgium remains active, with ongoing discussions about the country's phase-out decision.

4.2.2 Problem Stream – Belgium

This section discusses the focusing events, indicators, and feedback loops that have shaped how certain issues related to nuclear energy reached the policy- and political agenda in Belgium. By tracing these elements throughout Belgium's history of nuclear energy policy, it becomes possible to understand how specific conditions were framed as problems requiring governmental attention. Belgium's nuclear energy policy dates back to the 1960s and 1970s, when the Belgium government decided to invest in nuclear energy because of growing energy demands and a lack of fossil fuels (Engie, n.d.). Moreover, "*the reason for the construction originally was mainly also the oil crises in the 1970s, where we then, for example, had security of supply problems with oil and gas, and that actually did lead to an acceleration, and also the desire to produce electricity in a different way.*" (Interviewee FOD Economie, 2025, quote 8). The oil crisis thus served as a focusing event that accelerated Belgium's investment in nuclear energy, as the condition of growing energy demand and fossil fuel shortages became

increasingly apparent and called for a policy response. As such, seven nuclear power plants were commissioned between 1975 and 1985 (World Nuclear Association, n.d.-a).

Then, a new focusing event occurred in 1986, when the nuclear disaster in Chernobyl took place. The political momentum around nuclear energy began to shift, as safety concerns moved to the forefront of the nuclear debate. Proposals for new nuclear power plants were cancelled, and critical discussions emerged regarding the safety and long-term future of the reactors already in operation (Verbruggen, 2013). Eventually, when the Greens, consisting of the Flemish Agalev and the Walloon Ecolo, joined the coalition of the Verhofstadt-I federal government in 1999, they pushed for a nuclear phase-out, which ultimately led to legislation being adopted in 2003 (Belgische Federale Overheidsdienst Justitie, 2003).

Nevertheless, the following years were marked by criticism and ongoing debate over the nuclear phase-out law, partly due to concerns about security of energy supply and climate reduction targets. After the 2007 elections, an expert commission was consulted for advice. In two separate reports, it was recommended to abandon the nuclear phase-out (Van Horenbeek, 2025). According to their findings, energy prices under the phase-out would become twice as expensive. The security of energy supply, financial losses, and climate reduction targets became conditions that rose to the political agenda because of different indicators and feedback loops exposing the negative implications of the phase-out law.

Postponing the phase-out law was repeatedly suggested in the years that followed, until another focusing event occurred in 2011, the Fukushima nuclear disaster. The debate on extending the operation of nuclear power plants temporarily came to a halt (Van Horenbeek, 2025). But in the years that followed, it became clear that Belgium's electricity system would face urgent challenges in phasing out nuclear energy due to the lack of solid capacity-replacement plans (Kunsch & Friesewinkel, 2014). The government subsequently decided in 2015 to extend the operational lifetime of the Doel 1 and Doel 2 reactors by ten years, until 2025, in order to prevent electricity shortages (Van Horenbeek, 2025; World Nuclear Association, n.d.-a). The interviewee from FOD Economie (2025) also confirmed that the reason for extending the operating lifetime of the reactors was because of capacity issues with electricity production. She also added that assumptions about the liberalised energy market investing on its own created problems, as investments did not come as quickly as expected. This was more straightforward when the market was more regulated.

The nuclear phase-out remained an active part of the nuclear debate in Belgium, but when the Greens rejoined the governing coalition in 2020, it is confirmed that the country will stick to the phase-out plan (Van Horenbeek, 2025). Debates over higher energy prices and more pollution because of the phase-out remained (Steel, Van de Velden, & Dujardin, 2023). A new study by the University of Antwerp shows that the closure of nuclear power plants would lead to greater dependence on energy imports and on gas (Stevens & El Mabrouk, 2022). It could also result in price volatility, blackouts, and is expected to cause a significant increase in prices and CO_2 emissions. However, the Greens remained committed to the nuclear phase-out, until another focusing event occurred, the Russian invasion of Ukraine in early 2022. Suddenly, access to Russian oil and gas is at risk, and the energy crisis across Europe intensifies the debate surrounding the nuclear phase-out.

The pressure on the Greens increased, and ultimately, maintaining the nuclear phase-out timeline proved untenable. In 2022, the government agreed on extending the operating lifetimes of the Doel 4 and Tihange 3 reactors by ten years, until 2035 (Steel, Van de Velden, & Dujardin, 2023). For the first time, a complete nuclear phase-out by 2025 was officially off the table. In 2023, an agreement was reached with operator Engie, finalising the extension (World Nuclear Association, n.d.-a). The interviewee from FOD Economie (2025) also confirmed that the Russian invasion of Ukraine marked a clear turning point in the debate and served as the direct trigger for the decision to extend the operation times for some of the reactors. Concerns over security of supply and a lack of domestic electricity capacity were central to this decision. Although the share of renewable energy has increased significantly in recent years, it has not grown at the pace required. While capacity continues to rise, it has not done so to an extent that fully compensates for the nuclear phase-out.

All in all, several focusing events, indicators, and feedback loops throughout Belgium's nuclear energy history have demonstrated that the problem stream was ripe for coupling, ultimately paving the way for policy change. Initially, the conditions were favourable for the introduction of the nuclear phase-out policy. However, as new information emerged regarding rising energy prices, capacity shortages, and growing dependency issues, the problem stream became ripe for extending the phase-out timeline. The condition of insufficient domestic energy capacity, surging prices, and rising CO_2 emissions has gained significant public and political attention and is now widely recognised as requiring government intervention. As such, the problem stream can also be considered ripe for a complete reversal of the nuclear phase-out policy.

4.2.3 Policy Stream – Belgium

This section examines whether policy proposals for nuclear energy in Belgium meet the key criteria for surviving the softening-up process, namely technical feasibility, budgetary viability, national mood, and political support. Belgium has a long history of nuclear engagement: “"*Yes, we have, historically speaking, they started very early with all the research. And that has its origin in the Second World War, because Belgium, from Congo in fact, the former colony, supplied uranium from a uranium mine in Congo for the Manhattan Project. And in return, I don't know if it's written like this in the history books, but in return they were also given access to technology, and a site was selected in Mol/Dessel. And that then became an area where a nuclear research centre was built in the 1950s, and from there a lot of research and a lot of interest and new technology emerged, which made all kinds of things possible."* (Interviewee FOD Economie, 2025, quote 9).

Belgium's access to uranium through Congo, and its partnership with the US under the Manhattan Project, are the reasons behind its early engagement with nuclear energy and a strong research and development programme (Schröder, Bergmans, & Laes, 2015; Verbruggen, 2013). Moreover, its long history of nuclear energy, with seven operational nuclear power plants at its peak, is evidence of the technical feasibility of Belgium's nuclear energy policy. Moreover, Engie, the operator of Belgium’s nuclear power plants, has extensive expertise, with decades of operational experience managing nuclear reactors.

As for the budgetary workability, phasing out Belgium’s nuclear reactors has created capacity challenges on the energy grid, due to a lack of solid capacity-replacement plans (Kunsch & Friesewinkel, 2014). Rising energy prices are frequently brought up as a consequence of the nuclear phase-out (Stevens & El Mabrouk, 2022; Van Horenbeek, 2025). Thus, extending the operational lifetimes of the nuclear reactors also presents a good business case. Additionally, the largest costs of a nuclear power plant are its construction and initial investment. Once operational, running the plant is relatively cheap (Interviewee FOD Economie, 2025). Since the nuclear plants in Belgium are already built, there is an economic incentive to keep them running for as long as possible.

The next section will examine the national mood and political support in greater detail. However, neither presents a major obstacle within the policy stream. Political support has historically been closely tied to the composition of governing coalitions. Meanwhile, the national mood is generally favourable towards nuclear energy (Nuclear Forum, 2024). Overall,

the policy stream has shown to be ripe for coupling with regards to extensions to the nuclear phase-out, since these extension proposals fit the survival criteria and fits the policy problem at hand, namely a lack of energy capacity. Moreover, the proposals are backed by the policy community: "*A country heavily tied to the nuclear path cannot be expected to change course overnight. The power companies, industrial circles, academics, officials, opposed the law, and continued business-as-usual. For abolishing or amending the 2003 law, they brought up mainly three arguments: addressing climate change (by being part of the "nuclear renaissance"), financial losses by premature closure, loss-of-load risks because no substitutes for nuclear are feasible, affordable, or ready.*" (Verbruggen, 2013, p. 96). The policy stream is in this sense also ripe for a reversal of the nuclear phase-out strategy.

4.2.4 Politics Stream – Belgium

To study the politics stream, the national mood, interest groups, and the government will be studied regarding their stances on nuclear energy in Belgium. Starting with the national mood, the public debate on nuclear energy in Belgium began to intensify in the 1970s (De Morgen, 2010). As several nuclear power plants were commissioned and others were still under construction, the public became increasingly informed about nuclear energy. People also began protesting against the dumping of nuclear waste into the sea, a practice that was only officially banned in 1982. However, the real turning point in public opinion came with the Chernobyl disaster. From that moment on, more and more people turned against nuclear energy. This shift was also confirmed by the interviewee: "*I think that in that respect it is certainly also still a consequence of Chernobyl and the public opinion that was more negative at that time. Before that, it was more like, people didn't question it. It was taken as a given that those nuclear power plants were there, they were running, everything was without problems.*" (Interviewee FOD Economie, 2025, quote 10).

The years after Chernobyl were marked by significant uncertainty. The left side of the political spectrum was pushing that the country could not continue with nuclear energy because of its dangers (Interviewee FOD Economie, 2025). It took some time before a formal decision was made, but eventually both public and political opinion shifted in favour of a nuclear phase-out, which was formally enacted in 2003. Another dip in the public opinion occurred after the Fukushima nuclear disaster, that once again brought security issues to the core of the nuclear discussion (Perko, Turcanu, & Greenen, 2012). Recently, however, public opinion has shifted

in favour of nuclear energy. According to a public opinion poll conducted by the Nuclear Forum (2024), 73% of Belgians now support the use of nuclear energy.

With regard to interest groups, Belgium does have environmental organisations such as Greenpeace, and also Sortir du nucléaire that oppose nuclear energy. However, these voices of protest have not been decisive. The interviewee from FOD Economie (2025) also noted that, since no new nuclear power plants are currently under development, the level of public protest remains limited. Even the decisions to extend the operation lifetime of existing reactors have encountered little resistance.

As for the political dynamics, much of Belgium's nuclear history has been shaped by the composition of the different governing coalitions. At the time of the nuclear phase-out decision, the Greens had joined the federal government for the first time, and they strongly advocated for the nuclear phase-out law that was ultimately adopted in 2003 (Van Horenbeek, 2025). The coalition was a collaboration between the left and the right. The nuclear phase-out was a key ambition of the Green minister, but it was also a compromise where on the other hand the energy market would be liberalised to please the liberal parties (Interviewee FOD Economie, 2025). Criticism on the nuclear phase-out mainly comes from the right and liberal side of the political spectrum, with the N-VA in particular being a vocal opponent.

The first postponement of the nuclear phase-out occurred under the influence of the N-VA in 2015, which was part of the federal government coalition for the first time (Van Horenbeek, 2025). The second postponement ultimately had to come from a Green minister, but due to the war in Ukraine, capacity problems, and increasing pressure, there were few alternatives left. Nevertheless, if we look at the party manifestos for the 2024 elections, we see that both of the Green parties still advocate for completely phasing out nuclear energy as quickly as possible (Michiels, 2024). However, they remain to be the only parties firmly against nuclear energy. The N-VA, for instance, strongly promotes nuclear energy, many other parties favour extending the operating times of the existing nuclear reactors, and investments in SMRs are also widely supported.

Thus, in the political stream, there have been moments when the stream was ripe for coupling, as there was sufficient political support to approve postponements of the nuclear phase-out law, such as in 2015 and 2022. Nevertheless, when examining the most recent government coalition within the scope of this thesis, the De Croo administration, which included the Green parties, it

becomes clear that the political stream is not ripe for a full reversal of the 2003 law or for renewed nuclear investments. Since the Greens remain committed to the nuclear phase-out, such a policy proposal would not enjoy sufficient support within the government.

4.2.5 Policy Window & Policy Entrepreneur – Belgium

This section explores the policy entrepreneurs and policy windows that have shaped Belgium's nuclear energy policies over time. The Belgian nuclear energy debate is characterised by a traditional left–right divide: "*So yes, it's mainly the right-wing liberal parties that are strong proponents, and then the left-wing ones that are more opposed or tend to moderate things a bit.*" (Interviewee FOD Economie, 2025, quote 11).

The Green parties in Belgium have acted as the key policy entrepreneurs in advancing the nuclear phase-out. As the most vocal political actors opposing nuclear energy, both Ecolo and Groen have consistently campaigned for the closure of nuclear power plants. Their influence culminated in 2003, when they succeeded in pushing the nuclear phase-out law through parliament during their first participation as a coalition partner in the federal government (Van Horenbeek, 2025). On the other side of the debate, the N-VA has emerged as the pro-nuclear policy entrepreneur, consistently criticising the nuclear phase-out law. Whether from the opposition or as part of the governing coalition, the party has repeatedly argued that the nuclear phase-out was a mistake (Van Horenbeek, 2025). N-VA has long advocated for postponing the closures of nuclear reactors, and if it were up to them, the phase-out should be abandoned entirely. As part of the governing coalition in 2015, they played a decisive role in securing the first extension of the nuclear phase-out, allowing the Doel 1 and Doel 2 reactors to remain operational.

Throughout the history of Belgium's nuclear engagement, several policy windows have opened and closed, enabling or preventing policy changes. From the late 1960s to the mid-1980s, Belgium opted to invest heavily in nuclear energy. Firstly, due to Belgium's access to uranium through its colonial history in Congo and its partnership with the USA, nuclear energy was a feasible policy option, making the policy stream ripe for coupling (Verbruggen, 2013; Schröder, Bergmans, & Laes, 2015). As energy demand in the country was growing and fossil fuels could not meet this demand, the problem stream was also ripe for coupling and aligned well with the policy solution of nuclear energy (Engie, n.d.). Since there was also political will to invest in nuclear energy and the government commissioned several nuclear reactors, the political stream also proved to be ripe for coupling (World Nuclear Association, n.d.-a). Essentially, all streams

were ripe for coupling, creating a policy window for investment in nuclear energy. Additionally, the oil crisis of 1973 served as a focusing event that accelerated Belgium's deliberate choice to invest further in nuclear energy, commissioning more nuclear reactors and ultimately resulting in the construction of seven nuclear power plants between 1975 and 1985 (World Nuclear Association, n.d.-a).

Although the government was still in favour of investing more in nuclear energy, and proposals for new nuclear power plants were on the table, momentum began to shift when the nuclear disaster at Chernobyl occurred in 1986. This focusing event put an end to the policy window in favour of nuclear energy. The government halted its ambition to construct additional nuclear power plants, and societal debate emerged about the safety and future of the reactors already in operation (Verbruggen, 2013). Eventually, when the Green parties joined the government in 1999, they acted on this societal distrust of nuclear energy and fulfilled their long-standing wish for a nuclear phase-out (Van Horenbeek, 2025). With this change of government, a political window opened that led to the 2003 phase-out law.

In both instances where Belgium decided to extend the operation lifetime of its nuclear reactors, in 2015 and again in 2022, clear problem windows opened that made such decisions possible. These windows emerged primarily from urgent concerns about security of energy supply and capacity shortages. In 2015, without sufficient capacity-replacement plans, the phase-out of nuclear energy threatened to create electricity shortages and price instability (Kunsch & Friesewinkel, 2014). These issues gained attention through indicators and feedback loops, ultimately leading to government interference. In 2022, the Russian invasion of Ukraine triggered a new energy crisis that brought energy dependence and price volatility to the forefront of the public and political discussions (Stevens & El Mabrouk, 2022). These conditions created a renewed problem window through a focusing event, pushing the government to reconsider its nuclear phase-out strategy. In both scenarios, all three streams were ripe for coupling.

When analysing the potential scenario of a full reversal of the nuclear phase-out law or renewed investments in nuclear energy, it becomes clear that both the problem and policy streams are ripe for coupling. The issues surrounding energy security, capacity shortages, and climate goals continue to serve as pressing indicators demanding government intervention, while feasible policy alternatives that favour nuclear energy exist and are supported within the policy community. However, the political stream does not align with these conditions during the period examined in this thesis. Since the Green parties are part of the governing coalition from 2020

until the end of 2024, and they remain committed to the nuclear phase-out, any policy proposals aimed at reversing the law would not receive sufficient support within the government. As a result, despite favourable conditions in the problem- and policy stream, a policy window has not opened up for policy change in this direction.

4.3 Comparison

4.3.1 Problem Stream – Comparison

In both the Netherlands and Belgium, the problem stream related to nuclear energy has been shaped by comparable focusing events such as the Chernobyl disaster in 1986, the Fukushima disaster in 2011, and the Russian invasion of Ukraine in 2022. Both nuclear disasters brough safety issues to the forefront of the nuclear debate. Nevertheless, the implications for both countries were different, due to the different baseline regarding their nuclear energy trajectories. Belgium already had seven operational nuclear reactors by the time the nuclear disaster of Chernobyl occurred. Thus, the country was already embedded in a nuclear strategy. In contrast, the Netherlands at the time only had one big operational power plant in Borssele, and a smaller one in Dodewaard. So, where in Belgium the focusing event of Chernobyl led to discussions about the future and safety of the existing power plants, in the Netherlands Chernobyl mainly led the country to halt it's nuclear ambitions and cancel plans for the construction of new reactors (Verbruggen, 2013; Aarts & Arentsen, 2017).

In both countries, the nuclear debate regained some momentum in the years leading up to the Fukushima disaster. After the incident however, in Belgium, ambitions to delay the nuclear phase-out, and in the Netherlands, efforts to invest in more reactors, were quickly abandoned as safety concerns once again dominated the nuclear discussion (Horenbeek, 2025; Aarts & Arentsen, 2017). In the years that followed, both countries were confronted with a series of indicators and feedback loops related to the composition of their energy mix, the need for diversification strategies, concerns over security of energy supply, and growing dependency on energy imports. In Belgium, these indicators frequently underscored the risks of capacity shortages resulting from the nuclear phase-out, because of a lack of capacity replacement plans (Kunsch & Friesewinkel, 2014). In the Netherlands, the same signals strengthened arguments for investments in nuclear energy, as a way of diversifying the energy mix and becoming less dependent on energy imports.

The war in Ukraine served as a focusing event that accelerated the nuclear energy debate in both countries, strengthening arguments in favour of nuclear power in light of the urgent need to diversify energy sources, reduce dependency on Russian oil and gas, and respond to skyrocketing energy prices. In the Netherlands, this reinforced nuclear energy as a strategic investment choice, whereas in Belgium, it directly led to a decision to extend the timeline of the nuclear phase-out (Hensen, 2021; Steel, Van de Velden, & Dujardin, 2023). In sum, although the baseline of nuclear energy strategies differed between the two countries, the same focusing events, combined with similar indicators and feedback loops, have given salience to underlying conditions in both national energy systems. In each case, the problem stream has become ripe for coupling, creating opportunities to advance nuclear energy policy proposals.

4.3.2 Policy Stream – Comparison

Historically, the Netherlands and Belgium have pursued different nuclear energy strategies, shaped by different timelines and policy choices. Belgium's early engagement with nuclear energy was strongly influenced by its colonial access to uranium from Congo and its early partnership with the USA through the Manhattan Project (Schröder, Bergmans, & Laes, 2015; Verbruggen, 2013). Therefore, Belgium had early access to nuclear technology and expertise, enabling it to invest in nuclear energy from an early stage. By 1985, Belgium had constructed seven nuclear reactors, embedding nuclear energy deeply into its electricity system.

In contrast, the Netherlands did not invest as heavily in nuclear energy, as it had access to alternative policy options to meet its energy needs. Both interviewees from KGG (2025) and FOD Economie (2025) emphasise that a key reason for the divergence in nuclear strategies lies in the discovery of natural gas fields in the Netherlands in 1959: "*For us, the discovery of the gas field in Slochteren was truly a game changer.*" (Interviewees KGG, 2025, quote 12), "*And it was actually, a gas power plant is also built very quickly, is efficient, and actually, in terms of investments, it's a lot more limited than building an expensive nuclear power plant.*" (Interviewee FOD Economie, 2025, quote 13). Additionally, the interviewee from TNO (2025) remarks that Belgium also has a smaller part of the North Sea than the Netherlands. The Dutch part of the North Sea is larger than the Netherlands itself, so that gives more possibilities for offshore wind.

The question of budgetary workability reveals another key contrast between both countries in the policy stream. In Belgium, the main financial concern revolves around the cost of phasing out nuclear energy (Stevens & El Mabrouk). The lack of capacity-replacement plans and rising

energy prices are a key concern in phasing out nuclear energy. Moreover, since the investments in building the nuclear power plants are already made, keeping them operational is relatively cheap, giving an economic incentive to extend the operation lifetimes. In contrast, in the Netherlands, the debate resolves around the costs of investing in nuclear energy. Several studies have shown that investments in nuclear energy are high, with uncertainty of cost overruns and delays in construction (Witteveen+Bos, 2022; Walstra, 2024; Kooiman et al., 2025). Nevertheless, the cost impact on the energy system as a whole will be marginal, so the decisive factors revolve more around arguments related to diversification and strategic considerations. Thus, discussions in Belgium tend to centre around the costs of abandoning nuclear energy, not initiating it, as is the case in the Netherlands.

All in all, the policy proposals for nuclear energy in both countries meet the criteria to survive the softening-up process, are supported by the policy community, and align with the energy challenges outlined in the problem stream. Therefore, the policy stream can be considered ripe for coupling in both cases.

4.3.3 Politics Stream – Comparison

The political stream surrounding nuclear energy in the Netherlands and Belgium shows both similarities and differences. In both countries, the national mood has historically been reactive to nuclear disasters such as Chernobyl and Fukushima, which led to increased public opposition toward nuclear energy. However, the timelines of the public debated in both countries are a bit different. In the Netherlands, public engagement with nuclear energy developed relatively early, most notably through the BMD initiated in the late 1970s. This public consultation process halted quick investments in nuclear energy and ultimately led to the public rejecting the expansion of nuclear energy (Van Hengel, 2003). After the report from the BMD, a new government still decided it wanted to invest in nuclear energy. However, shortly afterwards, the Chernobyl disaster occurred, which again prevented investments in new nuclear reactors.

In Belgium, by contrast, the public debate intensified only after the country had already committed heavily to nuclear energy. By the time public opposition grew, all seven nuclear reactors had already been commissioned. This meant that in Belgium, societal concerns were largely reactive to an existing nuclear reality, whereas in the Netherlands, it halted nuclear investments from a much earlier stage. Thus, while in the Netherlands Chernobyl brought the country's nuclear ambitions to a halt, in Belgium it triggered a debate about the future and safety of the nuclear reactors already in operation. When asked about the reasons behind Belgium's

early investments in nuclear energy compared to the Netherlands, the interviewee from TNO (2025) responded: "*Well, I think that has to do with the fact that we had that broader societal debate, whereas Belgium, but you have to, I'm not exactly sure, but you should take a look at the construction years, but you basically see that, because I think they were built in the 1980s, and at that time we were still debating, and they already had nuclear power plants under construction*." (Interviewee TNO, 2025, quote 14).

In recent years, national attitudes toward nuclear energy have become more favourable in both countries. There is increasing public support in the Netherlands (CBS, 2023; Krouwer et al., 2022), and a similar shift in Belgium, where a clear majority of the population now supports the continued use of nuclear energy (Nuclear Forum, 2024). Regarding interest groups, there are no significant obstacles in the political stream in either country. Environmental organisations are campaigning less on the topic of nuclear energy, and societal opposition is relatively limited.

The most substantial differences between both countries in the political stream lies in the political sphere, and the composition of governing coalitions. One of the explanations for the different nuclear strategies of both countries is as follows: "*I think, maybe simply, just the coalition at the time. In the Netherlands, we've never had a Green party in government. I think that made a big difference in Belgium*" (Interviewees KGG, 2025, quote 15). Furthermore, in the Netherlands, political support for nuclear energy has grown significantly in recent years, and currently, a broad parliamentary majority supports investments in new nuclear reactors. Moreover, with the shift from the Rutte-III to the Rutte-IV cabinet, there was a governing coalition in favour of nuclear energy, ultimately leading to plans to construct new power plants (Stellinga, 2023; Ministerie van Economische Zaken en Klimaat, n.d.). This was also the case under the subsequent Schoof government (PVV, VVD, NSC, & BBB, 2024).

In Belgium, by contrast, the political spectrum is characterised by a more traditional left–right divide on nuclear energy. Although liberal parties such as N-VA strongly advocate for renewed nuclear investments and successfully pushed for operational extensions in 2015, the presence of the Green parties (Ecolo and Groen) in government coalitions has been a decisive factor in shaping the country's nuclear policy. Their influence led to the adoption of the 2003 nuclear phase-out law (Van Horenbeek, 2025). Their participation in the most recent government within the scope of this thesis, the De Croo administration, did result in another extension to the phase-out timeline. However, for the Greens, a full reversal of this policy remains non-negotiable.

In conclusion, while the political stream in the Netherlands is ripe for coupling, due to the presence of a governing coalition that supports policy proposals in favour of nuclear energy, the political stream in Belgium remains unripe for coupling. As long as the Green parties retain their position in government, they are likely to block any policy proposals aimed at further delaying the nuclear phase-out or initiating the construction of new nuclear reactors.

4.3.4 Policy Window & Policy Entrepreneur – Comparison

In both the Netherlands and Belgium, political parties have played a central role as policy entrepreneurs in the nuclear energy debate. In the Netherlands, pro-nuclear parties such as VVD and CDA have consistently advocated for renewed investments in nuclear energy. In Belgium, the N-VA has acted as the main policy entrepreneur in favour of nuclear energy, pushing for operational extensions and criticising the 2003 phase-out law. However, Belgium's political context is more polarised, and the Green parties have created a strong counter voice and have in that sense acted as anti-nuclear policy entrepreneurs.

The policy windows that have opened and closed throughout the histories of both countries' nuclear engagement often happened at similar times but had different outcomes. In Belgium, a policy window opened between the late 1960s and the mid-1980s, leading the country to heavily invest in nuclear energy. In the Netherlands, early investments in nuclear energy were delayed by a long public consultation process, preventing a political window from opening. By the time the streams did align, the focusing event of Chernobyl occurred, shutting down the policy window for nuclear energy in both countries. In Belgium, seven nuclear reactors had already been built, so the country's nuclear strategy was established, at least for the time being. In the Netherlands, Chernobyl halted any nuclear ambition beyond the large power plant in Borssele and the smaller one in Dodewaard that were already built.

Chernobyl, together with the following societal debate, and the political window that emerged due to a change in the federal government, when the Green parties joined the coalition for the first time, eventually led Belgium to phase out nuclear energy in 2003. In both countries, debates in favour of nuclear energy resurfaced in the lead-up to the Fukushima nuclear disaster in 2011. Nevertheless, this focusing event closed the policy window for nuclear energy in both countries, as it temporarily halted discussions about extending the phase-out in Belgium and constructing new nuclear power plants in the Netherlands.

Looking at the more recent policy developments on nuclear energy, the problem- and policy streams became ripe for coupling in both countries, but only in the Netherlands did the political stream also align, creating a full policy window that led to policy change. The agenda window opened in the problem stream, as various indicators and feedback loops introduced information about rising energy prices, dependency issues, and diversification strategies, drawing attention to nuclear energy as a potential policy solution. This was further accelerated by the focusing event of the war in Ukraine, which triggered an energy crisis. Subsequently, a decision window opened in the political stream, as a shift in government following elections resulted in a governing majority in favour of nuclear energy. This eventually led the Netherlands to invest in the construction of new nuclear power plants.

In Belgium, similar problem windows have also opened with regard to extensions of the nuclear phase-out law. Nevertheless, the presence of the Greens in government has prevented political support for new nuclear energy policy proposals, leaving the political stream unripe for coupling. As a result, while extensions to the phase-out timeline have been adopted, no major policy change has taken place.

5. Conclusion & Discussion

5.1 Conclusion

This thesis has aimed to answer the following research question: 'How can the differences in nuclear energy policy choices between the Netherlands and Belgium be explained?' The answer to this question is multilayered. By comparing how the three streams of the MSF evolved within each national context, this thesis has identified several explanations that together account for the contrasting trajectories of a nuclear phase-in in the Netherlands and a nuclear phase-out in Belgium. A detailed MSF analysis is conducted in section 4.3, offering a comparison between both cases following the MSF structure. This conclusion draws the short and concise main conclusions of this thesis.

Firstly, historical differences between both countries have shaped their respective nuclear energy trajectories. Belgium's early and extensive investment in nuclear energy was facilitated by colonial access to uranium and early collaboration and knowledge exchange with the USA (Schröder, Bergmans, & Laes, 2015; Verbruggen, 2013). This meant that nuclear power became a central component of its energy system from the outset. In contrast, the Netherlands' discovery of large domestic gas reserves in 1959 provided an alternative energy resource, reducing its reliance on nuclear power.

Secondly, societal debate and public engagement also played a key role in the divergence of the nuclear energy policies of both countries. While there was no lack of political will to invest in nuclear energy in the Netherlands, an extensive public consultation process, in response to widespread opposition, prevented early investments in nuclear reactors (Van Hengel, 2003). In Belgium, by contrast, public debate intensified only after the country had already built seven nuclear reactors, making public opposition more reactive and less influential in shaping the initial policy direction.

Thirdly, while both countries were confronted with similar problem indicators, such as rising energy prices, concerns over the security of energy supply, dependency on foreign energy imports, and the need for diversification, they had different implications. In the Netherlands, these indicators strengthened the case for investing in new nuclear capacity, while in Belgium, they highlighted the risks of capacity shortages in the energy system resulting from the nuclear phase-out law. They therefore supported the case for extending the phase-out, in order to buy

time to develop solid capacity replacement plans but did not lead to renewed investments in nuclear energy or a reversal of the phase-out.

Fourthly, political factors were the most decisive in explaining more recent policy divergence. In the Netherlands, growing support for nuclear energy culminated in governing coalitions, namely the Rutte-IV and the subsequent Schoof governments, that explicitly endorsed nuclear energy policies and announced plans for new nuclear reactors. In Belgium, by contrast, strong opposition to nuclear energy from the Green parties, and their presence in the governing coalition of the De Croo government, have hindered a reversal of the phase-out law and the advancement of nuclear policy proposals.

Lastly, from the perspective of the MSF, the key difference between the two cases lies in the alignment of the streams. In the Netherlands, all three streams became ripe for coupling, resulting in the opening of a policy window. As a result, policy change became feasible, and policy entrepreneurs from the VVD and CDA successfully coupled the streams, first by placing nuclear proposals on the policy agenda, and subsequently by advancing them through the decision-making phase, as subsequent problem- and politics windows emerged. In Belgium, by contrast, only the problem- and policy streams have proven to be ripe for coupling. The political stream remains unripe, as the presence of the Green parties in government has blocked support for proposals favouring nuclear energy. Consequently, beyond extensions to the phase-out timeline, substantive policy change in the Belgian case has not been feasible.

5.2 Discussion

From a societal perspective, this research provides valuable insights into how public opinion, societal debate, political dynamics, cost-benefit analyses, and strategic considerations interact and shape nuclear energy policy decisions. By tracing the nuclear debates in both countries, this thesis highlights the underlying factors that have influenced their respective energy policies. For policymakers and civil society actors, understanding the conditions under which nuclear energy policies become viable offers important insights into the responsiveness of the government, the role of public opinion, and the influence of focusing events, indicators, and feedback loops. From a scientific perspective, this thesis has filled a gap in the literature by comparing the nuclear energy strategies of the Netherlands and Belgium, since both cases are individually relatively understudied in the academic literature and a comparison was not yet conducted. By offering an in-depth analysis of both cases, this thesis offers new empirical insights into the policy considerations of both countries regarding nuclear energy.

Reflecting on the theoretical expectations outlined in the theoretical framework, the MSF suggested that the variation in nuclear energy policies between both countries could be accounted for by differences in the streams (Kingdon, 2014; Herweg, Zahariadis, & Zohlnhöfer, 2023). The theoretical expectation of this thesis suggested that in the case of the Netherlands, since policy change occurred, all three streams would be ripe for coupling. Since policy change did not occur in Belgium, the theoretical expectation suggested that one or more of the streams would not be ripe for coupling. The analysis of this thesis has confirmed both of these expectations.

Furthermore, this thesis expected the Russian invasion of Ukraine and the subsequent energy crisis to open a policy window for renewed nuclear energy investments in the Netherlands. While this focusing event certainly accelerated the discussion on nuclear energy and increased public and political support, the renewed traction had already begun prior to the invasion, and proposals for nuclear energy were already on the table at that time. As for the Belgian case, this thesis expected the 2003 phase-out law to be a possible restraining factor in the policy stream, along with potential differences in the political stream. The analysis has shown that differences in the political stream are the main reason policy change has not taken place. While the 2003 phase-out law has indeed acted as a constraint, its limiting effect has been primarily political, as the Green parties continued to adhere to the phase-out, leaving the political stream unripe for coupling. All in all, the MSF has proven to be a reliable framework for explaining the divergent nuclear energy policies of the Netherlands and Belgium.

The limitations of this thesis mostly lie in its lack of generalisability. As it focuses on two specific cases, the empirical findings cannot be directly translated to a broader set of cases. However, the internal validity of both cases is strong, as they have been studied in depth using process tracing (Voltolini & Eising, 2017). Moreover, this thesis allows for theoretical generalisations by applying the MSF in a comparative case study. The MSF has demonstrated a high explanatory power in this context, allowing for a thorough understanding of how the Netherlands and Belgium arrived at divergent nuclear energy policy outcomes. As such, the study confirms that the MSF can be effectively applied to decision-making processes within parliamentary systems, and that it offers valuable analytical concepts in comparative research.

The distinction between the two different coupling processes, as developed by Herweg, Huß, and Zohlnhöfer (2015), proved useful in understanding how policy change was realised in the Netherlands. First, an agenda window opened in the problem stream, advancing nuclear energy

onto the policy agenda, followed by a decision window in the political stream that enabled actual policy change. Findings by De Wals, Espinoza-Moya, and Béland (2019) that the MSF allows for the integration of technical considerations into the decision-making process are also supported by this thesis, as in-depth cost-benefit analyses of the energy system and the technical feasibility of nuclear energy have proven to be important factors in both the political and societal debates surrounding nuclear energy. Furthermore, Zahariadis (1992; 2003) emphasised the importance of coalitions in parliamentary systems compared to the presidential system of the USA. The cases of both the Netherlands and Belgium demonstrate that the composition of governing coalitions had a major impact on whether or not policy proposals on nuclear energy reached the decision-making phase and led to policy change.

As the topic of nuclear energy continues to play a central role in national and international energy debates, future research could apply a similar research design to a broader range of national contexts. By examining additional cases through the lens of the MSF, a broader understanding of how various countries develop and adapt their nuclear energy strategies could be gained. Admittedly, this thesis has also been partially overtaken by recent developments. In the meantime, Belgium's nuclear energy policy has taken a new turn, as a new government has come into office and officially repealed the 2003 phase-out law (Michiels, 2025). This development falls outside the temporal scope of this thesis, but it does invite for further research. The new political context in Belgium offers an interesting case to examine how these changes have reshaped the political stream, opening a policy window to enable nuclear energy policy change.

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Appendices

Appendix 1: Quotes Interviews

Quote 1

[KGG] Dus er zijn ongeveer net zoveel rapporten die zeggen dat kernenergie goedkoper is als de rapporten die zeggen dat kernenergie duurder is.

Quote 2

[KGG] Dus op systeemkostenniveau is het marginaal goedkoper of marginaal duurder, afhankelijk van de assumpties die je toepast. Dus die studie waar KGG 2 naar verwijst, gaat over de vraag, wat gaat de industrie doen in Nederland? Als de industrie echt elektrificeert en hier wel blijft, gaat kernenergie het energiesysteem goedkoper maken. Gaat Nederland veel van de industrie kwijtraken? Gaat de vraag drastisch omlaag? Dan wordt het misschien duurder. Maar dat is ook marginaal.

Quote 3

[KGG] Ja, wat ik zelf wel ingewikkeld vind, is dat van alle energievormen kernenergie wel de meest gepolariseerde is, zal ik maar zeggen. Dat heeft als voordeel dat iedereen er een mening over heeft. Het is leuk om daar ook met andere mensen over in gesprek te gaan. Het belangrijkste nadeel is dat de extreme voorstanders en de extreme tegenstanders, dat zijn niet hele grote groepen, maar die zijn wel heel erg vocaal, en die helpen dus eigenlijk niet om te komen tot een genuanceerde en goede besluitvorming. De framing vindt vooral in die flanken plaats, zowel door Greenpeace en WISE als door sommige voorstanders, hè, en met name in de wat radicaal-rechtse hoek.

Quote 4

[KGG] Die hebben wel continu gepleit voor kernenergie. Maar ja, ze deden dat daarvoor ook, en toen maakte het geen verschil. Dus ik denk dat het echt wel uit de politiek gekomen is.

Quote 5

[KGG] Dus ja het traditionele links-rechts, volgens mij hebben we nu 121 zetels in de kamer die voor kernenergie zijn, dus het wordt steeds minder bipartisan, het wordt steeds meer een gedragen onderwerp in de Kamer en in de politiek.

Quote 6

[TNO] Het CDA noemden we, hè, de VVD die en dan ja, op rechts natuurlijk wat meer partijen, maar die vooral. En die Bontenbal en Silvio Erkens. Dat waren toch de twee energiewoordvoerders die heel erg daarmee bezig waren.

Quote 7

[KGG] Dat is een beetje geboren, denk ik, vooral in de politiek, vanuit het CDA en de VVD.

Quote 8

[FOD Economie] Ja, de reden voor de bouw oorspronkelijk was voornamelijk ook de petroleumcrises in de jaren '70, waar we dan bijvoorbeeld zekerheidsproblemen hadden voor de olie en de gas, en dat daarvan ook eigenlijk wel toch een versnelling gekomen is, en de wil ook om op een andere manier dan elektriciteit te gaan produceren.

Quote 9

[FOD Economie] Ja, wij hebben historisch gezien, ze zijn heel vroeg begonnen met al het onderzoek. En dat heeft dan weer zijn oorsprong in de Tweede Wereldoorlog, doordat België vanuit Congo in feite, de vroegere kolonie, eigenlijk uranium uit een uraniummijn in Congo heeft aangeleverd voor het Manhattanproject. En in ruil, ik weet niet of dat zo in de boeken staat, maar in ruil kregen zij dan ook toegang tot technologie en is daar een site geselecteerd geweest in Mol/Dessel. En dat is dan één zone geworden waar een nucleair onderzoekscentrum is gebouwd in de jaren '50, en van daaruit kwam er eigenlijk ook heel veel, heel veel onderzoek en heel veel interesse en nieuwe technologie waardoor vanalles mogelijk was.

Quote 10

[FOD Economie] Ik denk dat het op dat vlak zeker ook nog een gevolg is van Tsjernobyl en de publieke opinie die toen wel negatiever was. Voordien was het eerder, mensen stelden zich daar geen vragen over. Het was als een gegeven dat die kerncentrales er stonden, die draaiden, alles was zonder problemen.

Quote 11

[FOD Economie] Dus ja, het zijn voornamelijk de rechtse liberale partijen die harde voorstander zijn en dan de linkse die dan eerder tegen zijn of die de dingen een beetje matigen.

Quote 12

[KGG] Bij ons is het vinden van het gasveld in Slochteren gewoon echt een game changer geweest.

Quote 13

[FOD Economie] En het was eigenlijk, een gascentrale is ook heel snel gebouwd, is efficiënt, en is eigenlijk qua investeringen een heel pak beperkter dan een dure kerncentrale bouwen.

Quote 14

[TNO] Nou, ik denk dat dat te maken heeft met dat wij die maatschappelijke, bredere maatschappelijke discussie hebben gevoerd, terwijl België, maar je moet het, ik heb het niet precies, maar je moet maar even kijken naar de bouwjaren, maar je ziet in feite dat, want ze zijn volgens mij in de jaren '80 gebouwd en toen waren wij nog aan het discussiëren en zij hadden gewoon kerncentrales in de steigers staan.

Quote 15

[KGG] Ik denk, misschien simpelweg, gewoon de coalitie van destijds. In Nederland hebben we nog nooit een Groene partij in de regering gehad. Ik denk dat in België een groot verschil is geweest.

Appendix 2: AI Statement

For this thesis, the only use of generative AI has been for the purpose of preparatory work and background research. Keeping in mind that AI can provide incorrect information, I consistently did my own research fist, acquiring in-depth knowledge of the subjects, to manage potential AI hallucinations. The full text of this master's thesis was written entirely by me, without the use of any generative AI systems.