



European Perceptions of Climate Change (EPCC)

Socio-political profiles to inform a cross-national survey in France, Germany, Norway and the UK

June 2016



About the EPCC project

The European Perceptions of Climate Change Project (EPCC) is coordinated by Cardiff University and forms part of the Joint Project Initiative–Climate Change (JPI–Climate – see www.jpi-climate.eu), a research programme uniting National Research Councils across Europe. Inter-disciplinary teams from the UK, Germany, France and Norway are individually funded to collaborate in the design and analysis of a major comparative survey of climate and energy beliefs amongst the public in these 4 participating nations.

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About Climate Outreach

[Climate Outreach](#) (formerly COIN) is a charity focused on building cross-societal acceptance of the need to tackle climate change. We have over 10 years of experience helping our partners to talk and think about climate change in ways that reflect their individual values, interests and ways of seeing the world. We work with a wide range of partners including central, regional and local governments, charities, business, faith organisations and youth groups.

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Executive summary

‘European perceptions of climate change’ (EPCC) is a two-year project, with the central aim of designing and conducting the first ever theoretically grounded cross-national survey of public perceptions of climate change and energy transition in Europe. EPCC is a collaboration between academic teams in four participating nations (France, Germany, Norway and the UK, led by Nick Pidgeon at Cardiff University) and Climate Outreach, a UK-based think tank which specialises in climate change communication.

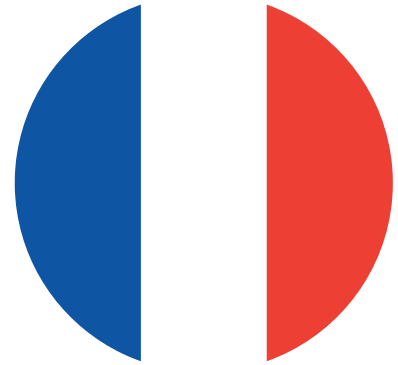
The purpose of this discussion paper is to provide a detailed overview of the socio-political context in each of the four participating nations. A key feature of the EPCC survey is that its design was directly informed by these national ‘profiles’, as well as by an ongoing process of stakeholder engagement with an international advisory panel. Following a general introduction outlining the pan-European context, the paper presents four separate national analyses, each organised into five sub-sections:

- The historical, cultural & policy context in each nation;
- Key actors shaping public perceptions of energy and climate change in each nation;
- Key climate and energy-related events that have taken place so far;
- The anticipated consequences of climate change in each nation;
- Media reporting on energy and climate change.

Because the analyses are quite detailed, we also provide in the next four pages a very brief summary of the key issues relating to each of the four nations in this Executive Summary, and identify Key Concepts (arising from these analyses) which inform the survey design (also highlighted throughout the document in blue boxes). In this way, we seek to make the links between the different components of the project clear. These key aspects informed the design of the EPCC questionnaire, alongside detailed study of the literature of previous surveys, and our own stakeholder consultation process.

France: summary of key issues

- France has low GHG emissions per capita relative to other European and developed nations. This is largely due to the fact that the electricity production is mainly nuclear. Legislation voted in 2015 will reduce French reliance on nuclear energy from an average of 75% of the electricity mix to 50% by the year 2025. Moreover there is a target to reduce total energy consumption by 50% by 2050.
- France hosted the COP21 meeting in Nov-Dec. 2015 and Conference president Laurent Fabius won high esteem for successfully leading the parties to a strong and historic agreement. After the record-breaking signature of the Paris Agreement by 175 parties on Earth Day in April 2016, successor president and Ecology Minister Ségolène Royal announced 12 decrees or decisions advancing specific mitigation actions in France.
- The dense network of territorial government units is recognised and encouraged in national governmental discourse as a major actor in climate change adaptation.
- NGOs and civil society organisations are increasingly represented in state consultative bodies discussing measures to mitigate climate change.
- The French Academy of Sciences includes a very small fringe of scientists who deny climate change which at times can gain a disproportionate presence in the media.
- France is a culturally and historically Catholic country. Pope Francis' June 2015 environmental encyclical calling on all religions to take action on climate change was taken note of in France.
- France is projected to experience more frequent and longer periods of heatwaves (potentially fatal to at-risk populations – the elderly, infants, the chronically/gravely ill etc.) and droughts.



The Scandola Nature Reserve is located on the west coast of the French island of Corsica, within the Corsica Regional Park. The park and reserve were added to the UNESCO World Heritage List in 1983.

Photo: [orangebrompton](#)

Germany: summary of key issues

- The history of public engagement with energy and climate change in Germany has been strongly shaped by major public protests against nuclear energy. These started in the 1970s and continued well into 2000s, resulting in a nuclear phase-out before 2022.
- The level of environmental awareness is traditionally high among German citizens. In 1983 the Green Party entered the German Parliament for the first time and was part of the governing coalition between 1998 and 2005. In the 2014 survey on environmental awareness in Germany, respondents ranked environmental protection as fifth among a list of the most important social issues currently facing Germany.
- Climate scepticism is not considered a serious problem in Germany. A national survey in 2014 reported that only 7% of respondents could be considered 'trend' or 'attribution' sceptics, only 8% as 'consensus' sceptics and only 5% as 'impact' sceptics.
- Politically, climate and environmental issues are closely related to the intended transition of the energy system in Germany ('Energiewende'). This transition aims at meeting national energy demands by at least 60% of renewable energy by 2050. However, brown and black coal are still important energy sources in Germany. The coal extraction industry not only serves as an important employer in Germany but also forms a part of regional identities.
- Climate change is a prominent issue in German news coverage, occurring frequently as the main cover story in magazines and newspapers. In 1986, Der Spiegel – one of the main news magazines in Germany – published an edition introducing the climate catastrophe with a fictional cover picture showing the Cologne Cathedral being flooded.
- According to current models, the impacts of climate change will mostly be moderate in Germany. The economy, especially agriculture in eastern Germany and those regions that depend on winter tourism will be affected by rising temperatures.



The Jasmund National Park is a nature reserve in the Jasmund peninsula, in the northeast of Rügen island in Mecklenburg-Vorpommern, Germany. It was added to the UNESCO World Heritage List in 2011 as an extension to the Primeval Beech Forests of the Carpathians and the Ancient Beech Forests of Germany.

Photo: [Pablo Necochea](#)

Norway: summary of key issues

- Oil and hydroelectric power play important roles in Norwegian society, as key providers of employment and energy. While the country's GHG emissions are close to the European average at about 11 tonnes CO₂e/capita per year, Norway's emissions profile is unusual, with essentially zero emissions from power production but high emissions from oil and gas extraction in the North Sea.
- The economic importance of the fossil fuel and hydropower sectors blends with social identity and conceptions of nature to form powerful narratives around how Norway found and exploited its offshore oil and gas resources.
- National and international companies, the central government bureaucracy, business and labour associations and NGOs seek to further their own interests in debates over the future of fossil fuel exports versus renewable energy and climate protection in the future. 'Cognitive dissonance' emerges because the country seeks a climate-friendly image at home and abroad, while being unable to curb its domestic emissions and maintaining fossil fuel exports at relatively high levels.
- Unlike countries such as the US and Australia, climate change is not considered primarily as a left-right issue in Norway, and Norway does not have any significant climate sceptical news outlets.
- Norway's most important mitigation policies are the EU emissions trading scheme, strong support for electric vehicles and overseas aid to reduce tropical deforestation.
- Heavier rainfall, more frequent landslides and heavier floods are likely to result from climate change as average annual temperatures are expected to increase by about 4.5°C (range: 3.3 – 6.4°C) and annual precipitation by about 18% (range: 7 – 23%). Norway is set to experience less snow and glaciers will shrink or disappear.



The Geiranger Fjord is a fjord in the Sunnmøre region of Møre og Romsdal county, Norway. It was listed as a UNESCO World Heritage Site in 2005, jointly with the Nærøyfjorden.

Photo: [Whuups](#)

UK: summary of key issues

- The industrial revolution, the discovery of North Sea oil and an ambivalent/unsettled relationship with nuclear power are key issues in the historical background of the UK in relation to energy.
- A broad cross-party consensus on climate change led to a world-leading Climate Change Act (2008), and the instalment of the Committee on Climate Change to track the progress towards an 80% emission reduction by 2050.
- Media analysis has identified scepticism in the media to be primarily an Anglophone phenomenon with sceptics views given more presence in the US and UK media than in other countries.
- The UK 'political sector' has a history of framing nuclear power as a solution to climate change, while public perception research identifies a consistent preference for renewable energy among the UK public (Spence et al. 2010).
- The current conservative government announced the phase-out of subsidies for onshore wind farms and solar systems, and continues to support the development of shale gas, North Sea oil and gas, and nuclear power.
- In 2015 the government received criticism from UN scientists and business analysts for 'sending mixed signals' with regards to the support for low-carbon technologies and solutions in the UK.
- Climate change is expected to increase the risk of severe flooding and hotter summers in the UK, with potential opportunities (e.g. for the agricultural sector).



The Jurassic Coast covers 95 miles of stunning coastline from East Devon to Dorset, in Southern England. It was added to the UNESCO World Heritage List in 2001.

Photo: [GaryW2008](#)

Key concepts to inform the survey design

The purpose of completing these socio-political analyses was to provide – in conjunction with the advice and guidance of the stakeholder panel – a robust and practically-grounded evidence base with which to inform the design of the survey. By situating the design of the EPCC survey in stakeholder views and an analysis of the socio-political context in each participating nation, the project aims to go beyond simply documenting differences between European publics on climate change, and say something about why these differences are apparent. Throughout the document, key concepts which have, in addition to theoretical considerations, informed the survey design are highlighted in blue boxes. In this section we summarise them for ease of reference.

Climate & energy in context

The EU's central position in the global climate change policy debate may impact on European publics in a number of ways. On the one hand, the (relatively) high profile leadership provided by the EU at a global level may act as a cue for European citizens to take climate change more seriously. But it is also possible that the centrality of climate change to the EU could mean that the issue of climate change is conflated with the 'European Project' – and all the negative connotations that this has for some European citizens.

The political attention given to the global economic recession, the serious impacts it has had on European citizens' lives, and the ongoing challenges that people face in terms of employment and income are highly likely to detract from the relative perceived importance of issues like climate change.

In response to the discussion around climate change migration sparked by the current refugee crisis in the EU, our research could assess the perceived link between climate change and migration and concern about 'climate change victims'.

Climate scepticism & environmentalism

The EPCC survey will be able to shed light on the relationship between political ideology and views about energy and climate change in the four participating nations, as well as differences in views emerging from a classical 'environmentalist' tradition of thought, and more 'technologically optimistic' perspectives.

Climate scepticism is a largely Anglophone phenomenon (in terms of media coverage and public perceptions), and is therefore likely to be higher in the UK than in other participating nations. The concentration of climate sceptical views in the media may also lead to a higher political polarisation than in the other countries.

National energy policies

There are likely to be differences in the national climate and energy ‘self-identity’ of EU members who are ‘producers’ of energy and those who are primarily ‘consumers’ of it. There is an important question about whether these sorts of dynamics impact on public perceptions of energy and climate change – and how comparisons with the energy and climate policies of other EU states may influence national perceptions.

The EPCC survey will be able to compare levels of support for fossil fuels between the four participating countries, both now and into the future. There may be regional differences within nations (e.g. in the UK, on perceptions of North Sea oil).

The decision to phase-out nuclear energy and the transition to an energy system mainly based on renewables is one of the most important aspects of German environmental policy, and the EPCC survey will be able to compare public views on the components of the Energiewende with attitudes towards renewables in the other participating nations.

There are likely to be important differences in perceptions of nuclear power, for example in the way that the technology is ‘framed’ (as a ‘low-carbon technology’), and in different national response to the Fukushima disaster.

Media & other cultural influences

Although the EPCC study cannot monitor media discourse and volume in detail, our analysis of survey results will be attentive to this as a possible factor in any changes in perceptions (within each nation, and whether these track trends in media coverage) and between the four nations.

Perceptions of political inaction may increase the sense among some citizens that “the impact of climate change was exaggerated by climate scientists as well as the media” (Ryghaug et al., 2011, p. 790). This should be seen in connection with the fact that trust in the state is much stronger in Norway than in many other countries.

A widespread feeling of national environmental identity (being associated with the green landscape) might be able to explain attitudes towards renewable energy – we will be able to explore whether the four countries define their national identity in the same way and how that affects their attitudes towards climate change policies.

Climate impacts

The EPCC survey can identify whether perceptions of the seriousness of climate impacts in four participating nations differ, and whether these differences have any relation to the actual projected impacts of climate change in each nation. Where are there potential 'opportunities' from climate change for individual nations and will this impact on public perceptions of climate risks?

People in areas more likely to be affected by climate impacts (and/or people who indicate previous experience with climate change impacts) might perceive climate change to be less of a 'distant' issue, which might lead to higher concern about climate change and more willingness to engage in related behaviours (differences may emerge between or within participating nations).

The UK public might be more positive about the national impacts of climate change compared to people in (e.g.) France due to the potential opportunities for the UK.

Personal engagement

The EPCC survey will be able to compare levels of perceived need for 'personal' or 'domestic' activity to limit the effects of climate change, and assess whether they differ across the four participating nations.

Do per capita emissions relate to the four nations' public perspectives on climate change and energy use?

The EPCC survey will be able to compare emotional and affective reactions to climate change and energy system change in the four participating nations.

Trust in the state is much stronger in Norway than in many other European countries. The EPCC survey will be able to compare levels of trust in policy actors, and perceived policy action/inaction.

The EPCC survey will include items that help explore the factors underlying this tension, which may derive from a conflict between classical environmentalist and technologically optimistic strands of thought.

While levels of climate change scepticism have been low over the last few years the presence of climate change sceptic views in the UK media landscape might lead the public to underestimate how many people consider climate change in their daily lives.

Introduction: climate change and the European public

In April 2016, 175 parties (174 countries plus the EU, which represents 28 countries) signed up to the Paris Climate Agreement. The Agreement itself had been agreed at the summit held in Paris at the end of 2015. Whilst the Paris summit did receive media attention across Europe, it's important to note the quantity of the coverage wasn't as high as that of the Copenhagen conference in 2009. The quality of the reporting, however, was much more positive, and negotiators were able to get across a good news message about the outcomes of the summit.¹ This sense of optimism has been carried through to the signing of the Paris Climate Agreement.

For the EU, the climate negotiations in Paris were a diplomatic success, aligning global ambition on climate policy with the EU's longstanding call to limit global warming to an average of 2 degrees celsius.² As part of its commitment to the 2°C limit the EU has set a climate target of reducing emissions by at least 40% by 2030. However, up to now that target has only been a statement of intention. The EU has held off implementing legislation in the run up to the Paris summit because the steps needed to meet the targets are deeply contested by some member states. Subsequent to the signing of the Paris agreement the EU now has to push forward with agreeing the required policies needed to deliver these cuts. This potentially divisive process will be taking place against a backdrop of other threats to EU unity. In addition, the challenge of implementing this climate legislation is exacerbated by the introduction at the Paris summit of a possible 1.5°C target for warming, which may require the EU to either bring forward the date by which the cuts will be achieved or strengthen the target itself.³

In the context of this crucial moment for European climate policy, the EPCC project addressed a significant knowledge gap with regard to European public engagement with climate change. While there have been national polls of EU member states and occasional cross-European surveys of public opinion (most notably the 'Eurobarometer' series which has sometimes included items relating to climate change), there is very little evidence on how citizens in different European nations differ on engagement with climate change.

By grounding the design of the EPCC survey in stakeholder views and an analysis of the socio-political context in each participating nation, the project aims to go beyond simply documenting differences between European publics on climate change, and say something about why these differences are apparent. The focus of the current discussion

1 Pashley, A. (2016). Why did Paris climate summit get less press coverage than Copenhagen? Climate Home. Online: <http://www.climatechangenews.com/2016/03/07/why-did-paris-climate-summit-get-less-press-coverage-than-copenhagen/>

2 Geden, O. and Droge, S. (2016). After the Paris Agreement - New Challenges for the EU's Leadership in Climate Policy. German institute for International and Security Affairs. Online: <http://www.isn.ethz.ch/Digital-Library/Articles/Detail/?id=196630>.

3 ibid

paper is on the ways in which key events, influential actors, media and the wider cultural/historical and policy context in the four participating nations may impact on public engagement with climate change.

The European Union (EU) itself, and notably the European Commission, is an important and unusual actor at a pan-European level in terms of setting the agenda on climate change. As a longstanding, well-established and relatively stable regional grouping, it has historically been a leading voice advocating for policies to mitigate and adapt to climate change (Rayner & Jordan, 2013; Tvinnereim, 2013). In rhetoric and in policy ambition, the EU has tended to position itself as a world leader on climate change. The EU has committed to spending at least 20% of its €960 billion budget for the 2014–2020 period on climate change-related policies. And even if the ambitions of EU directives have not always resulted in proven policy efficacy or influence on other key global actors (Jordan et al, 2010), it has been argued that “the EU can be looked upon as a rather benign ‘critical case’: if [it] cannot develop effective climate policies, then the implications for the globe are grim” (Wettestad, 2000).

However, while there are clearly important influences which might be expected to operate at a pan-European level, every European nation has a different social, political, historical and cultural context which shapes public engagement with climate change.

There are likely to be differences in the national climate and energy ‘self-identity’ of EU members who are ‘producers’ of energy and those who are primarily ‘consumers’ of it. There is an important question about whether these sorts of dynamics impact on public perceptions of energy and climate change – and how comparisons with the energy and climate policies of other EU states may influence national perceptions.

The EU’s central position in the global climate change policy debate may also impact on European publics in a number of ways. On the one hand, the (relatively) high profile leadership provided by the EU at a global level may act as a cue for European citizens to take climate change more seriously. But it is also possible that the centrality of climate change to the EU could mean that the issue of climate change is conflated with the ‘European Project’ – and all the negative connotations that this has for some European citizens.

While it is not within the scope of this paper to document in detail the dozens of trends and political, economic or cultural developments that have shaped the EU and its member states, it is possible to point to some ‘meta-trends’ that have characterised and defined Europe (and by extension the wider world) over the past decade.

The financial crash of 2008 – triggered by lending practices in US banks, but with its roots in debt-driven property market bubbles in many Western nations – quickly enveloped most of Europe in an economic recession that has not yet passed. While some nations responded unilaterally to worsening economic conditions by spending large amounts of public money on propping up financial institutions, and injected new stocks of money into the economy through ‘quantitative easing’, the EU as a whole advocated a policy of ‘austerity’ (substantial reductions in government expenditure on public services), which was mirrored in many of its member states. Nations such as Spain, Ireland and Greece have experienced huge increases in unemployment and a serious deterioration in the living standards and livelihoods of many millions of people.

The implementation of the EU's austerity measures has caused significant disagreements between member states – in particular Germany and Greece – and played a role in a process of political fragmentation in some nations, with new political parties emerging on both the left and the right of the political spectrum. The left-leaning parties (e.g. Podemos in Spain, Syriza in Greece) have rejected the logic of austerity and called for a return to higher public spending and employment. The right-leaning parties (e.g. UKIP in the UK, the Front National in France) have tended to focus on the role of immigration and argued for tighter controls to protect jobs and services for existing nationals.

These significant and profound changes to the relative stability enjoyed within most EU member states previously provide the backdrop against which public attitudes to climate change, energy, or any other subject must be considered.

The political attention given to the global economic recession, the serious impacts it has had on European citizens' lives, and the ongoing challenges that people face in terms of employment and income are highly likely to detract from the relative perceived importance of issues like climate change.

Assuming people have a “finite pool of worry” (Weber, 2010), issues which do not manifest themselves in an immediate and tangible way are likely to be crowded out by more pressing concerns (Scruggs & Benegal, 2012; Shum, 2012). And there is evidence that the perceived importance of climate change and environmental issues can drop (even if temporarily) in response to major economic and societal events (e.g. the recession sparked in 2008, or immigration flows) both in individual European nations (UK – DECC, 2015) and across the continent as a whole (Eurobarometer, 2013).

This is the pan-European context against which national attitudes to climate change should be considered. The paper now discusses in detail the national socio-political contexts in the four participating nations in the EPCC project.

France: A socio-political profile



Historical, cultural and policy context

≈ The nuclear technocracy

France has the largest share of nuclear electric production in both Europe and the world, and the second largest number of reactors after the United States. In parallel with military development in the aftermath of World War II, the exploitation of France's uranium reserves in a French-designed electronuclear programme, served a definite goal of increasing national prestige and energy independence. The 1973–74 worldwide oil crisis was a springboard for massive expansion of this energy option. France's national utility, Electricité de France, sometimes called 'a state within the state', grew and prospered; and historically its nuclear production capacity was generally over demand levels, even with export schemes. Nuclear power still dominates primary energy production in France and contributes massively to France's 50% plus rate of energy independence⁴ (CGDD, 2015) as well as the cheapest electricity in Europe.⁵ However, following a national deliberative exercise, the July 2015 law on 'Energy Transition for Green Growth' will reduce the nuclear share from an average 75% to 50% by the year 2025. In Spring 2016, there was discussion in the media of the large financial risks attached to Electricité de France's Hinkley Point nuclear new build project in the UK.

The top-down, centralised governance visible in the nuclear sector is very characteristic of France, as is the idealisation of the scientific elite. Various commentators point to these traits – exemplified in the nuclear 'technocracy' – as shaping public perceptions of climate change and possible 'solutions' to it.

Teräsväinen et al. (2011) analysed nuclear discourse in regard to climate change. The major strategies used by nuclear power advocates in France are *necessitation* (the authors quote then-President Sarkozy as saying in 2010 "There is not a single serious person who could think that we can fulfil our objectives by using only renewable energy sources") and *naturalisation* (as when nuclear power production is described as self-evidently carbon-free or low-carbon, safe and affordable). The main strategy used by opponents to nuclear power in France has been *scientification*, "resorting to scientific evidence and expert knowledge to refute the argument that nuclear power would help to combat climate change", and borrowing government statistics to support claims.

⁴ A measure of self-sufficiency. Defined by the national institute of statistics INSEE.fr as: the ratio between national production of primary energies (coal, oil, natural gas, nuclear, hydro, renewable energy) and the consumption of primary energy, in a given year.

⁵ 14.12 C€/kWh in 2013, according to Electricity of France. Online: <https://www.lenergieenquestions.fr/wp-content/uploads/2013/05/électricité-comparateur-pays.pdf>

≈ Visibility of climate change

The current French President, François Hollande, proposed France as host of the annual UN climate change summit in Nov–Dec. 2015. This 21st Conference of Parties to the UN Framework Convention on Climate Change (COP21) was presided by Laurent Fabius, at the time Minister of Foreign Affairs, with the announced aim of reaching a binding agreement to limit global warming to 2°C beyond pre-industrial levels. In the lead-up to the meeting, much Government communication revolved around the need for France to be exemplary in its environmental performance (the COP21 village severely limited CO₂ emissions resource consumption) as well as to provide strong leadership to ensure the protection of the world's future citizens. Laurent Fabius won high esteem from the assembled delegates, leading the 195 parties to forge and adopt an agreement called “fair, sustainable, dynamic, balanced and legally binding”, and “holding the increase in average temperature to well below 2°C and pursuing efforts to limit this increase to 1.5°C, which would significantly reduce the risks and impacts of climate change”.⁶ In April 2016, 177 parties signed the agreement at the United Nations in New York.⁷

In 2015–16 many governmental actions included specific references to climate change. For example, the government-financed voluntary ‘civic service’ employment programme for young people (16–25 year olds) incorporated a new topic: ‘Energy transition, climate and biodiversity’. Climate change is presented as involving every sector of economic life (e.g. agriculture – for environmental awareness and better use of resources) and all citizens (e.g. each household will be equipped with a smart electric meter to save energy).

Climate change in France was historically framed as one environmental and ecological issue among many in the discussion of sustainable development. The term ‘climatic warming’ (*réchauffement climatique*) was/is used. Scientists prefer this term putting the focus on temperature rise, whereas political actors like Laurent Fabius tend to use the term ‘climate disruption’ (*dérèglement climatique*), placing the accent on the consequences of global warming (Jouzel, in CNTE, 2015).

Ministerial structures to deal with climate change emerged at least as early as 1992. In 2005 an Environmental Charter was incorporated into France’s Constitution and focused attention on the precautionary principle (PP). Although the PP discussion tended to focus predominantly on present-day public health and safety issues (and scandals), consequences of climatic change were identified among ‘grave and irreversible’ effects to be avoided. The growing discussion on the reduction of greenhouse gases has probably been framed by European targets (cf. the 2008 Climate and Energy Package negotiations; contrary to most other European countries, France had a limited scope for further emissions reduction in the power generation sector given her already dominant share of CO₂-free power generation, mainly from nuclear; requests by both Chirac and Sarkozy to consider nuclear power as a renewable energy source or at least a ‘carbon-poor’ source were rejected by the EC).

⁶ <http://www.cop21.gouv.fr/en/the-french-cop21-presidency-has-presented-a-final-draft-agreement/>

⁷ <http://www.cop21.gouv.fr/en/a-record-over-160-countries-expected-to-sign-the-paris-agreement-in-new-york-on-22-april-2016/>

In France, awareness of climate change has historically been high, but fewer people than the European average believe that renewable technologies will be widespread by 2050 (Eurobarometer 2011, 2014). While local or regional governments are said to complain about ‘immature technologies’, the major obstacles to climate adaptation and mitigation in France’s various regions today were described by one observer to be “administrative straitjackets, budgetary arbitrage, inability to work as teams, and resistance to change” (CESE 2015).

≈ Energy production and consumption

France’s energy needs decreased sharply in the hot year of 2014. Primary energy consumption (adjusted for climate variations) pursued a downward trend seen to have started in 2005. Final energy consumption reached its lowest level since 1996. Much of the 2014 decrease can be ascribed to the residential sector’s lessened need for winter heating. Conversely, there was a slight increase for transport, France’s foremost sector of energy consumption (CGDD, 2015).

Primary energy production in France for 2014 was composed of 87% electricity, 12% thermal (renewable fuelwood and recovered waste), 1% oil, and less than 1% each for natural gas and coal. Within generated electricity, in 2014 nuclear was the source of 94% whereas hydro, wind and solar power together provided a total of 6%. The use of renewable fuelwood and hydro were both somewhat lower than usual due to weather conditions (CGDD, 2015). The 2014 final consumed energy mix in France was by descending order: refined oil products (45%); electricity (22%); gas (20%); renewables and recovered waste fuels (10%); coal (3%). According to provisional calculations, CO₂ emissions related to combustion for energy dropped by 9.4% in 2014 in real terms. Emissions adjusted for climate variations are clearly falling: they have decreased by 2.4% per year on average since 2007; their 2014 level was 15.6% lower than that of 1990 (CGDD, 2015).

France is already one of the European countries with lower emissions per unit GDP and one of the developed countries with lower emissions per capita (7.51 tonnes CO₂e/capita in 2012, compared to 9.15 in the UK and 11.47 in the UK, and below the EU-28 average of 8.98 tonnes/capita⁸). This is largely due to the fact that the electricity production is mainly nuclear.

One interesting question which the EPCC survey will be able to address is whether per capita emissions relate to the four nations’ public perspectives on climate change and energy use.

The 2013 update of France’s national climate change adaptation plan (‘PNACC 2011–2015’) reinforced measures to reduce greenhouse gas emissions, in particular through improved energy efficiency. Actual implementation was favourably assessed at midterm: 92% of the planned actions had started; 60% of the needed budget had been engaged (i.e. more than €100m) in spite of a difficult budgetary context; 60% of actions were progressing according to plan (CESE, 2014).

⁸ Eurostat table t2020_rd300

≈ The Energy Transition law

The programmatic law on 'Energy Transition for Green Growth' was adopted on 22 July 2015 after some 3 years of preparation under 4 different ecology ministers, and significant debate in France's two houses of parliament. The law was identified as a flagship endeavour of the Hollande presidency. It is presented as a way for France to fight climatic impacts, improve adaptation, and provide an example globally. Climate change adaptation is presented as a growth opportunity (120,000 jobs are expected in the next 5 years to develop renewable energies). The law legalises the ambitious targets already announced in the National Climate Plan in 2013:

- 40% reduction in greenhouse gas emissions by 2030 (compared to 1990 levels);
- 30% reduction in fossil fuel consumption by 2030 (compared to 2012);
- Diversification of electricity production sources to arrive at a 50% nuclear mix by 2025;
- Renewable energies to rise to 32% of final consumption and 40% of production by 2030;
- 50% reduction in final energy consumption by 2050 (compared to 2012).

Amongst the measures with a potentially significant impact on public experience are: state aids to foster building insulation; clean transport and a circular economy; and support for better air quality, including traffic restricted zones in cities.

The law was heralded as going far beyond the 'lowest common denominator' identified by the European Council in 2014, and perceived as a good signal in the lead-up to COP21. However, ecologists criticised the absence of a calendar for phase-in. Discussion on how to achieve the targeted energy mix was not started until more than six months after the formal adoption of the law. In parallel to the signature by 177 parties of the COP21 Paris Agreement in April 2016, Ecology Minister Ségolène Royal issued decrees of implementation or news of progress on a dozen fronts. These include a call for tender to develop small-scale, localised hydroelectric generators; decrees on energy performance requirements for new build and revision of energy standards for existing building stock to become the most demanding in Europe; etc. Prime Minister Manuel Valls also spoke out on the need to reform transport policy in harmony with the COP21 agreement.

Key actors in the French context

≈ Central government

COP21, hosted by France in Nov–Dec 2015, was successfully presided by Laurent Fabius, Minister of Foreign Affairs (he has since left those posts to preside the Constitutional Council). The minister was very active in the lead-up to COP21, emphasizing the goal of facilitating a strong consensual agreement to limit global warming to 2°C, and engaging in many international discussions.

Climate change and energy issues are dealt with in France principally by the Ministry of Ecology, Sustainable Development, and Energy (MEDDE). Minister Ségolène Royal has taken over the presidency of COP21. Within MEDDE, the General Directorate for Energy and Climate (DGECE) is tasked with inter-ministerial coordination of policy to fight against climate change, and also to ensure energy supply security at ‘best price conditions’ in an open market. The National Observatory on Climate Change Effects (ONERC) prepared the 2006 National Climate Adaptation Strategy and the 2011 Adaptation Plan (PNACC) after a national consultation in 2010. The 2013 PNACC update introduced a methodology to define the level of acceptable risk from climate hazards. ONERC acts as the ‘focal point’ coordinating France’s interaction with the IPCC.

Other ministries involved include the Interior, Infrastructure, Research, Agriculture, and Overseas Territorial Development, etc.

Numerous national agencies give climate change issues a central place in their work programme, such as ADEME (Energy efficiency agency) and BRGM (Geological survey), amongst others. All promoted COP21 as a significant rendezvous in which France had an important responsibility to broker a political solution to climate change. In the Prime Minister’s office, the Centre for Strategic Analysis (now France Stratégie) inquired into public perceptions of the threat posed by climate change and levels of climate scepticism (Baecher et al., 2012; CAS, 2012), viewed as a determinants of the negotiating positions taken by the Parties.

≈ The advisory system

The importance attached by the French state to ecology and sustainable development issues is evidenced by the multiplication of highly specialised (and often overlapping) public advisory bodies and agencies from the mid-1990s onward.

The Economic, Social and Environmental Council (CESE) calls itself the ‘Third Chamber’ of France in light of its pluralistic and representative character. It counsels Government and the two houses of parliament on the formulation of public policy. Climate change and energy transition are strong themes for the CESE. In the lead-up to COP21 the CNTE is preparing statements and reports, including one analyzing the effects of France’s past 20 years of climate policy, and another focused on negotiation in view of brokering a Paris climate agreement. A special emanation, called National Council on Energy Transition (and now Ecological Transition; CNTE) includes representation from parliament, regional government, trade unions (both labour and management), NGOs (environment, consumer rights, youth), chambers of commerce, etc. Starting in 2013, CNTE engaged debate and consultation events across France to inform and prepare the 2015 programmatic energy law.

The General Commissariat for the Environment and Sustainable Development (CGEDD) is tasked with advising Government on issues affecting the environment and climate change (including construction, transport, urbanisation, use of oceans, etc.). It inspects the efficiency of government strategies and services in these domains and examines Environmental Impact Assessments for infrastructure plans, programmes and projects.

The Parliamentary Office of Assessment of Scientific and Technological Choices (OPECST) advises the two chambers of the legislature. Studies and hearings are led by members of parliament with the support of a permanent secretariat and a committee of 15 leading scientists.

The French Academy of Science is a key advisory body, and is “the only academy of sciences in the world in which the debate over human responsibility in climatic disturbance is not yet closed. It is very sad and very grave” (corresponding member and climatologist E. Guilyardi, in Foucart, 2015). Among its 263 members this historic chamber contains a small number of active climate sceptics, including geo-chemist Claude Allègre, a bombastic former minister and author of widely-diffused material on climate change denial, and geo-magneticist Vincent Courtillot, criticised for repeatedly presenting data already refuted by peer-reviewed publications. In May 2015, an Academy working group suspended discussion of a pre-COP21 statement, due to objections over the rule allowing a minority opinion to be annexed to the majority statement. “It would come down to publishing a statement that the world is round, accompanied by another stating the world is flat”, said a former Academy president (cf. Foucart, 2015). A new plenary climate discussion led to the November 2015 publication of a statement confirming the 2010 Academy report viewing anthropogenic climate warming as ‘unambiguous’, recognizing progress in reduction of uncertainties, and calling for resolute R&D and industrial innovation to transform the energy system (Académie des Sciences, 2015).

≈ Research institutes

Institut Pierre-Simon Laplace (IPSL) is France’s primary climate research organisation, recognised among the major world climate science institutions. It is directed by climatologist and IPCC member Hervé Le Treut, and previously by Jean Jouzel (vice-president of the IPCC). IPSL is composed of 1400 members including professionals and students. The CNRS (National centre for scientific research) is the network of university-based laboratories and research groups. In August 2015, 10% of public information articles searchable on CNRS’s plain-language website Le Journal contained the word ‘climate’ (43 out of 431 articles). Other pertinent national research institutes are Météo France (meteorology), IRD (development), and INRA (agronomy). ONERC, mentioned above, is the focal point coordinating all these institutes’ interaction with the IPCC.

≈ Multi-level governance

France has a dense top-down territorial administrative network including vast responsibilities in risk governance. This state administration is superimposed upon the elected government structures (regions, departments, and municipalities large and small). Most, if not all, administrative and government units include some work programme or discourse on climate change. Particularly in the run-up to COP21, they are making efforts to raise awareness and consult the public. The Ecology Minister frequently claims that

France cannot meet the climate challenge without the local administrations and their climate mitigation measures. The MEDDE website hosts 'Wiklimat',⁹ a climate adaptation knowledge-sharing platform open to all types of public and private actors.

≈ NGOs

Since the 1990s French decision-making has increasingly incorporated stakeholder representation in advisory bodies and consultations. In particular, two environmental laws since 2007 have been developed and negotiated through a process known as 'Grenelle de l'Environnement'. Themes of debate included inter alia: climate change and energy, biodiversity and natural resources, environmental health, green development employment and competitiveness. Stand-out NGOs in France include Greenpeace, WWF, FoE, CARE, Réseau Action Climat (RAC, a public knowledge network), France Nature Environment, Fondation Nicolas Hulot (the popular ecologist and action-reporter is also a special COP21 advisor to French President Hollande), and other ecological, faith-based or justice-oriented development organisations.

'Coalition Climate 21' is a diversified forum of 75 NGOs and unions (grouping a total of 135 NGOs internationally). It provides a forum where policy differences amongst the different member organisations can be discussed so as to "contribute to forming a balance of power favourable to ambitious and fair climate action, and the transformation of all related public policy".¹⁰ In April 2015, Prime Minister Manuel Valls recognised their action to inform and mobilise civil society for a political accord at COP21. The 'grand national cause' label attributed by the PM gave the coalition free airtime on national television and radio.

In April 2016, the television producer and militant ecologist Nicolas Hulot, head of think tank 'Foundation for Nature and Man', emerged in a survey as the most popular political figure in France.¹¹

≈ Other actors

Pope Francis' June 2015 environmental encyclical, partly attributing climate change to human activity and fossil fuels and calling all religions to take action, was noticed in the French context. In July 2015, President Hollande received representatives of the Conference of Religious Leaders of France (CRCF) covering the spectrum of monotheist and other religions. They advocate climate justice and call for a binding agreement on climate policy, supporting the 2°C target for limiting global warming. "It is first and foremost our relationship with nature, and with God's gift of creation, that is at stake".¹²

⁹ <http://wiklimat.developpement-durable.gouv.fr/index.php/Wiklimat:Accueil>

¹⁰ <http://coalitionclimat21.org/en>

¹¹ <http://www.lesechos.fr/politique-societe/politique/021878186464-nicolas-hulot-double-alain-juppe-dans-les-sondages-1217478.php>

¹² <https://www.oikoumene.org/en/press-centre/news/religious-leaders-meet-french-president-to-advocate-for-climate-justice>

≈ Political party positions on energy transition and climate change

In 2009, 78% of French voters stated that the candidates' environmental platform influences their vote (IFOP, in Baecher et al., 2012). Comments below on political party positions are based on a search of their websites in August 2015 and again in April 2016.

In a representative national survey, ADEME (2014) categorised persons as 'convinced, sceptical or hesitant' about the reality of anthropogenic climate change. Correlations with declared political affiliation or sympathy (with 6 major parties) were calculated. While significance was not assessed, sympathisers of the right-wing parties showed the highest proportion of scepticism in their survey replies. The percentage distributions for four major parties are reported below. (For comparison, respondents declaring no political affiliation were categorised as 42% 'convinced', 11% 'sceptical', and 46% 'hesitant').

- **Socialist party¹³**

France is governed today by a socialist majority. The new Energy Transition for Green Growth law, showcased by the Socialist Party as a direct response to the 'climate threat' or 'climate challenge', is an example of its 'doctrine of eco-socialism or social ecology'. Like the government, the Socialist Party highlights energy transition as a great growth opportunity and a source of hope and optimism. In the lead-up to COP21, the Party website also laid typical stress on national government's willingness to involve the local level and youth. France was urged to show 'exemplary' climate behaviour and facilitate a universal and binding agreement that will 'maintain global temperature under 2°C [sic]'. 'There is not an instant to lose, it's urgent and it's the responsibility of this generation to prepare a different world for the coming generation(s)'. France's role in COP21 was given a historic, revolutionary dimension: 'After establishing human rights, we will establish the rights of Humanity, that is, the right for Earth's inhabitants to live in a world where the future is not compromised by the irresponsibility of the present'. In April 2016, the site focussed primarily on electoral topics but two of three educational video segments on the homepage presented 'ecological taxes' and 'circular economy'.

ADEME (2014) found that Socialist party sympathisers could be categorised as 51% 'convinced' of the reality of climate change, 9% 'sceptical', or 39% 'hesitant'.

- **The Republicans¹⁴**

The website of the newly named right-wing party centred around former president Nicolas Sarkozy, and his criticism of the current Socialist government, was searched using the keywords 'ecology', 'environment', or 'climate'. No results were returned.

ADEME (2014) found sympathisers with the UMP (former name of the party) to be 39% 'convinced' of climate change, 18% 'sceptical', and 43% 'hesitant'.

¹³ <http://www.parti-socialiste.fr>

¹⁴ <http://www.republicains.fr>

- **National Front¹⁵**

The far-right nationalist party expresses a populist view on several current climate change measures. The ‘chaotic and irresponsible’ project, under Sarkozy and then Hollande, of an eco tax on truck transport is described on the website as a ‘hard blow’ for French truckers already subjected to ‘intolerable’ disloyal competition from East Europeans. Two FN parliamentarians published a communiqué on the website stating that they voted against the Energy Transition for Green Growth law. They recognise climate change affects: ‘health and climate risks, scarcity of natural resources are growing realities’, but they denounce the ‘coercive and limiting Socialist ecology’ poised ready to destroy the nuclear sector, the pride of France. ‘Although ecological issues are global, a pragmatic national response, respectful of economic and budgetary balances, is needed for a viable and sustainable ecology.’ In April 2016, ‘ecology’ appeared at the bottom of a list of site keywords, and returned news items all of which used environmental themes strictly to question the safety of the French populace and the probity of political leaders outside the Front.

ADEME (2014) found National Front sympathisers to be 33% ‘convinced’ of climate change, 18% ‘sceptical’, and 49% ‘hesitant’.

- **Europe Ecologie les Verts¹⁶**

The Greens’ website heralds France’s 2015 Energy Transition law, augmenting the share of renewable in the energy mix, as the concrete outcome of the ‘long battle’ by ecologists, and welcomes the ‘historic breach’ opened in the ‘most nuclear country in the world’. A bold picture of progress is painted: “Energy transition is a true societal project turned towards solutions with a future, enabling job creation (...) and stronger purchasing power for households”. Still, the ecologists will ‘scrupulously watch over’ the actual implementation of the law’s measures through decrees of application and interactions with the upcoming finance law. They denounce large projects on the boards in France (a new airport, a deep geological repository for radioactive waste) as ‘incoherent and incompatible’ and completely inadequate for facing the ‘climate challenge’.

ADEME (2014) found Green sympathisers to be 64% ‘convinced’ of climate change, 2% ‘sceptical’, and 34% ‘hesitant’.

¹⁵ <http://www.frontnational.com>

¹⁶ <http://eelv.fr>

Key climate and energy-related events in France

Date	Key event
1945	France's nuclear age opens: General De Gaulle secures energy independence and international prestige for France: a civil nuclear power programme will ensure energy supply by using (at first) French-mined uranium and will produce plutonium for the military programme.
1974	Plan Messmer: In response to the 1973–74 worldwide energy crisis, which quadrupled oil prices, Prime Minister Messmer launches an 'all-nuclear' energy programme to reinforce France's security of supply. On advice from the nuclear technocracy, 13 reactors are to be built in 2 years. In 2015 France is the world's proportionally strongest producer of nuclear electricity and home to the second largest number of working reactors (58) after the United States.
1986	Chernobyl: The nuclear catastrophe introduced a wedge into the French public's traditional confidence in centralised risk management. Although the words "the Chernobyl cloud stopped at the French border" may never have actually been uttered, this remains an iconic statement revealing France as a paternalistic state in the grips of the nuclear power lobby.
1992	Inundation at Vaison-la-Romaine: A major episode of flash flooding occurred on September 21 and 22, 1992, in Vaison-la-Romaine, in south-east France, leading to 47 deaths in 4 localities.
2003	Heatwave: Twenty thousand people died in the French episode of heatwaves in 2003, during the hottest summer in Europe since 1500. Unusually high temperatures combined here with socioeconomic vulnerability and in particular, social attenuation of hazards – a multi-form inability of individuals and institutions to recognise that people were dying of the heat (Poumadère et al., 2015). Since then, an efficient prevention policy has been set up by the French government.
1999 and 2011	<p>The 1999 storms: Lothar and Martin were violent European windstorms which swept across western and central Europe over 36 hours in December 1999. The storms caused major damage in France (24 deaths), as well as in southern Germany, Switzerland, and Italy. 3.4 million customers in France were left without electricity, one of the greatest energy disruptions ever experienced by a modern developed country.</p> <p>The 2011 storm: Xynthia was a violent windstorm which crossed Western Europe between 27 February and 1 March 2010. At least 51 people were killed in France, most deaths occurring when a storm surge went over an ancient sea wall off the Atlantic coast. The storm cut power to over a million homes in France. Amid turmoil, the French Government announced in April 2010 the plan to destroy 1,510 houses in the vulnerable areas, fully compensating homeowners based on pre-storm real estate values. Xynthia triggered a government policy document called 'Rapid Inundation Plan: coastal floods, flash floods and dike failures'.</p>

2007	<p>Grenelle de l'Environnement: This series of political encounters brought together government agencies and many NGOs interested in environment and public policy. Negotiated solutions and agreements were reflected in a Framework Law definitively adopted in 2009.</p> <p>Among recommendations was to increase the number of high speed trains (TGV). In 2015, the costly programme was reduced. Typically for France, political debate led to recommendations somewhat agreeable to all, but the implementation can be hampered by technical feasibility and cost (as well as by opposition from specific groups in the general population).</p>
2009	<p>COP15, Copenhagen: Media attention to climate risks was seen to drop off markedly in France after the failure to reach a political agreement in Copenhagen (Baecher et al., 2012).</p>
2010, 2011, 2014	<p>Inundations in the Var: A series of 'catastrophic' floods in south-east France destroyed property and took several lives. At blame were inadequate local zoning plans and uncontrolled residential development.</p>
2010	<p>'L'imposture climatique': A book of scepticism and denial published by outspoken former Minister of Education and Research, geochemist and Academy of Sciences member Claude Allègre. Although the publication's scientific errors, falsehoods and ad-hominem insults were denounced in a letter signed by 604 researchers, Allègre's position drew attention through his high profile, his bombastic personality, and the support he received from a few other public figures (most notably, popular philosopher Luc Ferry, another right-wing former Minister of Ed. & Research).</p>
2010	<p>Pursuit of Hinkley Point nuclear new build project in the UK: Despite the resignation in protest by its Financial Director, Electricity of France plunged forward with its project to build a new nuclear power plant at Hinkley Point in the UK, with trumpeted support from the Prime Minister of each country.</p>
2011	<p>Fukushima: The tsunami and nuclear catastrophe had a significant impact on public perceptions of all types of risks, making it difficult to analyse annual trends in climate change perception (ADEME, 2011).</p>
2011	<p>Fracking forbidden: With a divided parliamentary vote in June, France became the first country to forbid hydraulic fracturing.</p>
2013	<p>Ongoing smart meters: Installation in process, to be extended to 35 million households.</p>
2012, 2014, 2015	<p>Fessenheim NPP: 'Fessenheim: To Close, or Not To Close?' Presidential candidate Hollande promised in 2012 that France's oldest nuclear power plant would be phased out by 2016. However, it received €400 million of funding in 2014 for refurbishment after the post-Fukushima national safety review, and has been judged safe by the Nuclear Safety Authority. Parliamentarians say dismantling Fessenheim would be a bad financial decision; a strong local/regional lobby points to 1,900 jobs that would be lost. In March 2015, an incident closed Fessenheim temporarily, renewing popular fears about its safety. Socialist government announcements subsequently claimed that the plant will close in 2017 as part of the energy transition. Greenpeace said there is no reason to focus on the Fessenheim reactors, "the issue is to close them all, and fast".</p>

2015	Grand Carénage (nuclear plant lifetime extension): Of France's 58 reactors, 2 to 8 units will reach 40 years of age each year from 2020 to 2030. If retired from service, an annual withdrawal from the grid ranging from 1800 to 7200 MWh of electricity would result. In June 2015, the board of Electricity of France validated the 'Big Refitting' investment program worth €55 million over the next ten years. The target is to render 56 of France's current 58 reactors worthy for continued service up to 50 or 60 years (subject to authorisation in each case by the Nuclear Safety Authority).
2015	Carbon and Road transport eco taxes: abandon and reprise: These two taxes were promulgated as part of the Grenelle Law, but withdrawn because they were seen to be disadvantaging the more modest economic groups in society (e.g. suburban commuters; truckers and small businesses in agricultural zones). Outcry from these groups gave a populist foothold to the opposition. The 2015 cancellation of an international contract and deconstruction of 173 eco tax toll booths will cost France some €800 million.
1997, 2015	Air pollution: Air pollution is the number one environmental problem cited by French residents. The inequitably distributed public health effects of diesel pollution are recognised by the administration. An extensive air quality monitoring scheme is in place. Daily air quality ratings and level of 'ozone air pollution' are reported through the media. Particularly severe alerts were given in the summer of 1997 & 2015.
Adopted July 2015	Programmatic Law on Energy Transition for Green Growth: The 3 years of preparation for the law included consultations and events across France. It sets ambitious targets in keeping with the government's desire to show France as 'exemplary' in the lead-up to COP21. Transition to a higher percentage of renewable energies is touted by government as an opportunity to create 120,000 jobs in 5 years. Despite a start to implementation, the law is nonetheless criticised by ecologists and NGOs as lacking a firm plan and calendar.
2015	Successful conclusion of COP21 under French presidency: "Why will 12 December 2015 be remembered as a great day for the planet?" ¹⁷ In an emotional final day of the COP21, 21st Conference of the Parties to the UN Framework Convention on Climate Change, Laurent Fabius proclaimed the Paris Agreement adopted by 195 parties as "fair, sustainable, dynamic, balanced and legally binding", and "holding the increase in average temperature to well below 2°C and pursuing efforts to limit this increase to 1.5°C, which would significantly reduce the risks and impacts of climate change". The agreement was subsequently signed by 177 parties in April 2016.

17 <http://www.cop21.gouv.fr/en/laurent-fabius-officially-elected-as-president-of-cop21>

Anticipated consequences of climate change in France

The MEDDE funded a 5-volume report (2010–2015) entitled ‘France’s Climate in the 21st Century’, led by climatologist and IPCC vice-president Jean Jouzel, which details the actual and foreseeable impacts of climate change in France. The discussion below also draws on Alex et al. (2014).

How will France be impacted by climate change? Extreme weather events are anticipated to be more frequent and/or more severe. In particular more frequent and longer heatwaves (potentially fatal to at-risk populations – the elderly, infants, the chronically/gravely ill etc.) and drought periods are expected in France (CESE, 2015). Frequent forest fires linked to drought are predicted across an exponentially greater zone in France by the middle of the 21st century (according to a 2010 inter-ministerial report based on IPCC scenarios). Major public health risks include salmonella infections, which will total 20,000 annual cases in 2040 with up to 40,000 supplementary cases per year by 2070. Previously ‘tropical’ diseases will be common as their insect carriers colonise France’s warmer territory (Le Treut, 2013).

Coastal erosion of up to 10 meters has already significantly affected 24% of France’s Atlantic coast along 1,720km, caused particularly by numerous winter storms in 2013–14. The Mediterranean area is also impacted. Increasing coastal urbanisation is seen as putting France at risk of major humanitarian disaster resulting from the combination of climate-driven erosion and storms, and in 2012 the MEDDE launched a coastal management strategy. Extreme flooding is highly likely (as it is throughout Europe, according to the IPCC). Paris civil defence assigns 100% probability to a 100-year flood event in which up to 1.5 million Parisians would have to be evacuated. The OECD (2013) estimates that up to 5 million residents would be affected by serious economic and social consequences as well as service interruptions and property damage (overall worth €20–40 billion).

Nuclear power plant operation is vulnerable to elevated river temperatures, reduced flow, and/or freezing (all hamper their coolant function), and to increased air temperatures (threat of vital safety equipment overheating, and surge in aquatic organisms that can obstruct coolant circuits). Storms producing major inundation have already been observed to affect nuclear plants (in 1999, marsh dikes were overwhelmed leading to the emergency shutdown of the 3 Blayais reactors). Scenarios on sea level rise are calculated for nuclear power plants, and tornado scenarios are now also under development.

Indirect risks with potential impact for France and its policies are: climate migration, and (on a global scale) competition for natural resources and for territories (see also Alex et al., 2014).

Media reporting in France

As of 2004, the anthropogenic nature of climate change was “no longer questioned in the French media” with 97% of articles recognizing the influence of human activities (Fodor cited in Baecher et al., 2012). While media discourse was dramatizing and guilt-inducing in 2004, by 2008 coverage moved to the “description of a global and crucial phenomenon” requiring mitigation and adaptation (Baecher et al., 2012).

Painter and Ashe (2012) compared the number of articles on climate change topics in six countries during the period Nov 2009 – Feb 2010. They found that France was situated in the mid-range in terms of volume of reporting. Significantly fewer sceptical voices were found in French print media compared to the US or UK. This result is independently confirmed by Baecher et al. (2012), who also point out that French reporters do not feel bound to cite all viewpoints on a given question (in contrast to US practices of so-called ‘balanced reporting’).

A study assessed the topics covered in a year’s worth of cover pages for 5 French weekly magazines across a range of political affiliations, whose sales average from 112,000 to 448,000. Most prevalent were ‘cold’ topics, i.e. those not related immediately to current news stories although possibly triggered by an anniversary. Topics tended to cover health and lifestyle, culture and history. Purely political and international topics clearly do not sell: less than 5% of the covers in the 2014–15 period covered were devoted to international, geopolitical or European issues (*Le Monde*, 2015).



Figure 1: Cartoon by Aurel, accompanying the online edition of an article (Foucart, May 2015) in the major French quality daily, left-aligned *Le Monde*. “A climate sceptic slipped into the Academy of Sciences – Can you single him out?” [The clown says “I have proof”]. The article examined Academy members’ unwillingness to append a minority denial to a consensus statement on anthropogenic climate change, which was voted by the Academy pre-COP21.

≈ Social media

Blogs are identified as a major vector for the dissemination of climate scepticism, and described as engaged in a ‘veritable information war’ with the publication of stolen or falsified documents, ad-hominem attacks, etc. Such blogs emerged in France as of 2005–2006, with the oldest being www.climat-sceptique.com and the most important being www.skyfall.fr (Baecher et al., 2012).

An analysis of tweets in the period around the Durban Conference (Nov–Dec 2011) found that in France (like Brazil and the US), tweets centred often on scientific questions. In comparison, tweets originating in India and South Africa were centred on political aspects of climate change. More generally, when political themes appear in online forums in France, compared to the US they mainly concern the role of industrial lobbies and the sources of research funding (Baecher et al., 2012).

A small number of scientific journalists from left-leaning papers are identified with the issue of climate change (one at least maintains a knowledge bank and blog on climate science and political issues). They are anti-denial and pro-mitigation. The online publication of articles by these journalists usually spawns numerous reader comments, among which challenges from sceptics often voicing denial that global temperatures are warming. Baecher et al. (2012) noted that after climate change coverage dropped post-Copenhagen, the ratio between a) the number of *Le Monde* online readers' comments, and b) the number of articles on the subsequent Durban summit which inspired comments, "attains a maximum as if the public were more interested in this subject than the media".

Germany:

A socio-political profile



Historical, cultural and policy context

The history of public engagement with energy and climate change in Germany has been strongly shaped by many factors, but perhaps none more than the major public protests against nuclear energy in the 1970s. Compared to anti-nuclear movements in other countries, Germany's opposition to nuclear energy is the strongest and most persistent (Radkau, 2011). Initially, leftist intellectuals supported nuclear energy, which they regarded as a future oriented and progressive technology challenging traditional industrial structures. In contrast, the big energy companies, namely RWE, adopted a critical attitude, since they feared competition for their lignite-fired power plants (Radkau, 2011). Furthermore, the notion of protecting the natural environment was viewed as contaminated by the 'blood and soil ideology'¹⁸ of the Third Reich. This changed dramatically at the beginning of the 1970s, when the environmental movement acquired an international and progressive character due to a series of international conferences (Radkau, 2011). The German left started to embrace the environmental movement creating a multifaceted and broad movement with opposition against nuclear energy at its core (Uekötter, 2012).

At the beginning of the 1980s, 'Waldsterben' (forest dieback) became the guiding theme of the public environmental debate (Radkau, 2011). Culturally charged by the heritage of the German 'Romantik', forests have always been the focus of ecological considerations and sustainability efforts in Germany. At least until the nuclear disaster at Chernobyl, this led to a shift in the public environmental debate from resistance against nuclear energy to opposition against brown coal (Hohenemser & Renn, 1988; Radkau, 2011). Eventually, 'Waldsterben' was the key topic, which helped the Green Party to enter the German parliament in 1983 for the first time (Radkau, 2011).

Of course, German energy policy has also been affected by these societal developments. Since 1949, four factors have determined German energy policy: cost effectiveness, security of supply, social acceptance and compatibility with environmental and climate policy. In the 1950s and 1960s, energy policy was characterised by a focus on cost effectiveness. Even today, prices for electricity as well as for gasoline are an important factor in the public debate. In the public view, critique has formed stating that the costs of the current transformation of the energy system are carried mainly by regular citizens, while large companies and important industries benefit from generous exemptions. Because of the oil crises (1973/74 and 1979/80) security of supply gained in importance. With growing public resistance against nuclear energy since the middle of the 1970s, social

¹⁸ 'Blood and soil' was part of the Nazi ideology referring to a supposed metaphysical relationship between a people and a certain territory emphasising the virtues of rural living.

acceptance was added as another objective. At the end of the 1980s, climate protection became a fourth objective (Brauch, 1997). All in all, Brauch (1997) distinguished five different phases of German post-war energy policy:

- Reconstruction after World War II (until 1957);
- Intensified competition between coal and cheap petroleum oil and gas (1958–1972);
- Pursuit of security of supply (1973–1980);
- Environmental protection (1981–1989) triggered by the debate around ‘Waldsterben’;
- Climate protection (since 1990).

The beginning of the ‘Energiewende’, i.e. the transformation of the German energy system towards the use of sustainable energy sources, can be placed, broadly, in the early 1990s with a bill on the feed-in-tariffs passing the German parliament and the implementation of some measures for promoting renewable energy. Its pace picked up with the first Social-Democrats and Green Party coalition in 1998 and the first phase-out of nuclear energy in 2000 with the ‘Nuclear Consensus’. Some of the main goals of the Energiewende¹⁹ are to phase out nuclear energy by 2022, increase the share of renewable energy in final energy consumption by 60% by 2050, increase the share of renewable energy in gross electricity production by 80% by 2050, and cut CO₂ emissions by 80%–95% by 2050 (with 1990 as year of reference), in line with the overall EU goal for mid-century GHG emissions (Energiewende, 2015). Without a doubt, climate protection still remains one of the main objectives – if not the most important – of German energy policy. The disruptive change initiated by the Energiewende seems to be much more comprehensive than all the changes before. Since the Energiewende is still under way, it is difficult to precisely characterise the outline of the present phase of German energy policy. However, looking at the public debate about the Energiewende and the political goals associated with it, transport does not yet play a prominent role, even though the transportation sector contributes up to 20% of Germany’s overall annual CO₂ emissions (UBA, 2012), which even increased in 2015 by about 1.5% (UBA, 2016). With this, the German Energiewende is targeting foremost electricity supply and less other CO₂ contributors such as heating and mobility.

However, the decision to phase-out nuclear energy and transition to an energy system mainly based on renewables is one of the most important aspects of German environmental policy, and the EPCC survey will be able to compare public views on the components of the Energiewende with attitudes towards renewables in the other participating nations.

Climate scepticism is not a significant problem in Germany (Fröhlich, 2014). Among sceptical perceptions of climate change and its impacts, Engels et al. (2014) identify only 7% to be trend sceptics, 5% to be impact sceptics, 7% to be attribution sceptics and 8% to be consensus sceptics.

¹⁹ However, the process of the transformation of the German energy system was not only triggered by the Fukushima disaster. In fact, with the ‘Act on the Sale of Electricity to the Grid’ in 1991 and its revision and expansion with the ‘Renewable Energy Sources Act’ in 2000, the transformation of the energy system began 20 years earlier. Also, the phase-out of nuclear energy was already enacted in 2002 with the Amendment to the German Atomic Energy Act by the Social Democrat and Green Party coalition, before it was suspended by a general lifetime expansion by the Conservative–Liberal coalition in 2010. This in turn was amended in 2011 under the impression of the Fukushima disaster.

Key actors in the German context

≈ Governmental institutions

There are two main political institutions at the national level in Germany that have responsibility for environmental issues, including climate change:

- **Federal Ministry for the Environment, Nature Conservation, Building, and Nuclear Safety (BMUB):**

The areas of climate mitigation and environmental protection, including protecting the public from environmental toxins and promoting a sustainable handling of resources, have been core aspects in the 25 year history of this ministry. Besides preparing legislation and transferring EU directives (in the field of its expertise) into national law, the BMUB is charged with research funding and shaping specific research and support programmes. For these, the ministry can make use of taxes and the revenues from emissions trading. For example, since 2008 the ministry has provided €400 million from the auction of emissions allowances for a programme called 'Climate Initiative', which supports public projects on climate mitigation on a national and international level. In December 2014, the ministry published the 'Climate Action Programme 2020' in accordance with the government's climate mitigation and sustainability guidelines.

- **Federal Environmental Agency (UBA), Germany's main environmental protection agency, founded in 1974:**

The Federal Environmental Protection Agency provides policy advice to federal bodies, including the Ministry for the Environment, Nature Conservation, Building, and Nuclear Safety, based on previous analysis of various environmentally relevant issues, such as environmental and energy research. The UBA also provides information and data on environmental issues to the general public, like issuing and publishing the biennial 'Environmental Awareness Survey Germany'. The German Emissions Trading Authority (DEHSt) is part of the Federal Environmental Agency and in charge of the implementation of the market instruments of the Kyoto Protocol, involving allocation, controlling and auctioning of emission allowances, reporting and cooperation with other institutions.

Climate and environmental issues are closely related to the intended transition of the energy system in Germany ('Energiewende'), which is one of the main concerns of the Federal Ministry for Economic Affairs and Energy which thus plays an important role in German climate and energy policy. Its main task is to coordinate, monitor and report on the progress of the German energy transition. Additionally, the German parliament may appoint non-partisan commissions (so-called 'Enquete Kommissionen') to work on specific policy problems.

≈ Research institutes and scientific advisory councils

There is a broad spectrum of scientific advisory councils and research institutes, whose work contributes to the climate change debate in Germany. These institutes are often associated with individual scientists who appear as spokespersons and advocates for the

cause in the public media (for example through interviews in popular news-outlets like an interview with Prof. Dr. Hans von Storch, director at the Institute of Coastal Research at the Helmholtz Center Geesthacht or an interview with Prof. Dr. Hans Joachim Schellnhuber, director at the Potsdam Institute for climate impact research (PIK) – both in *Der Spiegel* editions). Some of the most notable institutes are:

- **German Advisory Council on Global Change (WBGU):** It provides research on global change and environmental problems and identifies new areas of interest to German politics concerning global change (including climate change).
- **German Advisory Council on the Environment (SRU):** Climate mitigation is one of its areas of expertise. It submits a report to the German federal government every four years that assesses the development of environmental policy in Germany.
- **Wuppertal Institute for Climate, Environment and Energy:** Focuses on trans-disciplinary research in transitions towards sustainable development.
- **Potsdam Institute of Climate Impact Research (PIK):** Addresses scientific questions in the fields of global change, climate impacts and sustainable development. PIK-researchers also contribute to the IPCC of the UN (coordination of the working group on climate protection).
- **Max Planck Institute for Meteorology:** concerned with earth systems analysis.
- **A number of other research institutes,** some run as non-profit organisations, often seeking governmental funding, others as part of a university's infrastructure, also contribute on various levels to research on climate change, sustainability and energy transition. Including:
 - **Öko-Insitut e.V. – Institute for Applied Ecology:** non-profit association that provides research for federal agencies, ministries, industrial enterprises and the EU.
 - **AGORA Energiewende:** funded by the Mercator Foundation and the European Climate Foundation, the AGORA Energiewende project offers a platform for discussion about measures that are necessary for a successful energy transition

≈ NGOs

Besides the above mentioned institutes, there are several non-governmental organisations in Germany involved in the debate about climate change and energy sustainability. On the national level, important organisations are:

- **BUND e.V.** (Friends of the Earth Germany) with 530,000 members in 2014;
- **NABU** (Nature and Biodiversity Conservation Union) with 540,000 members in 2014;
- **Greenpeace Germany**²⁰ with 580,000 members in 2012;
- **WWF Worldwide Fund for Nature** with 458,000 members in 2014.

²⁰ Greenpeace is also a provider of eco-power in Germany.

Other organisations, smaller in terms of the size of their memberships but still quite important in the public debate are:

- **Germanwatch;**
- **Global Climate Forum, Berlin;**
- **Energy Watch Group.**

The above listed organisations focus on raising public awareness (campaigning, organizing public protests, etc.) about environmental issues, lobbying and applying pressure on policymakers to take environmental concerns into account.

Concerning the climate change topic specifically, Greenpeace, BUND and Germanwatch influence the public debate about climate change significantly (campaigning, PR work, etc.) and can be judged to have the most significant impact on policy makers (lobbying).

Even though they focus on national affairs, international cooperation and presence is an important part of their portfolio.

≈ Foundations (private)

In addition to NGOs, commercial enterprises also support climate protection efforts. The 'Stiftung 2°', with members like Eon, EnBW, Deutsche Telekom, Deutsche Bahn and others, supports the climate mitigation goal to limit an increase in the global mean temperature to 2°C. They work on the implementation of political goals in the market economy and on the corporate level. Another interesting player is the Mercator foundation which funds the Edenhofer Institute on Climate and Public Goods and AGORA Energiewende. The growing number of such foundations could be interpreted as a sign of the private sector's rising awareness of the climate change issue.

Key climate and energy-related events in Germany

Since the formation of the environmental movement in the 1970s, there have been some key events which have had considerable impact on attitudes towards energy and climate change in Germany, summarised and presented in the Table below.

Table: Key events impacting environmental and climate change attitude in Germany 1970–2014 (partly based on Radkau, 2011).

Date	Key event
1972	Publication of The Club of Rome's 'Limits of Growth': high influence among German decision-makers and policy-makers while its impact on the general public was limited.
1973/74 & 1979/80	Oil crisis: 70% increase of oil prices illustrated the external vulnerability of the German economy. German federal government introduced car-free Sundays and speed limits on highways.
1980s	Forest decline ('Waldsterben'): observation of forest decline as phenomenon where trees lose health and die without an obvious cause; highly perceived among the German public.
29 March 1983	Entry of German Green Party in Bundestag: the first successful new foundation of a political party in Germany since the 1950s.
12 Dec. 1985	Green environmental minister in Hessen Landtag: Joschka Fischer inaugurated as first Green minister. His wearing sneakers during the official inauguration became part of the German collective memory.
26 April 1986	Chernobyl disaster: huge impact on public perception of nuclear power in Germany.
1 Nov. 1986	Fire in chemical plant in Basel: the public is shocked by a huge fire in a chemical plant in Basel contaminating the Rhine river.
16 Sep. 1987	Montreal Protocol on Substances that Deplete the Ozone Layer: international treaty designed to protect the ozone layer by phasing out the production of numerous substances that are responsible for ozone depletion.
1988	Appointment of the Commission for the Mitigation of the Earth's Atmosphere ('Enquete Kommission zum Schutz der Erdatmosphäre'): Commission within the German federal parliament, served from 1987 until 1990; among others, its final report in 1990 suggested a reduction of CO ₂ emissions and accompanying legal changes.
1988	Seal deaths in the North Sea: tremendous number of seal deaths shocks the German public.
1989/90	Fall of the Berlin Wall/German reunification: fundamentally changed the political landscape of Germany and Europe. Reports on heavy soil contamination in East Germany.

1990	First IPCC Assessment Report: analysing the impact of climate change with a new scientific-political governance style (i.e. publishing reports with the agreement of leading climate scientists and the consensus of participating governments).
28 Sep. 1990	Foundation of 'Green dot' company: starting point for German waste recycling initiative with great impact on waste awareness among German consumers.
1 Jan. 1991	Act on the Sale of Electricity to the Grid: precursor to the Renewable Energy Sources Act in 2000.
1991	Foundation of 'Elektrizitätswerke Schönau (EWS)': the Schönau energy initiative embodies the first citizens' electric company and were labelled the 'Schönau rebels'.
June 1992	Rio-Conference on Environment and Development: establishing the term and concept of Sustainable Development in the media.
9 May 1992	Framework Convention on Climate Change: adoption of the United Nations Framework Convention on Climate Change (UNFCCC), an international environmental treaty.
30 April 1995	Brent Spar deep sea disposal: media campaign and three week occupation by Greenpeace activists.
1 Dec. 1997	Kyoto Protocol: adoption of the Kyoto Protocol which extends the 1992 United Nations Framework Convention on Climate Change (UNFCCC) that commits State Parties to reduce greenhouse gases.
1998-2005	Coalition of Social Democrats and Green Party led by Chancellor Schröder: first Green Party government participation on federal level in Germany.
29 March 2000	German Renewable Energy Sources Act: introduced by federal government subsidies with fixed feed-in tariff roll-out of renewable energies in Germany.
14 June 2000	Amendment to the German Atomic Energy Act ('Nuclear consensus'): Agreement between Social Democrat and Green Party federal government and the four leading electric power companies for phase-out of nuclear energy.
Aug. 2002	Elbe flood in Germany: perceived as securing the re-election of Gerhard Schröder as chancellor through high media attention of his on-site presence with election victory over his contender Edmund Stoiber.
2005	EU emission trading scheme: Start of the Pilot Phase of the European Trading System for CO ₂ -emissions.
2008	G8-Summit in Heiligendamm: Chancellor Merkel became renown as the 'Climate Chancellor' for her emphasis on governing climate change.
28 Oct. 2010	Nuclear lifetime expansion: the Conservative-Liberal federal government led by Chancellor Merkel agreed to extend the lifetime of nuclear power plants by on average 12 years.

11 March 2011	Fukushima Daiichi nuclear disaster: tsunami on the Japanese west coast which killed nearly 20,000 people and led to nuclear meltdown at the Fukushima nuclear power plant in three of the plant's six nuclear reactors.
30 June 2011	Phase out of nuclear energy: in response to Fukushima the Conservative-Liberal federal government led by chancellor Angela Merkel re-installed the phase-out of nuclear energy with the last plant closing down in 2022.
17 Dec. 2013	Incorporation of energy policy in the Ministry of Economic Affairs and Energy after formation of a new governmental coalition (Conservatives and Social-Democrats, led by Chancellor Merkel).

In December 2015, 195 countries came to an agreement to further reduce global CO₂ emissions (the so-called 'Paris Agreement'). The preceding negotiations were based on Intended Nationally Determined Contributions (INDCs), 147 countries submitted their INDCs prior to the Paris meeting (UNFCCC, 2015). Germany subscribed to a joint INDC prepared and submitted by the European Union on behalf of its member states. Here, the member states commit to reduce at least 40% of greenhouse gas emissions by 2030 compared to 1990 (European Commission, 2015). As this agreement was achieved just shortly before this report, concrete impacts on German policies are yet to be determined. However, the approach taken by the Paris Agreement can be seen as threefold: First, a technological approach or 'vision', which puts forward technological innovations to deal with the impacts of climate change and to reduce CO₂ emissions. Secondly, an economic approach, which supports regulating CO₂ emissions via market instruments. And thirdly, an approach, which targets consumption behaviour and the surrounding economic logic in favour of a sustainable transformation (Renn, 2016).

Anticipated consequences of climate change in Germany

According to current climate models, Germany will be, mostly, moderately impacted by climate change. Zebisch et al. (2005) report that in the last 100 years (1900–2000), the average temperature has risen by 0.8°C–1.0°C, with a specifically warming period in the 1990s in Southern Germany. This increase in temperature can be especially seen during the winter months, which led to a significant decline in snow cover (30% – 40% less snow cover in areas below 300m above sea level in the last 50 years).

Scenarios for future development (until 2080) show how this warming trend continues with a rise of the average temperature between 1.8°C and 3.8°C, especially in the South-West of Germany. While the annual precipitation does not show significant changes, most scenarios predict an increase of precipitation during the winter months, and a decrease during summer. These climate trends, together with socio-demographic developments will lead to significant vulnerabilities in various industrial and public sectors in Germany. Sommer and Schad (2015) base their scenarios for future development (until 2050) in Germany on socio-demographic trends such as an ageing population and a trend towards urbanisation, which will lead to urban heat islands. Warmer summers thus will have possibly health threatening consequences, especially for people above the age of 65 with little social resilience due to an increase in one-person-households. This regionally diverse vulnerability to heatwaves is also pointed out in Zebisch et al. (2005) scenario interpretation for trends until 2080.

Agriculture, especially in eastern Germany, will face an increased threat of droughts and low water levels for rivers. The Rhine, Donau, Elbe, and Oder are likely to cause difficulties for inland waterway navigation.

Perhaps unsurprisingly, winter tourism will suffer from a decrease in guaranteed snow, while summer tourism might profit from future warmer trends.

While these climate impacts are not trivial, the EPCC survey can identify whether perceptions of the seriousness of climate impacts in Germany differ from those in other participating nations.

Media reporting in Germany

Media reporting on climate change is an important determinant of the level of awareness and knowledge among the general public in Germany.

In a 2012 survey, about 60% of respondents stated that they gather their information about climate change from weekly TV programmes, 42% from radio broadcasts, and 40% from daily newspapers. Only 23% pointed to friends and family as a resource for information on climate change (Schäfer, 2012).

Climate change is a prominent issue in German news coverage (Schmidt et al., 2013). According to studies on media coverage about climate change in Germany (mostly newspapers and magazines), reporting has increased since the issue of climate change first surfaced in the 1980s (Neverla and Schäfer, 2010). However, the issue of climate change is often overshadowed and sidelined by other contemporary events, such as the financial crisis or other issues. Following the media's logic (Galtung and Ruge, 1965), the intensity of reporting varies over time depending on specific events and news selection criteria (Rhomberg, 2012):

- The release of the IPCC reports sparks media coverage of the event, political struggles and agreements, and potential consequences (Schäfer et al., 2011);
- Conferences of the UNFCCC and the conferences of the parties are often intensely covered by renowned German media (Schmidt et al., 2013);
- Occurrence of extreme weather events triggers reports on climate change (Schäfer et al., 2011).

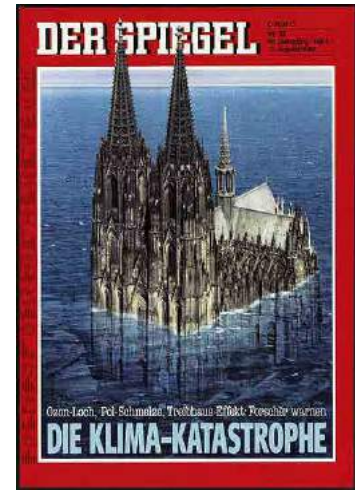
Neverla and Schäfer (2010) observe how media coverage follows national-cultural interests, thus supporting the emergence of national-domestic images and frames of climate change. Nevertheless, Schäfer et al. (2011) pointed out the emergence of a transnational, global public evolving around the issue of climate change, by comparing German media reporting with other European countries (e.g. France or the Netherlands).²¹

²¹ Study based on the analysis of newspaper articles (N = 6899).

≈ Specific media events

- **Introducing the ‘climate catastrophe’**

In 1986, the German news magazine *Der Spiegel* published an edition with a cover showing the Cologne Cathedral being sinking in water, entitled ‘Die Klimakatastrophe’ (‘The climate catastrophe’). The front page cover has become iconic within the realm of media reporting on climate change. It was picked up from a press release in December 1985, published by the working group on energy of the Deutsche Physikalische Gesellschaft (German Physical Society), which warned of a ‘threatening climate catastrophe’. Despite the association’s efforts to discourage use of the term, it became part of media coverage on climate change and thus part of an often simplified presentation of climate change, its causes, consequences and solutions in German newspapers.



However, this statement and its alarming tone can be seen as one reason the German parliament called an inquiry commission to deal with issues related to the mitigation of the Earth’s atmosphere between 1987 and 1990 (‘Enquete Kommission zur Vorsorge zum Schutz der Erdatmosphäre’). Its final report already proposed to the German Federal Government the reduction of national CO₂-emissions by 30% until 2005 compared to 1987.

The magazine front cover serves as an example of how climate change took a different path in its quest for media attention than most other politically relevant issues. Rhomberg (2012) states that unlike most other issues, climate change was first introduced into the public (media) discourse by science, and – after its ‘success’ in media coverage – picked up by German politics.

- **The Kyoto Protocol & COP15**

The negotiation on the Kyoto Protocol in 1997 and the COP15 in 2009 in Copenhagen were intensely covered by the media. Rhomberg (2012) states that media coverage linked the Kyoto Protocol mainly to mitigation, i.e. emission-reduction policies. The author argues this is the reason why the public debate about climate change in Germany focuses on CO₂ reduction and mitigation rather than adaptation (Peters and Heinrichs, 2005; Post, 2008). However, it is worth noting that the Kyoto Protocol itself focuses on mitigation strategies rather than adaptation measures.

Arlt and Wolling (2012) utilised the COP15 event to specifically analyse how it was covered by German news media. The period of their analysis spanned 3 weeks before the conference and 2 weeks after (16.11.2009 – 31.12.2009) and covered 394 articles from various newspapers and weekly news magazines. According to this study, German media used the Copenhagen summit as an opportunity to put climate change back on the news agenda, resulting in a comprehensive coverage of the event. Reporting characteristics include the presentation of causes of

climate change (emissions from private households, transport and industry), and a discussion of nations and groups of nations as perpetrators of climate change (with industrialised countries as most responsible, threshold countries as second, and developing countries as last in the list). The consequences of climate change were discussed mostly in global terms, i.e. there was only a little mentioning of regional or national damage due to climate change. In addition, consequences were portrayed as being negative for the environment and the habitability of the planet. Potential positive consequences were rarely mentioned. Concerning adaptation or mitigation measures, the study agrees with findings from other studies (see above) that media coverage focuses mainly on mitigation in terms of emission-reduction. In contrast, measures to adapt to climate change are less likely to be discussed in news reports. Measures are also mostly abstract and involve international agreements rather than offering specific guidance to citizens for adopting a sustainable lifestyle. Thus, it seems reasonable that news coverage focuses more on governmental actors in this area of conflicts and less on actors from economy, science or civil society.

≈ Trends in German media coverage

In the early years of media reports on climate change scientific uncertainty was represented as a conflict or disagreement among scientists involved over the existence of anthropogenic climate change and its impacts. However, as scientific consensus emerged, German news media mirrored the consensus about the anthropogenic causes of climate change. Arlt and Wolling (2012) report in their study only 2% of daily newspaper articles mentioning climate sceptics or their arguments and only 10% in weekly news magazines. However, climate scientists even today do not fully agree with media coverage in Germany, as Post (2008) shows. Climate scientists are sceptical about the media's attention to dramatic news and its possible consequences for scientific work. They also criticise how the media overestimate the validity of climate models and the way complex scientific issues are simplified, thus presenting a scientific consensus on these complex issues that does not exist.

≈ Media reporting on the energy transition and energy policy

There is not much published academic work on media analysis and German energy policy. In 2010, a research report was published detailing aspects of successful energy communication based on stakeholder interviews, a media analysis, and a representative survey (Mast, 2010). The media analysis provides an overview of media reporting on energy and water conservancy in trans-regional daily newspapers in Baden-Württemberg in the year 2009. It concluded that articles on security of supply and energy prices dominate the media coverage on gas as energy source, often in view of German dependence on Russian gas supply. Renewable energy sources are generally viewed as positive and their expansion is endorsed. The topic of nuclear energy is discussed, particularly the remaining questions of nuclear waste disposal and reactor safety. The debate about extending the lifetime of plants is ambivalent; however, media reports do not follow arguments made by the nuclear industry, portraying nuclear energy as climate friendly, reliable, and guarantor for job security and low electricity prices. The rather negative assessment of nuclear energy as well as the slightly negative assessment of the development of energy prices for German households and industry leads to a more negative image of the energy industry in media reporting. Concerning the development

of energy prices, two different arguments are identified: first, media coverage allocates responsibility to the consumer by advising them to compare energy suppliers and consider a change to a renewable supply. Second, regulation efforts are supported and thus, responsibility is seen to lie within the realm of politics. Generally, regulation of the energy market and re-communalisation of the energy industry find approval in the media coverage.

Example for illustration: coal extraction in Germany

In 2013, 25% of Germany's primary energy consumption was covered by black and brown coal (BGR, 2014). While black coal does not play an overly important role (in terms of extraction), Germany remains number one in the world concerning brown coal extraction: in 2012 16.8% of the global brown coal extraction took place in Germany. Even though the heyday of coal extraction in Germany peaked around 1990 (with about 440 Mt/a) and then dropped significantly (after German reunification) to 190 Mt/a (BGR 2014), it is still one of the most important energy sources for Germany. With 22,000 people employed in this industry it remains a significant part of the politics of energy and the economy.

However, due to its poor environmental record, it is a huge obstacle to the German federal government reaching its climate mitigation goals. In order to ensure these CO₂ emission reduction goals, the implementation of a so-called climate fee was proposed. The idea was to charge major energy companies profiting from brown coal extraction. However, protests from unions and energy companies alike prevented its realisation, arguing that such an additional financial burden would threaten a considerable number of jobs and the future of the coal industry in Germany in general.

These recent developments are part of a larger debate about the future of the German energy market, which – as of now – is organised as an energy-only-market, and the uncertainties the 'Energiewende' might or might not pose to the security of energy supply. In July 2015, the federal ministry for energy and economic affairs issued its strategy for the 'energy market 2.0' (BMWi, 2015). Among others, this strategy includes the transformation of brown coal power plants into 'capacity reserves'. Again, this decision faces protests and criticism especially from environmentalists and the renewable energy sector, claiming that this instrument would in fact subsidise ecologically harmful and outdated energy technology.

Besides political regulatory means, Carbon Capture and Storage (CCS) was proposed as a technical solution to Germany's problem with coal induced CO₂ emissions. Massive public protests however (fearing dangers from this technology such as earthquakes) brought the development and application of this technology to a halt.

Norway:

A socio-political profile



Historical, cultural & policy context

Norway has been characterised by egalitarianism and by relatively modest standards of living up until recently. Culturally, it is relatively homogeneous, with a strong Protestant tradition, but recently immigration, often high-skilled, to the oil industry and auxiliary industries (and low or medium-skilled for the service industry) has led to increased diversity, particularly in some of the cities.

Norway's image as an environmentally friendly country, combined with the massive emissions caused by its fossil fuel exports, has led to a duality in the national discussion of climate change.

Many Norwegians consider themselves very green or think that Norway is a green country. There are several aspects to this. One is the strong outdoor and nature orientation. Another aspect is that production practices are perceived to be ecologically friendly. Energy being produced from hydropower is one example; another is that there is hardly any mass industrial farming (with the notable exception of fish farms). Related to this is a high trust in Norwegian products (and a complementary distrust of foreign products). The general belief in the quality and safety of Norwegian products includes the belief that they are of high ecological standard. A potential problem with this attitude is that if all practices and products are so good already then there is no room for improvement and no need to change (Rosentrater et al., 2012).

The EPCC survey will be able to compare levels of perceived need for 'personal' or 'domestic' activity to limit the effects of climate change, and assess whether they differ across the four participating nations.

People feel a strong attachment to nature, but nature is not seen as a limited and precious resource that may get depleted and should therefore be preserved. Nature is perceived to be plentiful and to be there to be used and exploited by humans. However, despite traditions of modesty there seems to be an explicit demonstration of affluence in some respects. Norway can afford to heat streets and light hiking and skiing trails at night, and to connect the remotest regions to infrastructure. When it comes to fighting the elements and the darkness then being frugal is not generally the first consideration. This extends to private homes that tend to be overly lighted and heated to be cosy and warm.

Furthermore, electric cars are not just bought because they are subsidised but also because they function as a status symbol signalling that the buyer can afford to be green (Griskevicius et al., 2010). Tesla electric cars are popular and bought by car enthusiasts across the population, not simply to be environmentally friendly. The rapid growth in electric vehicles

has led to new tensions, with some arguing that the move from fossil-fuelled cars to zero-emission cars is not radical enough and that car use must be curbed in favour of public transport, cycling and walking, regardless of the absence of tailpipe emissions.

The EPCC survey will include items that help explore the factors underlying this tension, which may derive from a conflict between classical environmentalist and technologically optimistic strands of thought.

Ambiguous messages are frequently sent by politicians, while climate change is at times considered taboo or subject to socially organised denial (Norgaard, 2006). In the words of Norgaard (2006), “We don’t really want to know.” Data collected from focus groups furthermore indicate that some Norwegians see climate change as less serious than scientific reports indicate because they do not see urgent political action. This suggests a ‘governance trap’ whereby politicians and the public point to each other as responsible for solving the challenges related to climate change (Ryghaug et al., 2011).

Perceptions of political inaction may increase the sense among some citizens that “the impact of climate change was exaggerated by climate scientists as well as the media” (Ryghaug et al., 2011, p. 790). This should be seen in connection with the fact that trust in the state is much stronger in Norway than in many other countries.

From a motivational perspective, two factors seem to be important to distinguish what can drive the evaluation of climate change and its impacts as well as behavioural or policy preferences: instrumental considerations; such as economic interests; and value or identity-based processes.

From an instrumental perspective, it follows naturally that Norwegians would, for example, be positive towards oil production (given its dominant role in economic prosperity; see below) and buy electric cars (thanks to generous government support). But issues such as oil and electric cars are also very closely related to values and identity. Oil is a central component of identity both on an individual basis (e.g., if one works for the oil industry and identifies with the job, or has a family tradition of oil related employment) but of course also on a cultural level (e.g., the Norwegian narrative of the oil discovery, the *oljeeventyr*, literally ‘oil adventure’ or ‘oil fairy tale’). There is great potential for emotional dissonance if something that has been connoted so entirely positively (like the oil tradition) turns ‘bad’ through the emergence of climate change.

Data from the Norwegian Citizen Panel show that oil and gas employment is systematically related to support for mitigation policies, where employees in the oil and gas industry differ from employees in other areas specifically with respect to those policy options that may threaten jobs (Tvinnereim and Ivarsflaten, 2016; see also Tvinnereim and Austgulen, 2014).

A very conspicuous divergence of the Norwegian pattern from what has been found in other countries is emotional reactions to climate change. Usually, something like worry or fear is among the most intense reported climate change related emotions. In Norway, in contrast, the most intense emotion is hope – a positive emotion (Citizen Panel data, see Figure 2 on next page). The emotion ratings are generally not very high, though; also hope is only in the middle range. These results may reflect social norms concerning the expression of emotions – that is, what people think they are expected to feel.

The EPCC survey will be able to compare emotional and affective reactions to climate change and energy system change in the four participating nations.

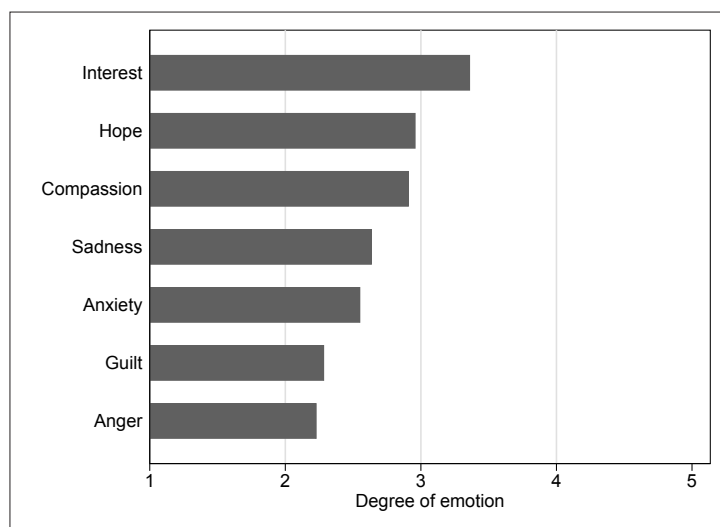


Figure 2: Emotional reactions to climate change, Norwegian Citizen Panel data (Wave 2, March 2014)

Question wording: "With regards to climate change and everything you relate to it, how strongly do you experience the following emotions?"

Concerning risk perception, Norway shows the same difference between personal risk and general risk as in other countries (Rosentrater et al., 2013; Bostrom et al., 2012). That is, climate change is seen as a risk to the world more than it is to Norway. This is to some extent a valid perception in that the impacts will be much less negative (some possibly even positive) for Norway than for other parts of the world, and apparently people are aware of this. Still, there have been some dramatic landslides and flooding in Norway. In the future, climate change is expected to affect biodiversity (notably in the ocean and in arctic and mountain regions), critical infrastructure and buildings; but economic life is not seen as particularly vulnerable (Government of Norway, 2010). Since risk perception is affected by personal experience (Spence et al., 2011), there may be strong regional differences depending on whether a region was hit by some extreme weather event.

The EPCC survey will be able to assess and compare perceptions of national risk from climate impacts, and relate them to actual projections of climate impacts.

Key actors in the Norwegian context

≈ Government

The Ministry of Petroleum and Energy (OED) is responsible for regulating and developing Norway's energy resources, including oil, gas, hydropower and emerging renewable energy forms. The Ministry of Climate and Environment (KLD) is responsible for the administration of Norway's main climate policy instruments, notably the national implementation of the European Union Emission Trading Scheme, which has been operational in Norway since 2008. The ministry also reports emissions and actions to the UN Framework Convention on Climate Change.

In addition, the Norwegian government owns a 67% stake in Statoil, the largest oil and gas operator active in the Norwegian sector.²² This stake is managed by the Ministry of Petroleum and Energy. The high level of state ownership in energy sector thus arguably blurs the distinction between regulation and operation. It also underlines the contrast between the institutional interests of the Energy and Environment ministries. While such interdepartmental tensions are not unusual around the world, the fragmentation of environmental administration is perhaps particularly clear in Norway given that the largest company in the country's main emitting sector – oil and gas – is also majority state owned.

≈ Local government

Norway's state structure is fiscally centralised, but gives municipalities wide powers in area planning. This gives them an important role in adaptation activities. Notably in light of extreme weather events over the past few years (floods, winter droughts and storms), municipalities have taken initiatives to improve the resilience of local communities. This work is supported by national ministries, research funding and notably by county governors (equivalent to French *préfets*) who oversee area planning in the 19 counties.

≈ Political parties

Unlike countries such as the US and Australia, climate change is not considered primarily as a left-right issue in Norway. The political debate is marked by a wide consensus on the reality of the problem and the need to enact significant measures, as evidenced by two legislative 'climate compounds' (*klimaforlik*) comprising large, cross-party majorities in the country's parliament. This consensus on the broader aspects has to some extent stifled climate change as an issue for election campaigning (Gloppen et al., 2014). A recent example of this consensus is seen in the unanimous parliamentary support for divestment from coal by the €800bn Norwegian Sovereign Wealth Fund (a.k.a. 'oil fund') on 28 May, 2015.²³

Furthermore, political debate on climate change, which takes place largely over issues related to mitigation, crosses the left-right axis of national politics (Båtstrand, 2012). Instead, the main contrast is seen between large parties (Labour, Conservatives and the populist right Progress Party), who are generally given low marks by environmental NGOs, and smaller parties (notably the Greens, Socialist Left, Liberals and sometimes Christian Democrats) who are seen as more environmentally friendly.

At the same time, results from the Norwegian Citizen Panel indicate that self-identified left-right placement has a significant effect on public opinion on climate change (Helliesen, 2015). This suggests a disjuncture between consensus on the part of political actors and public disagreement on climate change across the ideological spectrum. It is also worth noting that Norway has an unusually high number of parties that may reasonably be termed 'green': The Liberal Party (centrist, leaning right); the Socialist Left (left of Labour) and the most recent addition, in Parliament since 2013, the Green Party (self-identified as independent but whose voters tend to lean to the left).

²² Statoil is internationally active and has been involved in Canadian oil sands, which has led to controversy in Norway given the relatively high carbon intensity of this type of fuel and environmental effects around extraction areas.

²³ <http://www.theguardian.com/world/2015/may/27/norway-sovereign-fund-reduce-coal-assets>

The EPCC survey will be able to shed light on the relationship between political ideology and views about energy and climate change in the four participating nations.

≈ Business

The Norwegian power sector is dominated by hydroelectric generators fed from mountain reservoirs. In 2012, Norway's hydropower production constituted 96.7% of total electricity production (143 TWh out of 148 TWh); this would amount to 110% of total domestic consumption due to a net export of 18 TWh.²⁴ To further promote renewable electricity, Norway and Sweden have instituted a common market for green certificates, requiring a certain percentage of production to come from new renewable energy. In Norway, the energy projects supported by green certificates are dominated by small hydro projects, often run-of-river projects.²⁵ Norwegian renewable electricity producers are able to sell certificates of origin, as specified in the EU renewable electricity (RES) directive,²⁶ but domestic demand for such certificates is low and most are exported.²⁷

The most significant businesses in Norway in the field of climate change are the oil companies, including Chevron, ConocoPhillips, Eni, Lundin, Det Norske Oljeselskap, Statoil, Shell and Total. Statoil, which is majority-owned by the Norwegian state, aligns itself with conventional climate science in public statements, unlike some other major oil companies. It actively promotes gas as a climate solution. In 2015, a separate business area for emerging energy technologies – notably offshore wind – was established. Statoil remains committed to exploring and exploiting resources in the Arctic, despite calls for this activity to be curbed due to global carbon budget constraints. Significant players in electricity are Statkraft (power production), Statnett (transmission) and large, mostly municipality-owned, integrated power companies such as Hafslund, BKK and Trønderenergi. As is the case for Statoil, the public ownership of Statkraft is managed through the Ministry of Petroleum and Energy, again contributing to blurring the distinction between regulation and operation.

Norway does not have a developed gas distribution network, unlike most OECD countries. Electricity, including heat pumps, constitutes the main source of heating for buildings. Wood is also used as a fuel, contributing to episodes of low air quality in urban areas, especially in winter. Norway had early firms producing electric vehicles (Think, Buddy) and partly for that reason, zero-emission cars have enjoyed an extremely advantageous tax regime. This, combined with other advantages (permission to drive in bus lanes; public charging infrastructure; free passage on toll roads and ferries) and steep taxation of conventional, fossil fuel vehicles, has led to many Norwegians buying electric vehicles. In 2014, the market share was 12.5% for zero-emission vehicles, mostly electric.²⁸

24 Norwegian Water Resources and Energy Directorate (2013). "Energi i Norge 2012". Online: <http://www.nve.no/Global/Energi/Analyser/Energi%20i%20Norge%20folder/FOLDN2013.pdf>, accessed 11 Aug 2015.

25 Run-of-river projects cannot store water to produce when demand is the highest.

26 Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market

27 <http://www.nve.no/opprinnelsesgarantier>

28 <http://www.ofvas.no/bilsalget-i-2014/category648.html>

≈ NGOs

The main environmental NGOs are Naturvernforbundet (Friends of the Earth Norway) and Framtiden i våre hender (FIVH, Future in Our Hands). International NGOs such as Greenpeace and World Wildlife Fund are also represented. Norway also has a set of climate and environmental foundations acting as quasi-NGOs:

- **Bellona**, emphasising carbon capture and storage (CCS) and nuclear safety;
- **Zero**, working for technology solutions to climate change, notably electric transport;
- **Norwegian Climate Foundation**, emphasising fossil risk, divestment and corporate and municipal action to curb GHG emissions.

The two former are characterised by some as ‘corporatist’ given their friendliness with Norwegian business interests (Mildenberger, 2015). Increased levels of public funding for environmental NGOs, often through joint projects initiated by the state, has led to the emergence of what Bortne et al. (2002) characterise as new, ‘semi-governmental organisations’.

≈ Business and labour associations

Norway is a coordinated market economy, where business associations and labour unions play an integral part in policymaking and the development of regulation. These associations have traditionally supported industrial development, including expansion of the oil and gas sector. Arguably, this role has given fossil fuels a ‘double representation’ and made deep emission cuts difficult (Mildenberger, 2015). Key business federations related to energy and climate change are Energi Norge (Energy Norway), Norsk Industri (Norwegian Industry) and Norsk Olje og gass (Norwegian Oil and Gas Association).

≈ Research

Norway has strong research institutions in physical climate science, including the Bjerknes Centre for Climate Research in Bergen, the largest climate research centre in the Nordic countries. Research on climate impacts and mitigation has lagged behind, but efforts to bolster these areas are underway in most universities. CICERO in Oslo is the largest centre to focus on societal aspects of climate change. Norway has also launched 11 centres for environmentally-friendly energy.

Key climate and energy-related events in Norway

Date	Key event
1882	Norway's first hydroelectric power plant ²⁹
1969	Discovery of North Sea oil
1970s	Protests against hydroelectric dams
1972	Statoil established
1990	Sovereign Wealth Fund ("oil fund") set up
2011	Discovery of Johan Sverdrup oil field
2012	Petroleum sector accounts for 23% of value creation in Norway
2013	Controversy over oil drilling around Lofoten-Vesterålen-Senja archipelago
2015	Parliament instructs Sovereign Wealth Fund to implement fossil fuel divestment strategy

In 1882, Norway's first hydroelectric power plant, and one of the first in Europe, was built in connection with the Senja nickel works (Olje- og energidepartementet, 2013). A key feature of the country's development is the ambitious and successful government policy in the early 20th century to attract foreign investors (France, UK, others) while assuring that long-term ownership of rivers/waterfalls would revert to the state ('hjemfallsretten'). Currently, about 90% of electricity production in Norway is government owned, with local and regional authorities holding a large share. Hydroelectric power capacity expanded rapidly in Norway between 1950 and 1990, leading to controversy between environmental and industrial interests. Protests against the Mardøla (1970) and Alta (1979) dams included civil disobedience by campaigners (in the Alta case, also a hunger strike) and have remained as iconic events in the history of Norwegian environmental movement. Both dams were eventually built and are currently feeding electricity to the grid.

Probably the most important event related to energy and climate change in Norway was the discovery of North Sea oil at the Ekofisk field in 1969, and the subsequent establishment of Statoil in 1972. A blend of private investment (initially by international oil majors) and meticulous government involvement (through active ownership, support for research, and active regulation) has produced a profitable and dominant industry:

*"Petroleum activities have contributed significantly to economic growth in Norway, and to the financing of the Norwegian welfare state. Through over 40 years of operations, the industry has created values in excess of NOK 12,000 billion in current terms. In 2012, the petroleum sector accounted for 23 percent of value creation in the country. This is more than twice the value creation of the manufacturing industry... Investments in 2012 amounted to over NOK 175 billion, or 29 percent of the country's total real investments."*³⁰

²⁹ <http://www.nbim.no/fondet/om-oljefondet/>

³⁰ <https://www.regjeringen.no/en/topics/energy/oil-and-gas/norways-oil-history-in-5-minutes/id440538/>

The oil industry accounts for the greatest single contribution of greenhouse gas emissions from Norway in terms of territorial CO₂ emissions (about 14 Mt/year in 2011)³¹ and much more if factoring in 'downstream' emissions from burning of the Norwegian-produced oil and gas in other countries (about 490 Mt/year).³² Oil production in the North Sea has been declining, but the discovery of the giant Johan Sverdrup field in 2011 gave a boost to investment and employment in the sector. By contrast, the steep decline in oil prices in 2014 combined with an already planned decline in investment has recently led to a sense in Norway that the oil and gas sector has entered a stage of irreversible decline.

A major controversy around the 2013 parliamentary elections was whether oil and gas drilling should be allowed around the Lofoten-Vesterålen-Senja archipelago. The main arguments against such drilling related to the vulnerabilities of the rich fishing grounds in the area, but climate concerns and questions about the wisdom of prioritising non-renewable resources (fossil fuels) over renewable ones (fish) constituted an important secondary line of argument. To avoid so-called 'Dutch disease', the condition by which a sudden influx of resources creates inflation and crowds out other industry to the detriment of the national economy, Norway sets aside the direct income from oil and gas royalties into a sovereign wealth fund (SWF). This 'oil fund' was recently asked by Parliament to divest from companies deriving more than 30% of their revenue or output from coal, following successful campaigns by some political parties and by environmental NGOs and foundations.

Anticipated consequences of climate change in Norway

The most prominent climate-related events in Norway are floods and landslides. The late summer of 2015 saw major inundations in Eastern Norway. In the autumn of 2014, the Western towns of Odda, Flåm and Voss were hit as rivers overran their banks. A landslide related to unusually heavy rain claimed three lives in Bergen in 2005.³³

The Norwegian Climate Services Centre has estimated the following most likely changes to occur by 2100, based on the IPCC scenarios RCP2.6, RCP4.5 and RCP8.5 (Hanssen-Bauer et al., 2015):

- Annual temperature increase of about 4.5°C (range: 3.3–6.4°C);
- Annual precipitation increase of about 18% (range: 7–23%);
- More frequent occurrences of heavy, concentrated rainfall; greater volumes per event;
- Larger and more frequent floods from rainfall;
- Smaller and less frequent floods from snow melt;
- Snow will almost disappear from low-lying areas most years; more snow could be seen in some areas of high altitude;
- There will be fewer glaciers and remaining glaciers will be much smaller;
- Sea level will increase by 15–55cm depending on location;
- Temperatures are likely to rise the most in the northernmost region of Norway.

³¹ Norway's 6th national communication to the UNFCCC, Table 10S1, p. 228.

³² Glen Peters, Cicero, personal communication, 30 May 2015, see also Peters GP, Minx JC, Weber CL, et al. (2011). Growth in emission transfers via international trade from 1990 to 2008. *Proceedings of the National Academy of Sciences* 108: 8903–8908.

³³ <http://www.nrk.no/hordaland/fem-ar-siden-hatlestad-tragedien-1.7290256>

Media reporting in Norway

Data from the Norwegian Citizen Panel (2014) indicate that TV, research reports and national newspapers are important sources of information about climate change (see Figure 3 below).

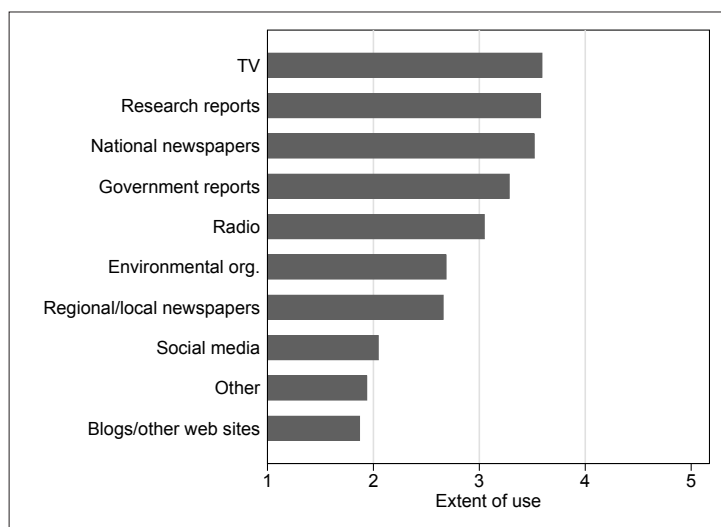


Figure 3: Media use concerning information about climate change, Norwegian Citizen Panel (Wave 2, March 2014)

Question wording: “How important are the following sources to you when you seek information on global warming or climate change?”

Norway does not have any significant climate sceptical news outlets. The business daily *Dagens Næringsliv* is generally seen as having some of the best climate-related reporting and commentary. The major liberal-conservative broadsheets *Aftenposten* and *Bergens Tidende* as well as the left-leaning *Klassekampen* had the most climate reporting in 2013, while the country’s largest tabloid, *Verdens Gang*, had the least (Eide and Naper, 2014).

In the campaign leading up to the 2013 parliamentary election, climate change was expected by some to become a dominant issue, but in fact received less coverage than health and education, and less than during the 2009 election campaign, although high volumes of letters to the editor on the issue were recorded (Eide and Naper, 2014). Key sub-topics related to climate change discussed in Norwegian media are the use of gas as a ‘bridge fuel’, Norwegian dependence on oil (and related risks) and the utility of action by a relatively small country.

Journalists in Norway discuss the acceptability of campaign journalism related to climate change (Ytterstad, 2014). Overall, they accept conventional climate science, but debate the extent to which their own opinions should be allowed to enter their task of informing the public. The ideal of objectivity is seen as an absolute requirement, but is considered hard to fulfil.

Norway and COP21

The 2015 Paris agreement was greeted publicly by key cabinet ministers and the main Norwegian political parties. The Norwegian preference for coordinating its climate policy with the EU remains, including the relatively strong emphasis on financing emission cuts in other countries due to perceived high abatement costs domestically in sectors such as transportation, fossil fuel extraction and agriculture. However, it remains unclear to what extent the EU is willing to include Norway under its climate policy umbrella.

After the emergence of the 1.5°C aspirational target, a key question asked in Norway was what the consequences would be for the oil and gas industry. Environmental NGOs such as Bellona argued that the strengthened global ambition would spell the end of Norwegian oil and gas after 2035.³⁴ At the same time, the Minister of Petroleum and Energy argued that the deal would cause greater demand for Norwegian natural gas due to its ability to replace coal in power generation.³⁵ The debate between environmental and economic interests over the size of future Norwegian hydrocarbon production thus continues.

34 Dette betyr klimaavtalen i Paris for Norge, Aftenposten, 14 Dec 2015. Online: <http://www.aftenposten.no/nyheter/uriks/Dette-betyr-klimaavtalen-i-Paris-for-Norge-8282201.html>, accessed 3 May 2016.

35 Olje- og energiminister Tord Lien: - Frederic Hauge må ha tatt for mye Møllers tran. Aftenposten, 12 Dec 2015. Online: <http://www.aftenposten.no/okonomi/Olje--og-energiminister-Tord-Lien---Frederic-Hauge-ma-ha-tatt-for-mye-Mollers-tran-8281908.html>, accessed 3 May 2016.

UK:

A socio-political profile



Historical, cultural & policy context

The UK has traditionally been a country heavily dependent upon fossil fuels for its existence. As the cradle of the European industrial revolution it pioneered early exploitation of its abundant coal reserves, has used coal and gas for much of its electricity generation and heating, and during the 1980s and 90s was a net exporter of oil from the North Sea fields. However, for various historical, institutional and political reasons the UK currently regards itself as a leader in international and domestic climate change policy. Dependence on coal for domestic fires and power stations in the cities was challenged as early as in 1952, when the great London smog killed an estimated 4,000 people and led to the clean air act in 1956 restricting the burning of coal in urbanised areas. Perhaps paradoxically given the poor environmental conditions that had existed in all major cities across the UK up until that time, British identity and culture also incorporate a view of the nation and its countryside as a 'green and pleasant land' – wholly free from the degradations of industrial development. This aspect of British environmental identity is one of the reasons, latterly, why some energy developments in the countryside, and not just nuclear power, have been fiercely resisted by campaigners. The 1950s also saw an ambitious programme of nuclear power development launched at a number of sites across the UK, utilising home-grown gas-cooled reactor technologies and with only muted local and national public opposition. As a nuclear weapons state, however, the rise of CND (Campaign for Nuclear Disarmament) during the 1960s would begin to change attitudes to nuclear power as well. During this time the question of acid rain and ozone depletion also became prominent in public discourse, although this was typically framed as a threat to continental European rather than UK forests.

A widespread feeling of national environmental identity (being associated with the green landscape) might be able to explain attitudes towards renewable energy – we will be able to explore whether the four countries define their national identity in the same way and how that affects their attitudes towards climate change policies.

In the 1970s came the discovery of the North Sea oil and gas fields, although a debate has existed ever since about the extent to which the governments of the day squandered the resource (by taking a very different licensing and exploitation policy to that followed in Norway). Ownership and use of these North Sea oil resources has subsequently become a point of fierce contention between those seeking independence for Scotland from the UK. Politics and energy have never been far apart, with the UK's 'dash for gas' for electricity production being in part a by-product of the Thatcher government's determination to diminish the domestic coal industry, and thereby undermine the miners' unions, coupled with electricity privatisation.

Due to the long-standing role of fossil fuels, and in particular coal and (North Sea) oil, in the British economy, there will be sections and parts of the UK with more favourable views on these fossil energy sources.

The UK has always held a leading role in the Intergovernmental Panel on Climate Change, through modelling work conducted by the UK Meteorological Office and its Hadley Centre for Climate Prediction and Research as well as work at the University of East Anglia's Climatic Research Unit (CRU). British scientist Sir John Houghton was the first chair of working group 1 (physical science basis) of the IPCC which first reported in 1990. In 1988 Prime Minister Margaret Thatcher made a significant policy intervention in her speech to the Royal Society on 27 September: "It is possible... that we have unwittingly begun a massive experiment with the system of the planet itself". In 1989 she followed this with a major speech on global environmental change to the United Nations. Although both this and the earlier speech was seen by some as in part an attempt to bolster the place of nuclear power in advance of electricity privatisation, coming as it did from a political party seen as hostile to state intervention, it is cited by Carvalho and Burgess (2005) as a key 'elite cue' prompting subsequent media reporting and raised levels of public concern about the issue in the UK.

Moving to the turn of the millennium, the year 2000 saw the first of a series of major flood events across the UK, with the influential advisory body the Royal Commission on Environmental Pollution calling the UK's recent reduction in GHG emissions 'largely coincidental' (because of the dash for gas). It became the first to advocate a cut of national CO₂ emissions by 60% by 2050 from 2000 levels. A series of policy events then came together around the years 2005 and 2006, including scientific discussion of defining 'dangerous climate change', campaigns by NGOs for sweeping emissions cuts, the IPCC 4th assessment report and the Stern Review of the economic impacts of climate change. The Stern Review, commissioned by Gordon Brown in the UK Treasury, concluded it made better economic sense to mitigate now rather than wait until impacts are manifest. Because it was written by an economist, this report achieved very significant international and UK impact (and controversy) in both the media and policy circles. The political response was also important, as it laid the foundation for the current UK policy position and instruments. In July the All Party Parliamentary Climate Change Group inquiry (Clayton, Pidgeon, Whitby, 2006) recommended the setting up of an independent advisory climate expert committee to agree climate targets and hold the government to account, a measure enacted in the 2008 Climate Change Act, alongside a commitment to an 80% emissions target by 2050, with very strong cross-party parliamentary support.

To monitor and manage progress to achieve this goal, the Climate Change Act sets carbon budgets for five year periods (see Table on next page for currently set budgets).

Table: Carbon budgets set out by the Climate Change Act

	1 2008-12	2 2013-17	3 2018-22	4 2023-27
Carbon budget level ³⁶	3,018	2,782	2,544	1,950
Percentage reduction below base year levels	23%	29%	35%	50%

The independent Committee on Climate Change still serves as the major advisory body shaping UK emissions policy, and is proving a model for other countries (e.g. Denmark). In 2014, emissions were down to 36% below the 1990 baseline (8% decrease compared with 2013) despite economic growth in 2014. Based on the latest policies and emissions, the Committee on Climate Change concluded in 2015 that the UK is on track to meet the second and third carbon budget (up to 2022) but needs to make more progress across all sectors to meet the 2050 target. The level of cross-party agreement means that climate change in the UK has not seen the same levels of intense political debate as in the USA, although there is a consistent relationship between political ideology and scepticism about climate change (Whitmarsh, 2011).

Over the last 10 years nuclear power has been framed as a possible solution to climate change and as a reliable energy source for the UK (DTI, 2006; BERR, 2008a, 2008b). Despite this framing, research conducted in 2005 and 2010 showed that UK public preferred renewable energy sources over nuclear power (Poortinga, Pidgeon, & Lorenzoni, 2006; Spence et al., 2010). However, in 2010 more people agreed that there are benefits of nuclear power to people in the UK (60% in 2010 compared to 49% in 2005).

While research shows that the majority of the UK public favours renewable energy over nuclear power, in a cross-national comparison the UK can be expected to be more supportive of nuclear power as part of a future energy mix than France, Germany, and Norway. More so than in other countries nuclear power in the UK has been framed as playing a central role in reducing carbon emissions. Furthermore, responses to the Fukushima accident have been more muted in the UK than in other countries.

In policy terms the UK government has in recent years remained committed to the support (through a range of financial instruments) of the development of renewable energy particularly onshore and offshore wind, gas technology, and nuclear power. However, policy has been at times inconsistent or ineffective, with the new Conservative administration pledging to deregulate the energy market, supporting renewable energy under the condition that it is 'cost effective'.

In the first few months after the elections in 2015, the conservative government pledged to phase out subsidies for onshore wind and solar installations, to stop the Green Deal (financial support for homeowners to insulate their homes) and announced the privatisation of the Green Investment Bank (although they remain committed to the

³⁶ Million tonnes carbon dioxide equivalent (MtCO₂e)

Climate Change Act and to the Paris agreement). Furthermore, the current Conservative government announced to expand nuclear power, continue the support of development of North Sea oil and gas, and the safe development of shale gas. With a focus on cost, access and supply in the energy debate, the Conservative government continues to back the new nuclear power station at Hinkley, despite strong criticism about increasing costs associated with finishing this project.

UK businesses and professionals criticise the government's mixed signals, lack of clear regulations and hesitancy to invest in low carbon technologies. John Cridland, director general of the Confederation of British Industry (CBI) said in the lead-up to the climate negotiations in Paris in 2015: "(...) despite the progress so far, today's investors are more uncertain about the UK's low-carbon future. From the rollback of renewables to the mixed messages on energy efficiency, these changes send a worrying signal about the UK as a place for low-carbon investment."

Ahead of the UK election, leaders of the three main parties (Conservatives, Labour, Liberal Democrats) signed a joint pledge in February 2015 on climate change. The pledge states that "Climate change is one of the most serious threats facing the world today. It is not just a threat to the environment, but also to our national and global security, to poverty eradication and economic prosperity." The three leaders further committed "to seek a fair, strong, legally binding, global climate deal which limits temperature rises to below 2°C". Despite criticism that this pledge simply reframes previous commitments, this joint agreement was seen as a strong signal that the future UK government will keep climate change on the political agenda. However, during the election campaign, climate change was not a prominent topic and has barely been mentioned by Labour or the Conservatives during the launch of their manifestos (The Carbon Brief, 2015). In terms of the UK's current energy mix, the total production of primary fuels in the UK has fallen by 62% since 1999 mainly due to the exhaustion of oil and gas. Subsequently, dependency on energy imports increased sharply, with 47% of energy used in the UK being imported in 2013 (-17% in 2000). In 2013, 5.2% of energy production came from renewable sources (4.2% in 2012).

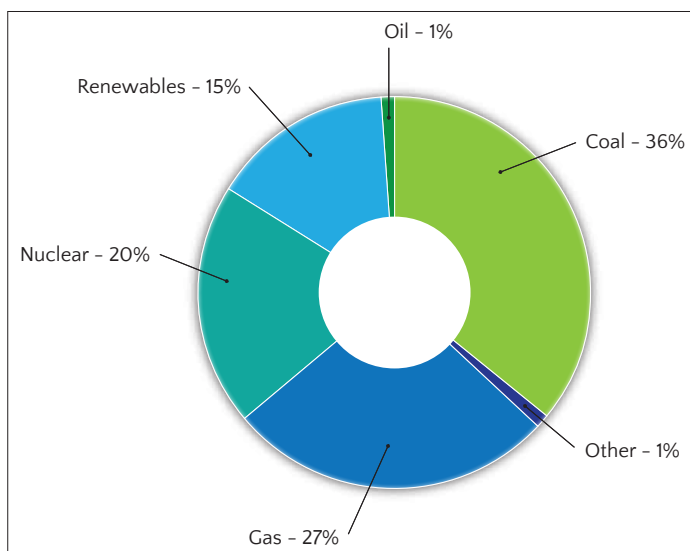


Figure 4: Distribution of energy produced in 2013 (source: DECC, 2014)

The proportion of electricity being generated from renewable sources rose from 6.7% in 2009 to 14.9% in 2013 (22.3% for the first quarter of 2015). Bioenergy and onshore wind are currently the main sources of renewable energy in the UK (see Figure 6).

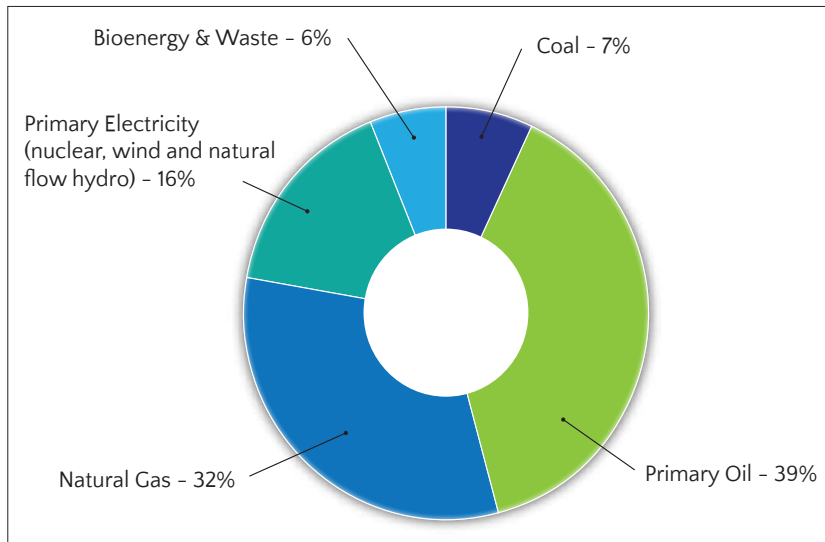


Figure 5: Distribution of electricity generated in 2013 (source: DECC press release, 2014)

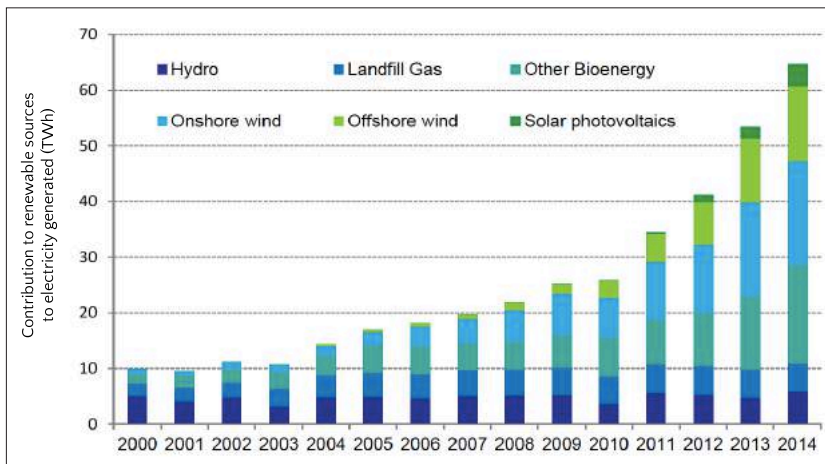


Figure 6: Renewable sources of electricity generation in the UK 2000–2014 (source: DECC, 2015)

Key actors in the British context

The UK has a range of actors who have been involved in climate and energy policy, across the whole spectrum of non-governmental organisations and civil society, government, and the corporate sector.

≈ Government

The main responsibility for climate policy is split across two major government departments. The first of these, the Department of Energy and Climate Change (DECC), was set up in 2008 in response to a perceived institutional fragmentation between climate and energy policy and the belief that this would produce a more joined-up approach. It holds the main responsibility for energy issues (development, regulation, decommissioning) as well as international climate negotiations. In effect it holds the brief for ‘climate mitigation’ widely drawn. DECC has to balance a range of responsibilities – for example it has responsibility for both supply and many demand reduction incentives, energy security and affordability as well as decarbonisation, and responsibility for the UK oil and gas industry alongside both renewables and nuclear policy. A very large proportion of the DECC budget is dedicated to dealing with energy legacy issues (clean-up and decommissioning) at fossil fuel and nuclear sites. Also many of the policies that might affect the UK’s carbon emissions are not under the control of DECC but set by

other departments (Communities and Local Government, Transport, Welsh and Scottish governments in some cases). In addition, the ability of DECC to drive climate mitigation policies is very much dependent on the support of HM Treasury which controls the actual budget (both public but also that levied from consumer bills) that can be spent on low-carbon infrastructure and energy efficiency.

By contrast the UK Department for Environment Food & Rural Affairs (DEFRA) which is a much bigger department than DECC and is mostly concerned with farming and food policy has main responsibilities for climate adaptation, although some measures (e.g. flood defences) are further devolved in England to the Environment Agency (EA in England, Scottish Environment Protection Agency in Scotland, and Natural Resources Wales in Wales). This latter observation points out the fragmenting responsibilities for climate change under current devolution arrangements, which can hinder a collective response.

A key institutional innovation in 2008 was the creation of the Committee on Climate Change (CCC). This is an independent statutory body which was established under the Climate Change Act (2008) to advise UK and devolved administration governments on setting and meeting carbon budgets, and preparing for climate change. It has a close relationship with DECC – both advising it and critiquing its policies – but also has a ‘Climate Adaptation Subcommittee’ which interfaces primarily with DEFRA.

≈ NGOs

A range of NGOs including Friends of the Earth, Greenpeace, RSPB, WWF-UK and Green Alliance have been active at the highest policy level. The UK also has specific climate-related information sources such as Carbon Brief or Climate Outreach (formally Climate Outreach Information Network).

≈ Corporate

Major energy companies supply and generate and are mostly non-UK owned now, including EDF, RWE NPower, Scottish and Southern etc., while BP and Royal Dutch Shell remain significant players in the UK and world oil and gas extraction industry. Energy UK is the trade association who represent the energy industry as a whole. A number of UK corporates have at times taken a leading role in arguing the case for climate change mitigation, including the insurance industry very early on in the history who are concerned with long range extreme weather risks. Progressive business-backed organisations such as the Aldersgate Group and Corporate Leaders Group seek to make the voice of progressive multi-sector businesses heard in the climate and energy debate and are regularly arguing for ambitious climate mitigation policies.

≈ Academic actors

Academic and climate science institutes tend to be more distributed (i.e. there is no single Potsdam Institute). The government funded Met Office Hadley Centre is responsible for climate modelling (UK Met Office itself is the weather forecasting agency). In the University sector a key player is the University of East Anglia (home-base of the Climatic Research Unit – a modelling facility who work side by side with NASA and the Hadley Centre – the Future Earth Initiative, and the Tyndall centre for Climate Change Research). Other key

players include Reading University (Walker Institute), Imperial College and UCL in London, Leeds University, Manchester and Exeter Universities. Environmental sociology of climate science is studied at Lancaster University and at Edinburgh University. Cardiff is the UK centre for work on climate beliefs and public engagement.

Key climate and energy-related events in the UK

Date	Key event
1945	Britain begins infrastructure reconstruction, including post-war nuclear weapons and civil nuclear power programme.
1952	The London smog – extreme event, 4000 casualties lead to the Clean Air Act 1956
1957	Electricity production remains dominated by abundant reserves of indigenous coal from England, Scotland and South Wales, with a small contribution also from hydropower.
1960s	The Central Electricity Generating board rolls out modern very large (1-2 GW scale) coal fired electricity generating stations across the UK (e.g. Longannet, Drax, East Aberthaw, Kingsnorth),
1965-1974	Major oil and gas field discoveries made in the North Sea.
1973/1974	1st OPEC Oil Crisis
1970s	Electricity blackouts (the so-called '3-day week') caused by high inflation, industrial unrest, and crippling strikes by mine workers.
1978/1979	'Winter of Discontent' followed in the spring by first election victory of Margaret Thatcher's Conservative government with a liberal privatisation agenda.
1982	Nigel Lawson new Secretary of State for Energy lays ideological foundation for later energy privatisations.
1984/1985	The position of coal has already become precarious following the loss of its traditional domestic gas market to North Sea sources. The scene is set for the decline of the traditional coal industry alongside the 'dash for gas'
1986	First big energy privatisation, of British Gas
1986	The Chernobyl accident occurs in the Ukraine.
27 Sep. 1988	Prime Minister Margaret Thatcher's speech to the Royal Society puts climate change on the political agenda.
1990	Beginning of privatisation of electricity generating industry which has the effect of new companies planning many gas fired plants (the 'dash for gas').
1992	UN Framework Convention Climate Change signed in Rio.
1997	New Labour and Tony Blair comes to power: promises to cut national CO ₂ emissions by 20% by 2010 (from 1990 levels), Kyoto protocol also signed.
1999	Second peak of North Sea oil production.

2000	The autumn of 2000 also saw major flooding events in Kent and Sussex, Shropshire, Worcestershire and Yorkshire, as well as elsewhere in Western European countries. Royal Commission on Environmental Pollution calls the UK's recent reduction in GHG emissions 'largely coincidental' (because of the 'dash for gas'); the first to advocate cut of national CO ₂ emissions by 60% by 2050 (from 2000 levels).
2003	Energy White Paper Our energy future: creating a low carbon economy (DTI). Three main objectives: energy security (nuclear door left open), climate change (60% cuts), reducing fuel poverty.
2005	Avoiding Dangerous Climate Change international conference (DEFRA) concludes that 'dangerous' should be defined as a 2°C rise in global temperatures compared to pre-industrial levels.
2005	Friends of the Earth launch 'Big Ask' campaign.
2006	At the end of January the opposition parties agree a cross-party memorandum on climate change, leading to the All Party Parliamentary Climate Change Group inquiry (Clayton et al. 2006) which recommends the setting up of an independent advisory climate committee similar to the MPC of the Bank of England.
2006	Stern Review (Chancellor and Treasury): makes economic sense to mitigate now rather than wait until impacts are manifest.
2007	Major summer flooding in June experienced across the UK (Northern Ireland, East Yorkshire and Midlands, Gloucestershire, Oxfordshire).
2009/2010	'Climategate': December and January saw the theft and publication on the web of emails from members of the Climatic Research Unit at University of East Anglia.
2011	Fukushima nuclear accident in Japan.
2012	Royal Society Report on Unconventional Gas and Oil.
July 2014	Significant protests and direct action in leafy Sussex (Balcombe) against oil exploration.
2013/2014	Winter flooding. Storms in December and January caused heavy flooding across the UK.
2014/2015	The fossil fuel divestment campaign gains momentum in the UK.
May 2015	Election of new Conservative government with a thin majority and some backbench climate scepticism embedded, although the UK Independence Party (against Europe, Wind power and Climate) and the Green Party, while securing significant votes, fail to make the expected seat gains.
November 2015	United Nations Framework Convention on Climate Change, 21st Conference of the Parties (COP21) in Paris led to an agreement amongst ca. 196 countries to keep global temperature increase "well below 2°C".
June 2016	Referendum on whether or not the UK should remain a member of the European Union. ³⁷

³⁷ Written prior to the June 24th result of the referendum.

Inspired by the discussion around climate change migrations sparked by the current refugee crisis in the EU, our research could assess the perceived link between climate change and migrations and concern about 'climate change victims'.

Anticipated consequences of climate change in the UK

The 2012 Climate Change Risk Assessment outlined the potential risks to the UK posed by increases in global temperature.

Heatwaves, cold winters and extreme flooding events have already affected the UK and caused disruptions and associated economic damage, for example the 2007 summer floods, cold winter of 2009, 2010, and drought in spring 2011 (Defra, 2012).

In more recent years the UK experienced the severe winter flooding and storms of 2013/2014 with heavy flooding across the UK. Overall the December and January storms resulted in around seven fatalities and 1,700 properties flooded across England (Met. Office, 2014).

With regards to expected future risks of climate change for the UK the Risk Assessment describes the highest costs and disruptions being expected through flooding. More precisely, analysis for England and Wales showed future potential risk estimates are within £1.5 billion to £3.5 billion by 2020s, £2.1 billion to £12 billion by the 2080s. As the second most severe risk, hotter summers are expected to affect water supplies and increase health risks.

People in more endangered areas (and/or people who indicate previous experience with climate change impacts) might perceive climate change to be less distant, which might lead to higher concern about climate change and more willingness to engage in related behaviours.

Furthermore, the UK is also likely to be affected by storms, floods and droughts that occur outside of the UK, through disruptions to trade or supply chains.

However, the 2012 report also highlighted that the potential climate risks in other parts of the world are much greater than those expected for the UK. Potential opportunities that higher temperatures in the UK would bring about are, for example, the potential for growing new crops as a result of a warmer climate and longer growing seasons where water and nutrients are not limiting factors.

The UK public might be more positive about the national impacts of climate change compared to people in (e.g.) France due to the potential opportunities for the UK.

Media reporting in the UK

≈ Newspaper coverage of climate change

Carvalho and Burgess (2005) identified three distinct circuits of climate change – 1985–1990, 1991–1996, 1997–2003 – which were characterised by different framings of risks associated with climate change in UK media coverage (see figure 7). According to Carvalho

and Burgess (2005) two important factors shaped the UK's broadsheet newspapers' discourse on 'dangerous' climate change: top political figures and the dominant ideological standpoints in different newspapers. The first period, from 1985 to 1990 ("from silence to political construction of risk") saw an important discursive transformation from climate change being a scientific to a more politically constructed issue. At first, scientists were the exclusive definers of the issue for the press; although their capacity to influence the media was limited. That was changed by Mrs Thatcher's speech to the Royal Society in September 1988, after which the media began to represent climate change as a major risk for human security (also see Jaspal & Nerlich, 2012).

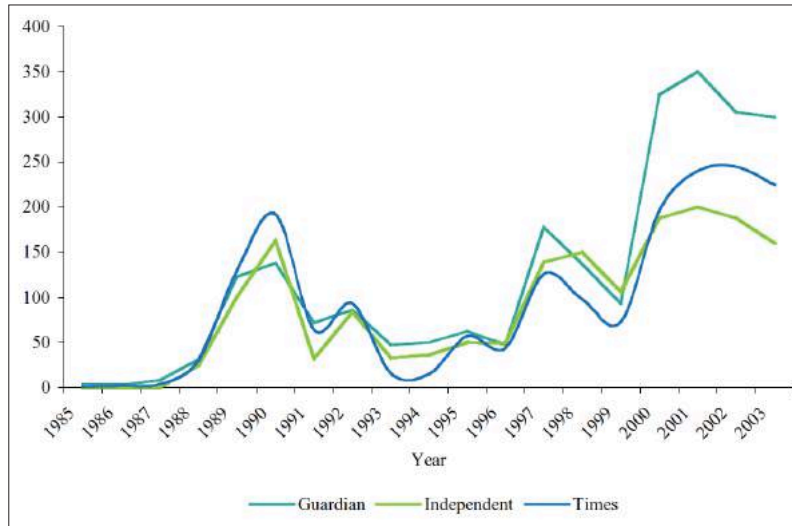


Figure 7: Cultural circuits of climate change in UK Broadsheet newspapers, 1985–2003 (Source: Carvalho & Burgess, 2005)

In the second period, from 1991 to 1996 ("Climate change recedes in the public sphere"), climate change began to receive less newspaper coverage and as result receded from the public's attention. After the high levels of coverage at the end of the 1980s, editorial fatigue set in as the UK experienced an economic recession in the early 1990s. Figure 7 shows that coverage of climate change declined dramatically in 1991, and remained low until 1997. The third phase, from 1997–2003 ("Danger comes close to home") was characterised by a substantial increase in volume of press coverage which can be directly related to important policy events, such as the Kyoto Protocol. In contrast to the earlier reporting, the discourse since 1999–2000 was marked by a new sense of urgency attached to the risk of climate change.

Further increases of newspaper coverage of anthropogenic climate change were observed between 2003 and 2006 (Boykoff, 2007), with an extended period of high newspaper coverage during the 2006–2007 period (see Figures 8 and 9; Grundmann & Scott, 2012). The high level of coverage was associated with important policy events, such as the publication of the Stern Review (2006) and the IPCC Fourth Assessment Report (2007), the awarding of the Nobel Prize to the IPCC in 2007, as well as the release of Al Gore's documentary 'An Inconvenient Truth' (2006). Newspaper coverage of anthropogenic climate change culminated in a peak at the end of 2009, during the United Nations Climate Change Conference in Copenhagen (December 2009) and the 'Climategate' affair (November 2009). The high levels of media coverage was followed by a dramatic slump in early 2010, after which attention dropped to the low levels seen around 2005 (Grundmann & Scott, 2012).

While newspaper coverage has fluctuated ever since the 2009 high, no clear peaks have been observed between 2010 and 2014 (see Figure 8). The higher levels of newspaper coverage of anthropogenic climate change throughout 2015 can almost exclusively be attributed to the *Guardian's* fossil fuel divestment campaign. The *Guardian* also published the most articles on the COP21 conference held in Paris, resulting in a peak of media reporting at the end of 2015 and beginning of 2016.

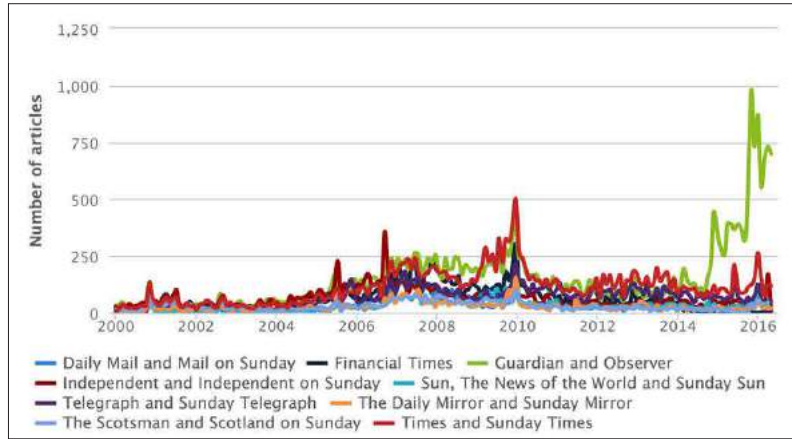


Figure 8: Newspaper coverage of climate change and global warming in the UK between 2000 and 2016 (source: Luedecke et al., 2015)

Shaw (2013) reported an increase in the number of newspaper stories featuring a mention of the 2°C dangerous limit, in line with the newspaper reporting of anthropogenic climate change in the UK. However, the results show that news reports largely ignore the 2°C limit as a division between safe and dangerous climate change. The term '2°C' only received a small number of mentions over the 2000–2012 period. While Carvalho and Burgess (2005) solely focused on the coverage of climate change in the broadsheets, other studies also included 'tabloid' newspapers. Gavin (2007, cited in Anderson, 2009) found a limited amount of newspaper coverage in the British 'tabloid' press between 1996 and 2000. Research reported here confirms the importance of policy-relevant events for media coverage of climate change and global warming. Peaks and sharp increases in the coverage of anthropogenic climate change have been observed at the time of the US withdrawal from the Kyoto process (2001), the G8 summit in Gleneagles, Scotland (July 2005); Hurricane Katrina (August 2005); the release of the film 'An Inconvenient Truth' (May 2006), the Stern Review (October 2006); the IPCC Fourth Assessment Report (early 2007), the Nobel Prize to the IPCC in October 2007, the United Nations Climate Change Conference in Copenhagen (December 2009) and the 'Climategate' affair that started in November 2009 (Carvalho & Burgess, 2005; Boykoff, 2007; Grundmann & Scott, 2012). Figure 9 shows prolonged attention in 2007 (at the time of the publication of the IPCC AR4 report and the awarding of the Nobel Peace Prize to the IPCC) and a short peak of attention in 2009 (at the time of the Copenhagen conference and the 'Climategate' affair). The peak at the end of 2015 and beginning of 2016 shows the attention for the COP21 climate talks in Paris.

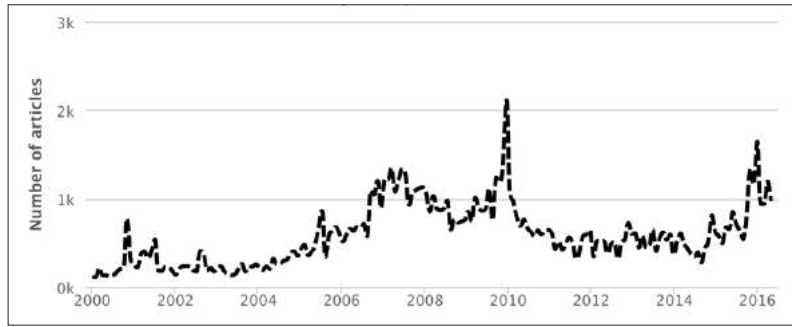


Figure 9: Newspaper coverage of climate change and global warming in the UK between 2000 and 2016, total of nine newspapers (source: Luedecke et al., 2015)

Painter and Ashe (2012) reported that when examining the media reporting in the UK, USA, France Brazil, China and India, more than 80 percent of the sceptical voices were found in the UK and US, with a big increase between 2007 and the 2009–2010 period. This makes climate scepticism to some extent an Anglophone phenomenon, at least in mainstream media. They further found that most of the sceptical views (40%) were expressed in the opinion pages and editorials. Climate sceptical voices are more common in right-leaning than in left-leaning newspapers (Painter, 2011). Carvalho and Burgess (2015) reported that the conservative, right-of-centre *Times* was more inclined to question the science behind climate change, while Boykoff and Mansfield (2008) claim that the politically conservative stance is a key element in shaping the *Daily Mail's* 'balanced' coverage of climate change.

Due to the specific tendency in Anglophone countries to accord a huge volume of media attention to climate sceptic voices, public climate scepticism will be higher in the UK than the rest of Europe. The concentration of climate sceptical views in the media may also lead to a higher political polarisation than in the other European countries.

Boykoff (2008) reported that the discourses in UK tabloid newspapers are mainly framed through weather events, charismatic megafauna, and the movements of political actors and rhetoric, with only a few stories focusing on the risks and justice aspects of climate change. While almost all broadsheet coverage includes climate science depicting significant human contributions (98%; Boykoff, 2007), UK tabloids coverage significantly diverges from the scientific consensus that humans contribute to climate change (Boykoff & Mansfield, 2006). The tabloid coverage of climatic change was far more likely to be 'balanced' (with roughly equal attention to competing views regarding human's role in climate change) or to depict human contributions to climate change as negligible, as compared to broadsheet coverage of climate change.

With discourses being mainly framed in terms of extreme weather events, people in the UK may be more willing to attribute such events to climate change.

Doulton and Brown (2009) identified eight discourses in the media construction of climate change in four UK 'quality' newspapers between 1997 and 2007, reflecting 'optimism', 'rationalism', 'ethical mitigation', 'self-righteous mitigation', 'disaster strikes', 'potential catastrophe', 'crisis' and 'opportunity'. Overall, the 'potential catastrophe' frame was used most frequently over the 1997–2007 period. Doulton and Brown (2009) reported that trends in coverage were fairly consistent across the 1997–2007 period for the four newspapers. However, the four newspapers used distinct frames. Discourses concerned with likely severe impacts dominated coverage in the *Guardian* and the *Independent*

since 1997, and in all four papers since 2006. Rationalism is the most common discourse represented in the *Times* and self-righteous mitigation in the *Telegraph*. Ethical mitigation was found in all four newspapers.

O'Neill et al. (2015) found ten different frames in the reporting of the IPCC fifth framework report: Settled Science, Political or Ideological Struggle, Role of Science, Uncertain Science, Disaster, Security, Morality and Ethics, Opportunity, Economics and Health. The first five frames were used most frequently, with only a few mentions of the latter five frames (also see below). UK broadsheets, in particular the *Guardian*, provided the greatest newspaper coverage of the publication of the reports. The *Guardian* stood out in its use of the 'political and ideological struggle' frame. The *Mail* did not use a 'settled science' frame at all.

While levels of climate change scepticism have been low over the last few years the presence of climate change sceptic views in the UK media landscape might lead the public to underestimate how many people consider climate change in their daily lives.

≈ Television broadcasts and online media

Most of the research on the coverage of climate change and global warming has been done on the printed media. Only a limited number of studies have focused on books (e.g. Jacques et al., 2008), television broadcasts (e.g. Painter, 2014), or online and social media, such as Twitter (e.g. Williams et al., 2015). The BBC takes a unique place in the UK media landscape. As the UK's most important public service broadcaster, the BBC has a duty to be accurate and impartial in the coverage of the news. This also applies to coverage of science and scientific issues that feature prominently in the BBC's public discourse. In an independent review of the accuracy and impartiality of the BBC science coverage, commissioned by the BBC Trust, Jones (2011) concluded that the BBC science coverage was generally of a high quality, but also noted that there should be no attempt to give equal weight to opinion and to evidence. Jones (2011) identified several instances where the BBC provided equal time to scientific experts and sceptics on the issue. The BBC's attempt to be impartial in the treatment of climate change therefore may have resulted in a false balance of reporting on the issue (cf., Boykoff & Boykoff, 2004). The House of Commons Science and Technology Committee (2014) have criticised the BBC for making mistakes in their coverage of climate science by giving opinions and scientific fact the same weight. While politicians, lobbying groups and other interested parties should be heard on the issue, the BBC has to be clearer on their roles, i.e. whether interviewees are lobbyists or disinterested experts (ibid).

Painter (2014) reviewed the television coverage of the publication of the IPCC Fifth Assessment report (AR5) in six countries (Australia, Brazil, China, Germany, India and the UK). He used the four frames of 'disaster', 'uncertainty', 'opportunity', and 'risk' to analyse evening news bulletin the day before and the day of the release of working group reports. The disaster frame was the most prevalent, salient and dominant across all publications. While the climate 'pause' narrative (referring to a lack of significant rise in global average temperatures since 1998) was strongly present in the media in the UK and Australia in the run-up to the release of WG1, only limited time was provided to sceptical voices. Nearly three-quarters of all those appearing on screen were IPCC authors or other scientists. Also the one sceptic who was given prominence in the general BBC coverage had previously been an IPCC author. O'Neill et al. (2015) examined the television, newspaper and social

media coverage of the IPCC fifth assessment report in the UK and US. They found that the publication of the report gained far more attention in the UK than in the US, in particular in the legacy media (i.e. television broadcast and newspapers), although there were some noticeable differences in the frames between the different UK public service broadcasters. While the 'settled science' frame was used by all public service broadcasters, Channel 4 was more likely to use a 'disaster' frame and the BBC an 'uncertain science' frame. Similarly, the 'settled science' frame dominated Twitter coverage in the UK.

UK and COP21

Ahead of the climate change conference in Paris, the UK was criticised by UN scientists for cutting renewables subsidies, suggesting that the UK have abandoned their leadership on climate change, while 150 other nations were making unprecedented pledges to shift towards.

Closer to the COP21, the public discourse was occupied with the terror attacks that took place in Paris only two weeks before the start of the conference. The French government decided to proceed hosting the COP in Paris under tightened security and with public demonstrations being cancelled. Tom Burke, a former UK government advisor, predicted that instead of taking the spotlight away from climate change, the terror attacks would make a deal more likely. He argued that some leaders will insist that by addressing climate change one of the drivers of terrorism will be removed, stressing the urgency for the UN nations to agree on how to respond to another global threat, climate change.

During the COP21 the media coverage was scarce but upon completion, all big UK newspapers featured the agreement, explained the content and implications for the UK (see peaks in figure 7 and figure 8).

Globally, the outcome of the meeting received criticism from some NGOs (e.g. Friends of the Earth) for not being a binding agreement and for missing a detailed action plan on how the set targets will be met. In the UK, all political parties welcomed the agreement as an important step forwards. For the UK markets the commitment to reduce Britain's carbon emissions offers some stability and reassurance that, despite mixed policy signals from the Conservative government, a shift towards green technologies can be expected.

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