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Report No ECHOES 5.2 –Report on the impact of "Energy memories"

Report

The impact of "Energy memories" on Energy Cultures and energy consumption patterns

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Report

ENERGY MEMORIES

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ABSTRACT
In the ECHOES project, we have conducted detailed case studies of energy historic "key events" and their consequences in five European countries, namely Austria, Bulgaria, Italy, Spain, and Norway. The guiding hypothesis was that "key events" may have resulted in the development of country specific "energy memories" with an impact on the respective national energy culture, consisting of material culture, energy practices and cognitive norms. The purpose of these case studies has been to provide a new perspective on the ways how energy transitions can occur in different regional, cultural, technological and political contexts. By incorporating the concept of "collective memory" into the well-established "energy cultures" framework, the newly developed "energy memory" approach provides a more holistic picture of the dynamics in energy transitions than previous approaches did. Understanding the role of key events and the way how national energy memories moderated past energy transitions are expected to significantly improve the level of detail in policy recommendations for the implementation of the Strategic Energy Technology (SET)-Plan.

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EXECUTIVE SUMMARY

The ECHOES project aims at understanding how and why we make the energy choices that we presently do across Europe. In doing so, ECHOES focuses on three technology areas: electro mobility, smart energy technologies and buildings. We are as interested what shapes the choices of an individual purchasing an electric vehicle, as we are in the choices of a political system implementing a new support mechanism for distributed renewable energy production and decarbonizing the transport sector. A key goal across the project is to harness knowledge about such choices, through mobilizing different disciplinary and analytical perspectives in order to produce policy relevant advice for the European Commission and its Member States in its quest to realize the goals of the Energy Union.

Work package five is primarily focused on processes at the meso-level of society, where the question of consumer/prosumer behaviour in the energy sector is addressed from a sociological perspective, by exploring: (i) the shaping and performance of so-called "energy lifestyles" across Europe, (ii) innovation and transformation through grass roots organization, and (iii) **the impact of *energy memories*.** This Work package explores the transformation of energy consumption patterns, energy production and innovation in the context of what we can call Energy Cultures. At its core, this approach recognizes that transforming a society's way of consuming and producing energy cannot be reduced just to a cognitive task, a social task or a technological task. Rather, such transformation requires addressing norms, practices and material aspects in a balanced way. The "Energy Cultures" approach differs between countries. Thus, the energy cultures that we study in ECHOES are situated within specific national and local contexts, and are produced by combinations of material elements, norms and habits. The energy cultures we study are also situated at a particular temporal location.

This report contributes to such endeavors through exploring the relationship between the past and the present by focusing on the **role of individual and especially collective energy memories**. Our introduction of the so-called **Energy Memories concept** is based on the approaches of Energy Cultures (Stephenson et al. 2010) and Collective Memory (Halbwachs 1985) and it represents a constructive effort to empirically explore the role of the past in feeding into contemporary energy cultures. We study to what degree past events become parts of contemporary normative, practical and material repertoires through which energy cultures can both stabilize, change and feed into a multitude of contemporary debates and practices. Furthermore, we study how political, social, cultural, and technological key experiences of the past within the energy domain may be recognized as **key impulses** that might resonate in powerful ways in contemporary energy cultures.

The method of case studies was used for the analysis of national energy memories, based primarily on desk top research with the study of historical sources and contemporary documents. The aim was to identify key events for the respective country and to analyse their relevance for the emergence of collective energy related memories. Discussion groups were organised in each country as a selective supplement to the case studies, but also as a questioning of the perspectives taken up in these case studies. The assessment of the energy memories' impact on national energy cultures turned out to be more complex than expected. Firstly, the availability and identification of non-biased historic reports can be problematic since the roles of political actors, media, and scientific experts can be very diverse in the context of energy-related key events. Secondly, the group discussions did not only identify collectively shared energy related memories, but also more individual memories. Since collectively shared memories and their potential impact on societal level is the key interest of our methodological approach, and as the national discussion groups were not representative for the respective societies, individual memories are taken into consideration only secondarily. In the national case studies, countries chose quite a broad selection of "key events": from punctual, partly catastrophic events to long lasting transition phases of a whole socio-political system. In total, 7 punctual events and 8 events covering a certain period were selected.

Adding the historical dimension to the energy cultures via the energy memories approach turned out to enhance the potential knowledge gain dramatically. The country studies presented in this report demonstrate how energy memories influenced one or more aspects of the national energy cultures. A number of key events discussed herein have been transformed into memories about how the energy cultures of involved countries became constituted as they did, and consequently also how old energy cultures became de-stabilized and modified over time. A particularly concise example is the development of a commonly shared “anti-nuclear” culture in **Austria**. Such a culture can be described statically, but incorporating the national historic background and considering the role of different energy sources and corresponding key events adds analytical strength and might make it easier for policy makers to act upon insights on the transformation of national energy cultures over time. In **Norway**, the discovery of oil was fundamental in shaping what has been described as a comfort-oriented energy culture. The “Finding oil fairytale”, and the memory of it, indeed is the recollection of how a new Norwegian energy culture was formed. In other accounts, energy memories serve to highlight both how energy cultures have been constructed, but also how old energy cultures have been de-stabilized. In Turkey, mass urbanization can serve as a case in point, where memories led to a radical de-stabilization of existing ways of using and producing energy, but at the same time mass urbanization assembled new material, practical and normative elements, constituting a new variant of Turkish energy culture. The consideration of the stabilizing or destabilising role of energy memories for energy cultures may also be viewed in a systemic context: Like every system, an energy culture is concerned with system maintenance and stability. To this end, the cultural sub-areas materials, norms and practices tend to support and reinforce each other. In this sense, "comfort orientation", i.e. the quest to offer or obtain "comfort", can be interpreted as a quest for stability. If collective memories are generally shared within large parts of a society, they tend to strengthen the stability of a social energy culture. Examples of this could be the establishment of institutions, organisations, legal frameworks, infrastructures (material culture), or the postulation and maintenance of corresponding social norms by institutions, media, etc. However, if certain key events lead to changed memories that no longer make sense for society in the current situation, these newly emerging memories have a destabilising effect on the existing energy culture and the system strives to achieve a new stability until a new balance is established.

Energy historic key events with an unquestionably connected and still existing shared memory on national level could not be identified in all countries. One of the common findings was that energy memories tend to be limited to generations who personally remember the key event or were influenced by the “cultivated memory” over the next 1-2 generations only. Only memories in cases that had an extremely strong and lasting impact at socio-political level could last longer times. Emotionally intense phases of power imbalance and protest are crucial factors in the question how and if events are commonly remembered (across generations), as e.g. the case of **Spain** shows, however, they were found to be no guarantee for the development of an energy memory according to the concept. “Collective” memories are sometimes strongly group specific and not existent at a national level, e.g. demonstrated by **Bulgarian** and Turkish cases.

Do energy-related events really create energy-related memories? In fact, many of the discussed cases are symbolically connected to other components of the respective events (questionable practices by governments, a new understanding of democracy, perception of physical threat, construction of identity etc.). In some cases, key events (for example in citizens' protests) are mainly a symptom in which current social developments and trends are reflected. Thus, key events and “Energy Memories” must always be discussed in consideration of their cultural and political context. Who, which social group, especially in the case of controversial events, shapes collective ideas and memories through their definitions? Based on the research conducted in this task, one can assume that the amount of people that share a certain memory within a society is one core factor for the stability of the specific memory over time. Other factors are the intensity of memory cultivation by media and the social background of the relevant public. Media can be considered social actors that undoubtedly have a strong stake in “turning events into key events” and “cultivating memories”.

In summary, we consider the confrontation with the new concept of energy memories as broadening and beneficial to the predominant static perspective. Memories are a good method to reflect on one’s attitude on day-

to-day energy behaviour at the consumers' level. Memories can be used as benchmark for reflection on personal behaviour in relation to national averages. In scientific work, the energy memories contribute to broadening the discussion away from the traditionally very technology-focused perspectives, and they direct the viewpoint in the socio-technological discussion which is usually centred on TODAY, towards the significance of history, which influences the status quo.

Policy makers should ideally be aware of the nationally relevant collective memories in the energy sector. The knowledge of existing energy memories that have a strong background influence on present energy cultures enables policy makers to set activities in the compartments of energy culture (e.g. material and norms related actions). If these activities are conducted in the "spirit" of the existing memories, because policy makers classify them as beneficial for innovative energy strategies, there is a higher probability that this intervention will be widely accepted. On the contrary, when it comes to "unlearning" outdated or unwanted energy cultures, policy makers are required to address, and no longer actively maintain, but demythologize memories that consolidate this energy culture.

What we potentially observe, is how discussions about past memories, coupled with discussions about contemporary practice and materiality, might allow us to identify energy cultural "cracks" or ruptures, i.e. instances of energy cultural instability. Obviously, key events do not only play a role as striking and potentially decisive points in a time course. They may also become the pivotal point of targeted policy measures that take advantage of destabilised energy cultures in which the three components "cognitive norms", "material culture" and "energy practices" are no longer fully compatible. This demonstrates how decision makers could e.g. utilise the "crack" between "material culture" and "energy practices" on the one side, and changed "cognitive norms" on the other side for supporting the energy transition by supporting a "material culture" in which the newly developed norms can result in (sustainable) energy practice. It is essential for the targeted use of "cracks" in energy cultures to recognise societal developments and trends as early as possible and to understand them as precisely as possible. The "Energy Memory" approach enables the development of such a systematic understanding. It can thus make a decisive contribution to finding socially and politically sustainable decisions that allow the successful implementation of sustainable energy cultures, compatible with the goals set out in the Paris Agreement throughout Europe.

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1. THE ENERGY MEMORIES CONCEPT

1.1. Aim of the report

The ECHOES project aims to understand how and why we make the energy choices that we presently do across Europe. In doing so, ECHOES focuses on three technology areas: electro mobility, smart energy technologies and buildings. The project focuses on these technologies through choices made across three levels: choices we make as individuals, as groups and other informal collectives (e.g. households, neighborhoods, grassroots initiatives), and finally as formalized collectives (e.g. companies, NGOs, parliaments). Hence, ECHOES probes choices across what is often described as the micro-, meso- and macro level of society. As an example, we are as interested what shapes the choices of an individual purchasing an electric vehicle, as we are in the choices of a political system implementing a new support mechanism for distributed renewable energy production and decarbonizing the transport sector. A key goal across the project is to harness knowledge about such choices, through mobilizing different disciplinary and analytical perspectives in order to produce policy relevant advice for the European Commission and its' Member States in its quest to realize the goals of the Energy Union.

Work package five is primarily focused on processes at the meso-level of society, by exploring:

a) the shaping and performance of so-called "energy life styles" across Europe,

b) innovation and transformation through grass roots organization, and

c) through the concept developed in this report: *energy memories*.

Our key assumption within this work package is inspired by a growing body of social scientific literature that explores the transformation of energy consumption patterns, energy production and innovation in the context of what we can call energy cultures (Aune 2007; Stephenson et al., 2010; Aune et al; 2011; Skjølsvold 2012; Ryghaug et al 2018). At its core, this approach recognizes that transforming a society's way of consuming and producing energy cannot be reduced just to a cognitive task, a social task or a technological task. Rather, such transformation requires addressing norms, practices and material aspects in a symmetrical way.

The "Energy Cultures" approach differs between countries. As a simple example, comparative studies highlight that what is understood as "cozy" or "comfortable" in terms of lighting differs between countries. In some countries there is a strong preference for bright, fluorescent light, while people in other countries prefer warmer tones of lighting (Wilhite et al. 1996). The same is true for thermal comfort, and the way people keep warm at home. In some countries, such as Japan, people "*tend to heat only one room in the house or even just the part of the room they occupy*", while the Dutch typically heat the entire building (Kuijer and De Jong 2011). Such differences in what constitutes thermal comfort and what constitutes pleasant lightning, can, with an energy cultures perspective, be interpreted as being shaped by routines and habits, by cognitive and societal norms, and by the material realities of respective systems of provision. As an example, proliferation of hydroelectric power in Norway has been described as a key element constituting a historically 'comfort-oriented' energy culture in Norway (Aune et al. 2016).

Thus, the energy cultures that we study in ECHOES are situated within specific national and local contexts, and are produced by combinations of material elements, norms and habits. However, the energy cultures we study are also situated at a particular temporal location, so to speak. The energy cultures of Spain, Austria, Bulgaria, Norway and Turkey anno 2018 are not the same as the energy cultures we would see if the ECHOES research team travelled back in time to observe these countries in the year 2000 or 1968. Thus, while studies looking at energy cultures often emphasize inertia and stability, there is a need to theorize more clearly the temporal dynamics of change in energy cultures.

Our aim in this report is to contribute to such endeavors through exploring the relationship between the past and the present by focusing on the **role of individual and especially collective energy memories**. Thus, we seek to understand how past experiences within the energy domain are made sense of individually and collectively, and the ways in which they become manifest in contemporary European energy cultures. Through this we hope to gain a better understanding of the dynamics of change and stability in energy cultures.

1.2. The concept's role for understanding European Energy cultures

Given the climatic, environmental and energy-related problems currently faced globally, understanding transformations in energy cultures is arguably one of the key social scientific research challenge of our time. It is well-understood that energy choices, as studied in ECHOES, will be essential to such transformations, because "*Low-carbon transitions […] will involve millions of citizens who need to modify their purchase decisions, user practices, beliefs, cultural conventions, and skills*" (Geels et al. 2017, p. 1243). Studies of such transitions have been rooted in dynamic, multi-level understandings of historical processes for some time (e.g. Geels 2002; Geels and Schot 2007), but such studies on how the past feeds into the present arguably tends to emphasize the importance of technical and economic factors. As Gordon Walker writes about this tradition:

> "*Technological innovation is often centre stage, as are changing patterns of economic activity and productivity, or political processes that move energy-society relations in particular directions. Such explanatory schemes therefore suppose that the orderings of social arrangements (and hence forms of energy/use) are best understood as outcomes of systemic forces and interactions*" (Walker 2014, p. 50)

To a certain extent, this tradition has also been concerned with how particular past events influence development trajectories, through the idea that historical events, such as wars, sudden environmental changes or economic crises might serve as external shocks that open "windows of opportunity" for new kinds of activities (Geels 2002; Koehrsen 2018). As an example, research focusing on the emergence of electro mobility highlights that innovation in this area has increased in the wake of incidents such as world war one and the OPEC oil crisis in the 1970s (Ryghaug and Skjølsvold 2018). Yet, the key characteristic of this social scientific mode of enquiry is arguably rooted in a systemic understanding of societal change, and a common criticism of this work, is that actors, agency and culture is given too little attention (Shove and Walker 2007; Schatzki 2011; Sørensen, Lagesen and Hojem 2018).

The **energy cultures framework** as mobilized in the ECHOES project, on the other hand, has been developed to support interdisciplinary work at the intersection of three key elements: norms, practices and material culture (Stephenson et al 2010; 2015). Norms, within this framework are "*people's expectations and aspirations about their practices and material culture*" (Stephenson et al 2015 p. 119). As an illustration of how one could study norms within households, Stephenson and colleagues write:

> *insights into household norms might be gained from examining their entrenched everyday practices […] the level of service they expect from the use of energy […] and the degree of importance that they would place on having energy-efficient technologies*" (ibid).

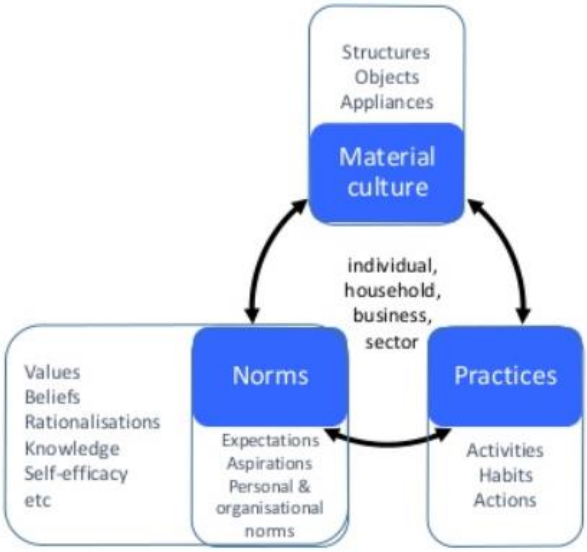

Figure 1: The energy culture framework as developed in Stephenson et al. (2010; 2015)

Material culture, in the energy cultures framework, refers "*the technologies, structures and other assets that play a role in how energy is used*" (Stephenson et al 2015 p. 119). Thus, this might entail objects that are in need of energy to work (e.g. refrigerators), objects that affect energy consumption levels (e.g. insulation) or generate energy (e.g. photovoltaic panels) to give three examples. Practices, within the framework "*span from everyday habitual activities to the less frequent process of choosing and acquiring material objects*" (ibid). In both instances, Stephenson and colleagues highlight that one of the strengths of the framework is that it allows us to see how "*people enact and reproduce a way of life that is consistent with their systems of belief*" (ibid.). Thus, through systematically studying how norms, practices and material culture interact in a specific context such as a neighbourhood, region, nation or company, one can gain insights about how such energy cultures are configured differently through an operationalization of the specific elements that make up such an energy culture.

While we sympathize with the overall ambitions of the energy cultures framework, its focus on forces of stability, entrenchment and reproduction of underlying cultural traits and beliefs, more easily lends itself to the study of stability, than it does to the study of change. Hence, the energy cultures framework, as most other social scientific work on energy, seems to lack some sensitivity to the links between contemporary specificities and historical processes (Sovacool 2014), which means that the understanding of the path leading a society to its contemporary energy culture should be strengthened.

Our introduction of the Energy Memories concept represents a constructive effort to empirically explore the role of the past in feeding into contemporary energy cultures. Through investigating how political, social, cultural, and technological key events of the past may be recognized as key impulses that might resonate in powerful ways in contemporary energy cultures, we will study the relationship between past and present neither as "external shock", nor as one in which we inevitably end up re-producing past cultural expressions. Instead we look at the degree to which past events become parts of contemporary normative, practical and material repertoires through which energy cultures can both stabilize, change and feed into a multitude of contemporary debates and practices.

In doing so, complementary to the energy cultures approach, we were particularly inspired by the **theories on collective memory**, and collective forgetting in a number of publications.

The basic approach of the Memory Concepts says, that societies actively relate to certain events of their past from today's perspective and behaviour. In addition to the psychological perspective, the sociological interest is focussed on the socio-cultural causes, but also the effects of "common memories" of a society (see also Pennebaker 2013, in Uhl 2010).

This is the basic idea behind the pioneering approach of "collective memory" developed by Maurice Halbwachs in the 1920s (Halbwachs 1950). The concept of a "collective memory" according to Halbwachs is based on the assumptions that...

> ...social groups cultivate a memory of their past and need it to preserve their identity. Therefore, above all, what serves the self-image of the social group and its interests is remembered (Erll 2005).
>
> ...collective memory is a construct that in changing socio-political circumstances must always define and "negotiate" anew (Neiger et al. 2011, in: Bosch 2016). According to Halbwachs, this also applies to the individual, who constantly reviews his memories to see to what extent they coincide with today's experiences and perceptions.
>
> ...memories are passed down from generation to generation. This transmission of "memory milieus" takes place primarily orally.
>
> ...memories exist at the level of social groups (family, friends, interest groups,…) and also form a frame of reference for these groups. Individual remembrance is strongly socially conditioned. Halbwachs went so far as to say that the development of an individual memory outside the group context was impossible for members of these groups. Both individual and collective memories are used to strengthen the significance of the group for the individual (Bosch 2016). Collective and individual memories are interdependent (Flatschart 2013)
>
> ....the following types of memory can be distinguished: "autobiographical memory - memory of those events we ourselves experience; historical memory - memory that reaches us only through historical records; history - as the remembered past which is no longer important to our lives; and collective memory - the active past that forms our identities" (Bosch 2016, p.3).

Collective memory is an exploration of a shared identity that unites a social group, be it a family or a nation, whose members nonetheless have different interests and motivations (Confino 1997)

Collective memories are often 'cohort memories', where members of a given cohort affected by a large-scale event will write the event's history and influence the collective memories for future generations (Pennebaker 2013).

Further development of the "collective memory" approach

J. Assmann further developed the Halbwachs approach of collective memory in the 1980s. He introduces the concept of "cultural memory", which brings together practices, rites, symbols, institutions, etc. that serve a society to cultivate its collective knowledge of the past (Assmann,J. 2007, in Flatschart 2013). As Assmann states, the preservation of "collectively shared knowledge", it's "heredity in the culturally institutionalized inheritance of a society", and requires continuous "care".

Starting from the concept of the Halbwachs "memory milieus", he developed the concept of "communicative memory" for the intensive interfamily exchange processes, which encompasses several generations that can still communicate with each other. This interaction constructs memories (Uhl 2010; Flatschart 2013). The limited time horizon available for this "memory building" distinguishes the "communicative" from the general "collective or cultural memory". Of course, a space of tension can arise between "private communicative memory" and "public cultural memory" (Uhl 2010).

A. Assmann introduced the concept of "social memory", which goes beyond families and also encompasses historical generations, saying that generations develop their own generation identity, their own values and needs that shape their memory (Flatschart 2013).

Garde-Hansen distinguishes terminologically between the "collected memory", which she defines as *"the aggregated individual memories of members of a group which can be researched through surveys and oral history collection",* and the "collective memory', which is *the public manifestation as mythology, tradition and heritage" (*Garde-Hansen 2011:38).

The interplay between artifacts, their interpretation and their actual origin, formulated by Confino with reference to Aby Warburg, served as a special inspiration. He stated that although art represents life and needs in its period of origin, a reconstruction of the connection between artificial representation and the actual social experiences and mentalities of that time is necessary for its correct interpretation (Confino 1997). The reference to art may seem inappropriate at first; however, if one expands from artistic artifacts to all those artifacts that play a role for energy-related behavior, the relevance of this bond becomes apparent: Firstly, as shown in several articles, energy related artifacts in a way represent life and needs of their period (Allen 2013; Kennedy 2013; Möllers 2013), which is why they are feasible starting points for discussing developments over time. Secondly, due to the fact that all individuals who live in modern societies inevitably use energy, the connection between energy related artifacts and social experiences and mentalities can even be argued to be closer than in the case of arts, where the dialogue between artwork and larger political and societal contexts is limited by a certain preselection made by the artists.

Connerton assessed the other side of the "memories", namely the question of how and why once established collective memories are forgotten. He distinguishes seven types of forgetting of cultural memory (repressive erasure; prescriptive forgetting; forgetting constitutive for the formation of a new identity; structural amnesia; forgetting as annulment; forgetting as planned obsolescence; forgetting as humiliated silence). Among these types, the "forgetting constitutive for the formation of a new identity" is interesting for our study of Energy memory. The point of this type is to get rid of memories that no longer serve the current situation in society, i.e. the "unlearning" of previous practices that hinder the acceptance of a new "set of memories", and thus also the acceptance of a new identity (including adapted practices). This can be relevant with regard to "de-learning" previous attitudes and practices in the energy sector that can no longer be reconciled with today's requirement for resource-conserving and climate change-conscious behaviour. Similarly, A. Assmann says that what is not anchored in a society's current "functional memory" is collectively forgotten (Assmann, A. 1999)

Another "forgetting approach", namely that of “structural amnesia”, is also relevant for ECHOES’ studies of national energy memories: only aspects which were / are socially important are remembered, others getting filtered out (Connerton 2008). Energy memories may also arise from key events that were not necessarily memorable for energy-related reasons, but always for essential social reasons (e.g. democratization, participation, suppression, loss of trust experiences...) and became a memory.

An essential step in the development of the memories discussion, which revived since the 1980s only, was the work of Nora, who described in his work "Lieux de mémoire" the so-called "sites of memory" of the French nation. He already understood the term "site" broadly and described it as "important cornerstones of a nation's memory", which are not necessarily geographically located (places, works of art, monuments, symbols...)(Nora 1984, in: Flatschart 2013; Uhl 2010). The term "memorial sites" was quickly incorporated into the memory approaches.

Uekötter finally took up Halbwachs’ concept of collective memories and Nora’s concept of “sites of memories” in order to apply them for the first time to questions of environmental awareness. Current environmental attitudes and actions in a society are influenced by past events that created deep impressions and traditions. In his work he examined to what extent collective memories emerged, how they changed, to what extent they are present in today's social groups or societies. Accordingly, the attitude towards environmental issues is not a uniform path that has developed uniformly, but is shaped by "sites of memory", which he defines as follows (Uekötter 2011:1):

> *…Historical events, limited in geographical and chronological respects, ….resonated in history over a longer period of time, producing a multitude of political, administrative, cultural and other consequences that still shape environmental debates and practices in our time”*.

Uekötter's approach is being pursued within ECHOES. The ECHOES Energy Memories concept for the first time applies the “collective memories” focus on the energy theme. The concept thus tries to capture and describe a) historic key impulses and it b) describes energy relevant attitudes, beliefs and practices that developed from that past impulses and may be observed these days, as (society-specific) “background noise”, becoming socialized and part of the cultural practices.

Particular “key” events, often creating “sites of memory” can lastingly influence the public discourse about energy use in the respective country or region, not least because they can be easily discussed. Pennebaker (2013:6) states that “significant historical events form stronger collective memories, and present circumstances affect what events are remembered as significant”. Major catastrophic events, as well as technological breakthroughs, are highly influential, but at the same time they occur only rarely. Examples for this kind of “key events” are, e.g. the nuclear power plant catastrophes of Chernobyl and Fukushima, or formative controversies about energy technologies or plants, e.g. wind parks or hydropower dams. Key impulses can emanate not only from such individual events, but also from events that took place over a limited period of time and were so intense that they shaped the social state and situation in the energy sector. Examples for this kind of “key events” are, e.g., the 1973 oil crisis, or intense political transition periods with strong impact on the energy sector (post-war poverty period 1945-55; political transition in the Eastern European countries in early 1990s; Ukraine crisis starting 2005).

While key impulses may have occurred at the national as well as international level, ECHOES investigates their effect on Energy Memories at the national level of several European countries.

2. METHODOLOGY

ECHOES' research interest in energy memories focuses on collective memory as an important part of the meso-level, where the question of consumer/prosumer behaviour in the energy sector is addressed from a sociological perspective. The main interest is put on the question if social/socio-political or socio-cultural events have created common energy memories in societies and what these memories entail.

Nevertheless, it is interesting to compare individually grown memories with memories collectively recognizable in a society. The latter attempt to grasp the socio-political, economic and media backgrounds against which memories were formed (especially "key events"), and to trace the effects of these collective memories on further social attitudes and behavioural choices in the energy sector. Finally, the question is how these forms of remembering operate as collective representations of the past: *…." how they constitute a range of cultural resources for social and historical identities, and how they privilege particular readings of the past and subordinate others"* (Keightley and Pickering 2013, in: Bosch 2016:2).

As Bosch discusses in her 2016 review of literature, interest in memory studies in the past primarily focused on theoretical considerations and not on methodological questions. Nevertheless, the variety of methodological approaches is greater than it may seem: desk top research with the study of historical sources and contemporary documents, oral history/storytelling, case studies, interviews and surveys are frequently used. Amongst others, oral history/ storytelling is of special interest for the energy memory approach.

Technically, storytelling is more than just a description of what happened; it is a memory construct formed by language and interpretation. Furthermore, literature describes the consideration of "cultural memoryscapes", i.e. *"multiple sites of memory connected by a particular associational logic (e.g. national, ethnic, religious, village, etc.)*" (Keightly and Pickering 2013, in Bosch 2016). With its explicit focus on the question how people reconstruct their social world by choice of words and language, also discourse analysis is useful and sometimes used for memory studies.

In ECHOES, case studies were selected as method for the analysis of national energy memories, based primarily on desk top research with the study of historical sources and contemporary documents. The aim was to identify key events as defined in chapter 1.2 for the respective country and to analyse their relevance for the emergence of energy memories. Guidelines for the selection of "cases" were provided to the partners[1].

Furthermore, a **template for the analysis of the case studies** was provided, which proposed guiding questions for each of the analysis chapters (see Table 1).

The identification of supposed “key” events by the ECHOES partners was usually based on the partners' previous knowledge and team-internal discussions, supplemented by the results of literature research and random, unstructured interviews with individuals of different age, professional background and gender.

[1] The proposed timeframe was key events that happened up to 3 generations ago. This was chosen in order to get sufficient information that is clearly relevant for today’s memories. Additionally, there is a likelihood that discussion participants will have experienced some lasting impressions either themselves or from the parents/grandparent generation.

Analysis chapter	Guiding questions (proposed)
A) The key event(s)	• What was the type of key event: e.g. Technological breakthrough? Catastrophy? Political? other…(see examples provided) • What happened (chronology if possible): actors, actions, immediate effects? • Describe the national societal/political…background framework when the key event happened. How should we understand this key event considering the background of national energy history? • Describe in short main key data of your national energy history (see example Spain below) (e.g. How was the national handling of natural and energy resources? Was the resource situation generally characterized by abundance or scarcity? Has the energy question been linked to an environmental issue? Has energy been perceived as an instrument of power? Was infrastructure incl. energy supply seen as a public service that is made available?) • Describe in brief the national status quo of the three components of "energy culture" at the moment of the key event: materials, norms, practices • Did the key event (e.g. technical innovation) come along with the potential emergence of new cultural values? • Was there a certain level of social dissatisfaction with current practices/material culture at the moment of the key event (e.g. expressed by public protest)?
B) Effects on the national Energy Culture	• Describe the short term effects caused by the key event: • Did the key events affect "factors of stability" in society, such as: legislation, cognitive routines, competences, practices and lifestyles, arrangements, organizations, material, artefacts…. • How was the stability of the prevailing system disturbed? Considering the "energy cultures" approach: where did the effects of the "key event" enter into the system, e.g. driving new behaviour or norms? • How did key events influence the attitude towards energy? • What basic personal/social needs were questioned by the event, so that this event left a deep impression (e. g. security of supply, autonomy...) • Did the key event initiate any struggle between old and new paradigms?
C) The long term effects on the national energy memory	• Is the memory of the key event maintained, cultivated? Is there a cognitive memory culture (e.g. memorials, museums, regular memorial events...)? • Whose interest is it to maintain or forget the key event? • Did this memory change over time? Has it become a "myth"? • Did place identity and place related symbolic meanings play a role in memory building? • To what extent are these memories present in specific groups of the society or in society at large? • To what extent does this key event shape today's energy practices? • What are any concrete long time effects in the areas: technologies, markets, policies, regulations, infrastructures, cultural/symbolical meanings, user preferences and practices? • Is there a lasting effect of this event on the societal discussion of energy today? • To what extent does this key event shape today's attitudes towards energy? (e.g. value of and responsibility for energy: is energy a public good that has to be provided?) • Is there a "national energy identity"(e.g. "Austria, the land of renewable water resources") • Do memories create opportunities or are they more of a hindrance (in the light of today's challenges)

Table 1: Guiding questions for national case studies on energy memories

As a second step, a **discussion group** was organised in each country as a selective supplement to the case studies, but also as a questioning of the perspectives taken up in these case studies. Aim of these discussion groups (1 per country) was twofold: first, to do a rough interim check of the validity of ECHOES' assumptions regarding key events and collective energy memories in the respective society; secondly, to explore what experiences or events had a particular impact on the individual energy behavior of the participant. The gained feedback helped to evaluate, to correct or to complement the interim desktop findings and enabled the research team to finalize the case study report.

Without aiming at national representativeness, the size of the group had to be sufficiently large to cover a mixture of social characteristics, being as representative as possible for the respective region / country. The composition should, ideally, cover a mix in terms of sex, age, socioeconomic status, educational level and kind of occupation. On the other hand, the size of the groups had to be limited to a number where direct interaction of all group members and the facilitator were still possible. Therefore, a minimum size of 8 and a maximum size of 20 persons were proposed. Group discussion is a qualitative method, facilitated by the national ECHOES partners. Recordings / notes of the discussion were taken. In the group discussion, both personal and collective experiences with key events and the attitudes and actions of the participants connected to them were discussed against the background of the interim desk top research results. Guidelines for the group discussion were made available to the partners (Table 2)

It was also suggested that at the end of the discussion, all participants should be invited for a collective ranking of the historic key events according to their importance.

Aim	Guiding questions (proposed)
Get feedback on interim results	• Ask for general feedback and specific feedback on the results of the three main chapters • Check any divergences between participant's perception of concrete events or consequences of these events and the content of your draft: Ask for details and explanations.
Explore personnel and collective perceptions	• In your opinion, what do you think has (had) a particular impact on the energy behaviour of your society? Do you think there are key events that affected future attitudes, behaviour, policies, technologies, measures, etc. in the field of energy across the country? Those mentioned in the draft or other? Give examples of such events and examples of their effects! Which are the effects of such events in the short and long term? *Ask for details and explanations* • Which historical events have shaped your personal energy behaviour over time? Those mentioned in the draft or other? Give examples of such events and examples of their effects on you personally! How did such events affect your energy life in the short and long term? *Ask for details and explanations*

Table 2: Guiding questions for group discussions on energy memories

In practice, all partners then selected the participants of their group discussions using their existing pool of contacts. This had the advantage that sufficient preliminary information about these persons was given and therefore a composition of the groups could take place in the desired mix without having to request extra personal data. One partner also used public announcements (website, posters), but requested prior information about the volunteers. The statements of the persons in the discussion groups were recorded anonymously and not assigned to the individuals. Some partners additionally made them sign a consent form.

In the course of the discussion groups, almost all partners finally deviated from the originally intended intensive "confrontation" of the discussants with interim results, as it was feared that this would lead to a focus on the "key events" selected by ECHOES and that fewer personal experiences and opinions would be expressed. Instead, the introduction to the questions was designed as "gradually" by most partners, e.g. through longer introductory discussion "warm-up" phases or by using thematically stimulating images as starting point. In general, the ECHOES partners kept the process theme-oriented to different degrees, depending on how this was culturally appropriated or depending on the characteristics of the group.

The resulting anonymous audio-transcripts from the group discussions were then analysed against the background of the three analytic chapters defined above (key events and their effects on the national energy culture, and long term effects on the national energy memory). The main findings relevant for the assessment of national energy memories were then contextualized and, where necessary, contrasted with the desktop findings in the sense of an empirical review. The compiled results of the national case studies are presented below.

3. RESULTS FROM NATIONAL CASE STUDIES

3.1. Austria

3.1.1. The key events

The myth of hydropower: Kaprun and Hainburg

Austria, favoured by its geographical situation (Alps, glaciers, abundance of precipitation, orography), is one of the "water castles" of Europe. The awareness of this wealth of resources is anchored both in the population and in the energy industry. Hydropower has always been used in the history of Austria. However, two major power plant projects in the 1950s and 1980s left their mark on the national memory of Austrian society in very different ways and brought about significant social changes:

- The construction of the alpine storage power station KAPRUN in the Hohe Tauern alps
- The prevention of the Danube power plant HAINBURG

Kaprun

"Let us unite all our forces - and our water forces are such a force - for reconstruction!" (Veichtlbauer 2008)

In 1940-1955 a group of storage power plants with an annual capacity of 720 GWh was built in Kaprun. Thus, its construction began during the Second World War under Nazi rule; its completion took place in the "new" Austria after the war. After the war, the financing of Kaprun, which had no longer been secured in the last years of the war, was largely financed by ERP funds ("Marshall Plan"); until 1954. 37% of ERP funds flowed into the development of the electricity industry alone (Wendering 2016).

The construction in the high mountains took place under the most difficult logistical and physical conditions, resulting in several serious accidents and numerous deaths. The period of "reconstruction" of Austria after the war (1950s and 60s) was deliberately given a heroic context relating to the emergence of a new national consciousness. The efforts of large technical structures and heavy industry stood for the joint and deprivation-rich performance of society in reconstruction. "Kaprun" became the moral symbol of the new national community and the performance of the people in building their homeland. It also became a symbol of the successful economic reconstruction of a destroyed country and the economic viability of the nation.

Apart from the Austrian State Treaty, perhaps it was Kaprun who gave the Austrians of 1955 the strongest faith in Austria's future" (Austrian President Kirchschläger, 1980).

Kaprun was anchored in this heroic national symbolism in the media, both in the current reports of cinema newsreels at the time, as well as in textbooks or political speeches. The mythologization of this power plant was able to convey pride and hope for the future to the Austrians, who were defeated and struggled for a new self-image (for decades, however, the role of hundreds of forced laborers in this project was concealed) (Breuss 2004). Characteristic of Kaprun's important symbolic role was the “war rhetoric”, still familiar to the ears of the population at that time, with which this project was reported: it was about a "fight" against an apparently

overpowering "enemy", about fellow fates who sacrificed themselves for a higher goal and became "heroes" as victims (Rathkolb 2012).

In this role Kaprun was immortalized in the memory of the generations that experienced the 50s and 60s of the 20th century.

The massive intervention in the natural environment that happened in favour of energy was not perceived a "destruction of nature" by the population, although the beauty of the Austrian landscape was another central pillar of the national identity foundation in the post-war period. The Alps and the Danube - along which other hydropower plants were built - played a particularly important role here, embodying home and security. The economic use of water as a resource and the protection of nature were not seen as antagonisms by society. The promotion of Kaprun has always been associated with impressive landscape shots, because "hydropower plants combined beautiful Austrian natural basis and economic success for the future" (Rathkolb 2012; Wendering 2016). National electrification and the construction of large power plants were understood as a natural part of the economic upswing and industrialisation process, for which nature would not be destroyed, but rather "improved" in its effect (not least for the second main economic pillar, tourism (Veichtlbauer 2008).

From an energy perspective, Kaprun stood for unlimited growth and progress and is a first prime example of the technological euphoria of the post-war era. Between 1937 and 1960, electricity generation from hydropower in Austria increased by 500% (Rathkolb 2012). In the population Kaprun stood for cohesion and sacrifice in a time of scarcity and for the economic overcoming of this scarcity for the upswing.

Hainburg

Under the impression of recurrent oil price shocks and after the decision not to build any nuclear power plants in Austria, the Austrian energy industry again stepped up its efforts to build coal-fired power plants and above all to expand the hydropower plant chain on the Danube, arguing that it would secure energy supplies and jobs (Wendering 2016).

In addition to the 12 400 GWh capacity of the existing Danube power plants, a new power plant should deliver 2075 GWh/year (In 1980, the total domestic electricity production was about 36 000 GWh, of which 27000 GWh by hydropower). Donaukraftwerke AG (DoKW), then the largest Austrian energy provider, announced plans in 1982 to build another power plant near Hainburg, Lower Austria (30 km downstream from Vienna). The decision to locate in Hainburg was made in 1983 and operations were to start in 1987. According to the operators, the advantages of this power plant, in addition to energy production, would have been an increase in the groundwater level for the adjacent intensive agricultural zone as well as a slowdown in the deepening of the river and flood protection (Kuchler 2012c).

Local citizens' initiatives against the power plant had already been formed years before. Opponents of the project stressed that international nature protection agreements (e.g. the Convention on Wetlands, called the *Ramsar Convention*) would be broken. The power plant would have destroyed 7 km^2 of protected floodplain forest, interrupted hydrological and ecological bridges and required massive earth movements. WWF International supported the protest.

The project was declared "preferred hydraulic engineering" by the Water Authority on the basis of public interest, which e.g. meant that the procedure was shortened and there was hardly any possibility of appeal by those affected. The procedure for issuing this decision was described by opponents as illegal (Strohmeier 2004).

Celebrities, including a Nobel Prize winner, took a stand against the construction of the power plant, and reporting in media increased. The first protests took place in 1984 and signatures were collected for the submission of a referendum. An actionist "animal press conference" demonstrated that personalities from all parties - including the ruling parties - supported the protest and received strong media coverage. At the same time, the workers union mobilized to protest marches in favor of the power plant. By autumn 1984, the protest movement had grown into an association of very different groups of the political spectrum, nature conservation NGOs and the Austrian student body.

In December 1984, the approval procedure was completed and grubbing-up began in the floodplain. The student body called for a star march to the floodplain, and 8000 people followed. The media reported continuously and on a daily basis. Protesters stormed a popular German-Austrian television show to draw attention to their concerns.

After the police closed the access to the floodplain, the demonstrators set up a winter camp with tents and barricades in the floodplain. The police received an eviction order and on Dec 19th 1984, 800 policemen with truncheons competed against 3000 occupants. The confrontation ended with several casualties. People chained themselves to trees. Under police protection, the forest workers tried to continue the felling. The resistance could only have been broken with the use of firearms. Unions threatened to send workers' troops to evict (Strohmeier2004).

Austria's largest print medium titled "*The shame of Hainburg*". This police operation and the reporting of a civil war-like scenario were decisive for public perception and identification with the case. In Vienna, 40,000 people protested against police violence against non-violent demonstrators[2].

The government was under massive pressure and announced a stop to the clearing and a pause for reflection over Christmas. Landowners lodged a complaint against the water law decision. In January 1985, the Administrative Court stopped the grubbing-up until the end of the ongoing appeal proceedings. As a result, the occupation was ended.

In March 1985, 350000 Austrians signed the referendum against the power plant and for the establishment of a national park. Shortly thereafter, an ecological commission was set up and later a feasibility study for a national park was commissioned. The water law decision was actually annulled by the Administrative Court in July 1985, so construction was no longer permitted (Veichtlbauer 2008).

The Hainburg power plant project deeply divided Austria. The front ran through all parties, social groups, even across the various nature conservation organisations. It is important to note that this key event took place at a time when the dying of forests in Europe caused a high public awareness of tree protection ("Brother Tree" initiatives). The killing of trees was a central argument in the fight against the project (headline "the battle of the trees") (Wendering 2016).

Another key message of this event was: "Uprising against the electricity industry, which knows only concrete" (Kuchler 2012c) and, associated with this, revolt against outdated patterns of thought and for democratic action.

[2] Besetzung der Hainburger Au. Wikipedia: https://de.wikipedia.org/wiki/Besetzung_der_Hainburger_Au (15.5.2018)

Hainburg was above all also a demonstration of the central power of the media in influencing the general population and in putting pressure on the government. Power plant opponents were given more and more space in the media and shone with professional performances. Although the power plant operating company had also run an information campaign, it had no chance against the media.

The Anti- Nuclear Power decision: Zwentendorf and Chernobyl cases

Zwentendorf

Austria started late on the question of the use of nuclear energy after the Second World War due to prohibitions by the victorious powers (Kuchler 2012a). In 1956 the Austrian Society for the Study of Nuclear Energy was founded, which also operated a first research reactor.

Nuclear power was considered an ingenious and modern development to which Austria wanted to connect. Due to the oil price shock in the 1970s, an expansion of domestic energy production was considered inevitable, as the end of the feasible expansion of hydropower was already predicted by 1980, as was a shortage or dependency on coal abroad. Electricity consumption in Austria rose by approximately 15% annually in 1946-52. It was assumed that nuclear energy would be highly economical and available indefinitely (Kuchler 2012a; Wendering 2016).The competitive situation between nuclear power and hydropower was the subject of fierce debate among experts, since both energy sources cover the base load, not the peak load in electricity demand (Kuchler 2012e).

In 1967 the government decided to build a nuclear power plant, which was to be followed by others. The regional population was initially positive. In 1969, a Radiation Protection Act was passed which did not provide for party status and the possibility for citizens to appeal. In a climate of great unity between the old and new governments, construction began in 1971 (Rathkolb 2012).

The questioning of nuclear energy in Austria initially began in the course of the emerging international resistance movement. The mood among the population has not been surveyed for a long time by the government. Local protests began in 1972 (Strohmeier 2004).

Construction continued although the final disposal of the waste had not been clarified.

In 1976, as the opponents formed, the political pressure to justify Zwentendorf increased. An awareness-raising campaign was launched. Despite the government's information campaign and the involvement of experts, public concern increased. Opponents also split off within the ruling party. The debate focused on the unresolved question of geological repositories. When a confidential site report on potential final storage sites became public knowledge, the parties split on the nuclear issue. The discussion became a party-political question and a question of the Chancellor's future.

When the protests increased in 1977, the government refused to engage in dialogue, the Chancellor stated on TV: "*I will not be terrorized by a few rascals"* (APA, 26.10.1977). In media confrontations with opponents of the nuclear power plant, the government's experts were perceived as arrogant (Strohmeier 2004). In view of the increasing debate also in the media, the government declared in 1977 that there would be no operating permit without a site for the final repository. The search for a repository - also abroad - was negative; therefore the depot of the fuel elements should first be used as an interim storage facility.

The protest movement had already organised itself in 1976. The umbrella association *"Nein zu Zwentendorf"* was chaired by a popular geologist in 1978. The groups under this roof came from different camps such as nature conservation groups, doctors, and the peace movement, left-wing and conservative groups, including groups hostile to technology. Also on the side of the opponents, technical experts had their say, who were increasingly offered a stage by the media.

Finally, a referendum was announced by the government and a clear victory was expected. The referendum was held on 5.11.1978 and resulted in a close NO to Zwentendorf with 50.47% against 49.33% of the votes.

This event is considered a milestone in the emergence of an Austrian environmental movement. At Zwentendorf, the vote was not only on nuclear power, but also on the (among other things energy policy and democracy policy) course of the Kreisky government. The concerns of parts of the population were ignored in the government's arguments, and for a long time the information of the population was perceived as completely inadequate (Strohmeier 2004). The rejection of nuclear power was socially linked to the rejection of big business and the call for participation (Kuchler 2012d).

Chernobyl

On 26 April 1986, the reactor in the Russian Chernobyl exploded and released highly radioactive particles. The information policy on this accident was inadequate, so that the radiation hit large parts of Europe unprepared. The released radioactive cloud first moved over Scandinavia, then south towards the Alps due to the weather. Due to intensive precipitation, the particles were strongly washed out over Austria from the end of April. The radiation was released in Austria for 10 days, and 150,000 km^2 were acutely irradiated. Austria was one of the most heavily contaminated areas, alongside Ukraine and Belarus (Kuchler 2012b).

Austria was hit more or less unprepared. Contingency plans were drawn up hastily and provisional protective measures were taken/ recommended: The sandboxes of the children's playgrounds were emptied, small children should no longer play outdoors and drink no more milk, and outdoor vegetables should no longer be consumed, and so on. The population was in panic, the information on the level of stress and the effect of protective measures was insufficient. Iodine tablets, dust masks and Geiger counters were hoarded.

"This insecurity, we didn't get any nutritional information... I remember well: don't eat currants!"

"We kids, who were playing outside were brought in, and the uncle was out somewhere and we couldn't reach him."

"...we learned everything in retrospect; piece by piece it was admitted"

"...I don't want to know how many times that happened"

"I only know from stories what the family experienced back then, but that's relevant to the next generation too, you have to learn from it."[3]

[3] Quotations from participants of the discussion group

This accident strengthened and finally confirmed the anti-nuclear position in Austria. Even the last vehement proponents of nuclear power in politics now changed their position. Zwentendorf had now died a second time, this time finally.

3.1.2. Effects on the national energy culture

The Kaprun and Hainburg cases

KAPRUN was completed in 1955, but its myth was cultivated until the 1970s. While during the construction phase and immediately afterwards, the glory of Kaprun was subject of newsreels and newspaper reports, Kaprun was immortalized more permanently in publications and above all in textbooks and thus in the collective memory of future generations. Kaprun was the prime example for the reconstruction of Austria, for the viability of the republic and for domestic electricity supply by domestic hydropower. Kaprun also played a role in films and novels, in which the confrontation of denial of technology and progress, nature and technology was mostly the subject of discussion.

It was not until the late 1970s that other events - not connected with energy - replaced Kaprun as a "place of remembrance" for social performance in Austria. Towards the turn of the millennium, technical innovation in the energy sector no longer played a decisive role in the identity of Austrians.

In the post-war period until the mid-1950s, there was an extremely high need to catch up in terms of electrification, which was also seen as a sign of modernization. Power plants were the symbol of this modernization, which was regarded as the longed-for connection to the rest of the world. During this period, the aim at the societal level was to strengthen the economy - which was equated with society - through performance and personal renunciation (also with regard to energy supply). Due to energy poverty, “saving energy” was the order of the first decade after the war, which was internalized by the population in favor of the higher whole (Breuss 2004).

The subsequent rapid growth of the Austrian economy was mainly due to construction, industry and the energy sector. While energy consumption increased by 250% between 1937 and 1959, domestic electricity production increased sevenfold over the same period[4].

Not only the will to catch up, but the vision of turning Austria into an electricity exporting country, above all thanks to hydropower, was anchored in society's consciousness. After energy production had multiplied in a few years - mainly due to the use of hydropower - and the economic situation of the population had also improved, an increase in energy consumption was promoted as "modern" within the population in order to increase sales of energy and electrical products. The so-called "electrical appliances campaign" of the late 1950s had a significant impact on the electrification of households with appliances. Electricity was cheap and available in surplus - this now shaped the energy behaviour of the population.

[4] Geschichte der Elektrizitätswirtschaft in Österreich. https://de.wikipedia.org/wiki/Elektrizit%C3%A4tswirtschaft_in_%C3%96sterreich#Geschichte (15.5.2018).

HAINBURG was the first great civil disobedience in Austria to prove successful and effective for the public. As the second major basic democratic event (after *Zwentendorf*), both in the energy sector, Hainburg made the Austrians aware of the principle of direct democracy[5].

The key event Hainburg led to the founding of the Green Party, and subsequently to its entry into parliament in 1986, after the Austrian environmental movement had already preformed in the anti-nuclear protest movement, and generally since the early 1980s, as the discussion about alternative energy sources began[6] . Only Hainburg led to the decisive breakthrough and degree of organisation of the environmental movement (Wendering 2016), which led to further institutionalisation alongside the Green Party (Kuchler 2012c).

The Anti- Nuclear Power decision – Zwentendorf

After a referendum in November 1978, all work on the Zwentendorf reactor was stopped and the National Council passed the Nuclear Ban Act in December 1978.

The major parties agreed that a new referendum on the commissioning of Zwentendorf would not be ruled out in the future, but could only be decided by a 2/3 majority in parliament. Conservation of the reactor was decided in 1980. In the years that followed, attempts were made time and again to address the issue of commissioning in political debates. However, the reactor accident at Three Miles Island (USA) in 1979 showed the vulnerability and the dangers and costs arising from a serious incident (Kuchler 2012e). As a replacement for Zwentendorf, several coal-fired power plants were finally built, and hydroelectric power was also stepped up again[7]

After the Chernobyl disaster, Austria's own attitude towards nuclear power was seen as confirmed. Austria included the ban on nuclear power in its constitution in 1999 (Wendering 2016).

"Environment" had now changed from a marginal topic to a societal topic in Austria. From 1979, important international environmental NGOs such as Greenpeace, WWF and Global 2000 established a headquarters in Austria (Strohmeier 2004). The criticism of the environmental movement was directed not only against nuclear energy, but increasingly also against economic shortcomings in the electricity industry. The electricity industry put public pressure on the construction of new power plants, even though there were still large capacity reserves. Domestic hydropower, which is regarded as "safe", experienced an image boost in the public eye (Winkler-Rieder 1997).

As a result, Austria's government, but also NGOs, began to engage internationally against nuclear power plants in its riparian states.

[5] Besetzung der Hainburger Au. Wikipedia: https://de.wikipedia.org/wiki/Besetzung_der_Hainburger_Au (15.5.2018)

[6] Geschichte der Elektrizitätswirtschaft in Österreich. https://de.wikipedia.org/wiki/Elektrizit%C3%A4tswirtschaft_in_%C3%96sterreich#Geschichte (15.5.2018).

[7] Geschichte der Elektrizitätswirtschaft in Österreich. https://de.wikipedia.org/wiki/Elektrizit%C3%A4tswirtschaft_in_%C3%96sterreich#Geschichte (15.5.2018).

3.1.3. The long term effects on the national energy memory

The Kaprun and Hainburg cases

Hydropower plants in Austria have become collective memorials of great political, technological and social upheavals. They represent the respective socio-ecological regimes, which not only enabled certain practices, uses and appropriations of nature but also suspended others (Veichtlbauer 2008, in Wendering 2016).

Just as Kaprun, the place of remembrance became a symbol of Austria's years of economic reconstruction and its reconnection to the modern world (Strohmeier 2004), Hainburg became the landmark of Austria's understanding of democracy and the turn of energy policy (Wendering 2016).

Hydropower projects have been and continue to be deeply symbolic issues between environmental and economic interests (Haberl 1997 in Veichtlbauer 2008). Hainburg became a symbolically strongly charged, central place of remembrance and can be understood as the "turning point" of Austrian environmental awareness in the sense of Uekötter.

"...ice-cold, the way people were treated"

"there was no experience in dealing with protesters back then."

"there's nowhere left to build hydroelectric power plants, there's always someone against it."[8]

Hainburg triggered the following developments in the Austrian society in the medium term (Veichtlbauer 2008):

(i) A paradigm shift in the relationship between energy production and nature; Hainburg made it clear to society that hydropower as a resource cannot be used to its full potential in terms of energy and comes into conflict with other public interests such as nature conservation, recreation and tourism. The new image was now that of a nature at risk of degenerating into an industrial landscape; this image replaced the earlier one of a "tamed and improved nature" through technology (Schmid and Veichtlbauer 2006, in Wendering 2016).

(ii) a new understanding of representative democracy: Since then, citizens' initiatives have been formed linked to larger construction projects, landscape occupations have also taken place again (Kuchler 2012d) and

(iii) the general questioning of the centralist planning and decision-making monopoly, also known as the "Government of Engineers". Hainburg marked the end of the great era of hydropower expansion, increasingly complex processes and the liberalisation of the energy industry made major projects uneconomical (Kuchler 2012b; Strohmeier 2004).

[8] Quotations from participants of the discussion group

Only 5 years after Zwentendorf, Hainburg became the second great success of the ecology movement, since then ecology has been a serious topic in Austria. In 1984, the year of the Hainburg occupation, environmental protection was granted constitutional status in Austria (Kuchler 2012d).

The change in values had begun in the 1970s, but it was in Hainburg that large sections of society stood behind the protest against environmental destruction and the prevailing system of thought (Schmid and Veichtlbauer 2006, in Wendering 2016). The medialization of Hainburg had also had a strong effect on those broad population groups that were not personally affected, and this "social attention" continues to exist today (Kuchler 2012c).

To this day, three decades after the event, the Austrian media are still active in the cultivation of memory by discussing the significance of the event for society and its institutions and parties (usually on the occasion of anniversaries).

The WWF used this memory site to support its demand for the "Danube Floodplain National Park". 5 years after the event, over 100,000 people, promoted by the WWF, bought a large piece of land for the planned national park. Subsequently, politicians moved into the floodplain and announced their support for a park's priority over power plants. The park was finally created in 1996, and any lobbying for the park had made intensive use of Hainburg's memory site for 10 years. This site of memory is not only an abstract, but also a materially concrete place, to which excursions have been carried out by nature conservation organisations, but also political institutions since then. (Strohmeier 2004).

Furthermore, Hainburg - in continuation of Zwentendorf - was a further step towards the social institutionalisation of the environmental movement in Austria. The following important institutional innovations in environmental and energy policy took place in Austria in the second half of the 1980s:

- The Austrian Electricity Industry Act and Energy Promotion Act have been amended to include requirements of the referendum (concerning social and ecological compatibility).
- Foundation of the Federal Environmental Agency
- Extension of the competences of the existing Ministry of the Environment
- Establishment of "environmental lawyers" in the provinces in the aim to defense environmental interests in planning procedures.
- Introduction of the EIA Environmental Impact Assessment 1993 for planning processes. Since 2001, the more comprehensive SEA (strategic environmental assessment) has been introduced (Wendering 2016)

Hainburg became a site of memory for the "myth of the birth of the Green Party", which then entered parliament in 1986. A myth that the party still cultivates today, for Hainburg has become part of its identity (Kuchler 2012c).

For several years Hainburg remained a negatively connotated memorial for power plant operators and trade unions, but over the years, like all other Austrian institutions, they have recognised the "environmental idea" in their programmes and strategies (Strohmeier 2004).

Figure 2 The Hainburg floodplain.

Picture under creative commons licence. © Alexander Russy: Donau/Danube, Austria[9].

The Anti- Nuclear Power decision: Zwentendorf and Chernobyl cases

"Austria is politically and socially opposed to nuclear power"

"If more became public, people would be even more against nuclear power."

"Chernobyl was the confirmation of our position against nuclear power."

"But people don't get smarter" [10]

Chernobyl finally transformed Austria into an "anti-nuclear power nation" and continues to raise people's awareness of nuclear power today (Kuchler 2012b).

The memory of Zwentendorf, like that of Chernobyl, belongs to the "self-evident memory" of Austria's "educated class". This basic experience and the resulting attitude of society became apparent in later disputes on the subject, e.g. nuclear power plants in neighbouring countries (Strohmeier 2004).

[9] *https://www.flickr.com/photos/alexanderferdinand/26707349655/in/photolist-GG39zM-Gio9p5-dTbKy5-m4qKQT-fVD6rx-g32DG2-gV8DnQ-gV8ERG-gsZSm4-XKViZJ-zFFv9K-YvyBbw-m12cUx-g52AHq-Y4jA7S-dRfCd3-KUHyjK-dSYjjF-dSBFsp-dRSqBA-dS5X7Z-ge6Bvp-XswvJA-dR8tQs-fYLHDD-ncg73Q-X6aqP5-fZwXYo-fTgsYW-gbgkPn-M5NwLQ-mdKLiq-gufjxR-dQDKtT-fUo4qA-zGebAw-dRCRPv-gj1VL5-gq2NDk-Y4jAnb-X7qzcR-Y8vSvx-fXbiUi-c1vJhu-e6rHhC-Y4jAHm-ysEip9-yvsTpA-zuScxo-gxxLW1*

[10] Quotations from participants of the discussion group

Zwentendorf is still a place of remembrance for the history and the population of the Second Republic. The power plant, which never went into operation, became a museum, spare parts warehouse and party location (Kuchler 2012d).

Zwentendorf became a site of memory especially for those social groups that played an important role in the discussion about the power plant (parties, interest groups, nature conservation groups,...)(Strohmeier 2004). The importance of this site of memory was confirmed and reinforced by the Chernobyl reactor accident in April 1986. Zwentendorf is still used today as a memorial of collective self-confidence, as it became a symbol of successful resistance to the nuclear lobby, including the authority of the government, which did not respond to developments in the population. In the power plant itself, the set-up museum cultivates this memory.

Figure 3: Zwentendorf Nuclear power station today.

Picture under creative commons licence. © Oliver Lindberg: Bärndorfer Hütte at nuclear power station Zwentendorf[11].

3.1.4. Discussion and conclusions

[11] *https://www.flickr.com/photos/dotnet/3641059355/in/photolist-6xKo6r-daVqFQ-9bnBfN-9bjscX-9bnAQN-9bjsJK-daVrDf-fysLmP-6HDktU-85YkzR-6HDkZy-daVExK-9bnzFu-6Hzmhe-daVtB4-9bnAp9-9bnzWs-fysMuD-9bnAhW-daVHpK-daVsx6-6HDcDW-6HzQXF-6HDopC-GNxPjU-GNxRQq-TxrRYK-6HDuLm-GNxSQS-a4pXks-6HDiJA-6HDdXj-daVszm-6HDfqu-daVpNu-6HDdij-daVrzK-o7QwSK-daVEEY-daVDRm-daVFux-9bnAGS-6HDp6q-GNxUp3-6HDpBS-5F3cX6-6HDjjm-daVDDD-862vjN-GTN1VL*

"The Austrian is lazy and unwilling to change"

"As long as we can afford our behaviour, we'll do it - Austria is doing well"

"Energy behavior is interplay between comfort and idealism."[12]

In the group discussion on "energy memories", which was conducted in addition to these case studies, we were able to record the following aspects of "personal key events":

There was consensus on Zwentendorf/Chernobyl as a shaping memory for the whole of Austria and for the further attitude of the population towards nuclear power and energy supply. The topicality of this attitude was confirmed by the accident at Fukushima. These key events are particularly strongly present due to the personal concern of every single Austrian living at the time.

The key events Zwentendorf/Chernobyl and Hainburg left their mark on the personal energy memory of the discussion participants in three main respects: on the one hand, the recognition that the population was never sufficiently informed about major energy projects, and therefore could not trust authorities. Furthermore, the experience of how protests were dealt with and what the consequences were. Thirdly, the recognition that hydropower is also associated with negative aspects, but that decisions must be taken in the quest for clean energy (the Mur power plant near Graz, which is currently under construction and controversial in Austria, was cited as an example). There was a consensus on PV technology as an environmentally friendly alternative.

As for the further energy behaviour of the participants, continuous experiences (see role models below) and certain framework conditions that promote efficient or low-emission energy behaviour seem to be more important than key personal events. These include financial incentives, especially through savings, opening new or securing old conveniences, recognizing personal benefits of change and personal ecological attitudes ("leaving living earth behind", using things for as long as possible).

Role models and how their behaviour in the field of energy influenced the own attitude, were mentioned in different ways: (i) the parental home, that was perceived as either an energy waster/or energy sparing role model/ or shaped by - emotionally positively experienced - post-war energy poverty; (ii) neighbour, energy wasting as a result of post-war experiences.

Specifically, the participants self-assessed the relevance of different factors (previously collected by the group) for their personal energy behaviour by assigning 3 votes per individual. The result is shown in the table below, whereby the cost aspect and the hazard aspect (= hazard potential of the energy source, e.g. share of imported nuclear power) strongly dominated.

Austria's self-image in the environmental and energy sector is that of a society that relies on an environmentally conscious energy supply, that is free of nuclear power and (meanwhile becoming important) low emission, and a society that is aware of its nature/ landscape treasure (which is still also a collective identity component) (Strohmeier 2004).

On the occasion of current major hydraulic engineering projects (e.g. Mur power plant near Graz) the confrontation of these identity elements is revived, whereby the socio-economic perspectives and the democratic-

[12] Quotations from participants of the discussion group

political criticism discussed in the case studies are revealed again ("Large Power Plant/Large Operator versus Nature Conservation/Simple Citizen ").

Factor	Votes
Costs	7
Risks	6
Convenience	4
Idealism	3
Reward	3
Utility/Purpose	2
Prestige	1
Responsibility	1
Habit	1
Conscience	1
Being a role model	1
Being a negative example	0

Table 3: Self-assessment of energy behaviour factors by Austrian discussion group members

Each of the key events described (Kaprun, Hainburg, Zwentendorf, and Chernobyl) was concerned not only with the primary topic but also with the question of "energy supply" in Austrian society: What did it mean for Austria's energy supply that this power plant (did not) go into operation or that this technology was (not) used? The discussion of these events at the time included arguments on this issue from different stakeholder perspectives.

National autonomy in the energy sector has always been a strong motive at these key events. Independence was sought at Kaprun and marketed in the media as "proof of oneself", independence was also the central lesson from the oil price shock of 1974, which then finally gave the impetus towards nuclear power, independence was and still is the main argument for domestic hydropower, alongside the issue of emissions.

Key events in the field of energy are obviously a formative memory when they are linked to one's own autobiography or to the biography of a social group of which one is a member, because they are linked to concrete memories within the "collective memory". In the other case, the key events can be cognitively present, but are not perceived as essential for the own person. From the point of view of the society as a whole, however, they were milestones of attitude (change) and have left their long-term traces through institutionalization.

3.2. Bulgaria

3.2.1. The key events

The daily planned interruptions in electricity supply (so-called electricity schedule) in mid-1980s and early 1990s as well as the rise of the electricity prices in 2013 were the key events with a significant impact on the energy memory of the participants in the ECHOES discussion panel in Sofia in December 2017.
These were part of a complex chain of events in Bulgaria during the over 30-year long period between 1984 and 2017, which influenced societal life and value systems in general, and energy culture and behaviour in particular. The period covers the last five years of socialism, the first decade after the political changes in 1989, the preparation of the country for the EU accession and the 10 years of EU membership of the country. The functional difficulties of the *Council for Mutual Economic Assistance (CMEA),* directly influenced everyday life at the national level in the period 1985-1990; the transition after that to liberal democracy and to market-oriented economy brought about social and political instability; the deindustrialization caused large-scale structural unemployment; the restitution and privatization of the major national assets provided new opportunities, which were differently taken by various groups and individuals and that was the reason for a persistent general feeling of social injustice. The critical situations in the energy field were related to the planning and management of energy generation and distribution but also to the difficult access to energy for large social groups; these led to abrupt changes in life standards, everyday behaviour patterns and value systems.

The national energy system of Bulgaria built up until mid-1980s was state-owned, centrally managed and based on conventional energy sources (fossil fuels – local coal, imported oil); the electrification of all the settlements, was accomplished till early 1960s; district heating was established in Sofia and in the largest cities and particularly relied upon in the newly built large housing estates there; a nuclear power plant (NPP) by the town of *Kozloduy* was set into operation in 1974 and provided for meeting the rising energy demand of both industry and domestic consumers; a relatively high share of energy based on renewables was achieved through the hydropower stations built in the 1970s.

The political instability since mid-1980s, the societal changes of 1989 and the economic restructuring during the next decades had a prolonged negative effect on the energy system. Throughout the whole 30-year period energy transition was structurally blocked by monopolism and protectionism, which complicated the functioning of the conventional energy system and a deepened the indebtedness at the national level. The political concept of early 1990s for shifting governance responsibilities from the national to the regional and local level was hampered by the lack of institutional and expert capacity in the energy field at these levels. At the micro level there was no significant evidence of entrepreneurship for introducing and spreading innovations due to many constraints at the political and administrative level. Some initial efforts for addressing energy management at the municipal level were undertaken in late 1990s through the partnership of a newly established specialized national NGO with national and international organizations and with a Bulgarian municipality; that was motivated by the extremely difficult living conditions in the housing estates and the lack of financial resource in the municipalities for covering the energy bills of the public buildings (kindergartens, schools, hospitals, administrative buildings, etc.). A successful application to the Global Environmental Facility (GEF) provided international funding and methodological support for developing a demonstration zone and a training programme for municipal experts. The process had further important spin off effects in the long term – the sharing of practical experience among the involved active municipalities started the national municipal network EcoEnergy; an increasing number of municipalities demonstrated growing motivation and self-confidence in searching international contacts and partnership; initiatives of self-organization at the micro level were also visible - groups of individuals and households started searching for ways to increase the energy efficiency of their homes and to switch to energy autonomous lifestyles even under unfavourable material and normative context.

Periodization of the energy related processes in Bulgaria (1984-2017)

Four periods could be outlined within the 30 year long time span with regard to the energy memory in Bulgaria: (i) mid 1984 - 1989; (ii) 1989 - 1999; (iii) 2000-2006; (iv) 2007 - 2017.

The **first period** (1984 - 1989) coincided with the so-called *Perestroika* in the Soviet Union, which influenced the whole Eastern Block and Bulgaria in particular both politically and economically and changed the resource exchange pattern. The period between 1974, when the first and only nuclear power plant (NPP) of Bulgaria entered into operation, and 1984, when the *Perestrojka* (Restructuring) processes started in the Soviet Union, had been characterized by growing energy supply in the country and a growing energy demand in parallel. The support provided by the USSR in the energy field had comprised not only funding and expert contribution in building the first and still the only one nuclear power station in Bulgaria by the Danube River, but also the import of cheap crude oil (partially re-sold to other countries), gas, and coal, etc. The changing energy policy of the Soviet Union and the reduced energy supply to Bulgaria in the years 1984-1985 resulted in abrupt changes in the previously substantial energy support - the imported energy quantities were considerably reduced and later on re-negotiated at higher prices. Bulgarian government attempted to provide foreign currency inflow through the sale of electricity to neighbouring countries; that unluckily coincided with unfavourable climatic conditions and with breakdowns of the energy distribution infrastructure; all these finally resulted in a large-scale energy crisis during the winter of 1984-1985; an '**electricity schedule'** (3 hours with and 3 without electricity) was introduced in all the larger cities of the country alongside limitations on energy consumption.

The **second period** (1989 to 1999) was related to the so called "period of transition" from socialism to democracy and from centrally planned to market economy in the country. There was enormous societal tension and opposition between different social groups. Numerous hardly coordinated legislation changes (starting from the national Constitution) were undertaken within a short period of time and influenced all aspects of life. The restitution of large urban property had a particularly negative effect in the large prefabricated housing estates once built on nationalized rural land at the urban fringes. The national economy was in a debt crisis and at the edge of collapse; state enterprises were closing down, most of them with restored ownership of previous owners or privatized in non-transparent way; agricultural cooperatives throughout the country were liquidated. Alongside other market-oriented reforms after that, some of the major power and petrochemical plants in the country were privatized and passed to Western (US) and Eastern (Russian) companies. Some of the key privatization actions in the focus of political and economic attention were linked to energy-related assets such as coal extraction, energy production and energy distribution.

Due to strategic reasons (export of electricity ensuring energy independence on national level) but also secure electricity provision, the national infrastructure was expanding. Two new blocks of *Kozloduy* NPP (planned in the previous decade, 1000 megawatts each) were set into operation; it gave additional confidence to nuclear energy supporters in promising 'clean energy' at a low price.

A broadly visible continuous deficit of goods and energy was observed in the meantime; a petrol crisis developed alongside the food crisis in 1990 and 1991. On January 1st. 1991, the Council for Mutual Economic Assistance cancelled the common currency for its member countries and Soviet oil and gas supplies had to be paid in hard currency, which was not available in Bulgaria. The **electricity schedule** was re-introduced in 1991 and 1992, because of electricity export to Greece and Turkey (aimed at providing needed foreign/ western currency). With almost no oil and gas supply Bulgarian economy was paralyzed in the winter of 1991. Another severe political and economic crisis followed in late 1996.

The **third period** (2000-2006) started with the official opening of the negotiations for Bulgaria's accession to the European Union and ended with their finalization with the relevant engagements taken by Bulgaria. The

Intergovernmental Conference on the Accession of the Republic of Bulgaria to the European Union started in 2001 and the Key Negotiating Chapter No 14 "Energy" was opened up; many important changes in the energy field were negotiated and introduced during the next years. Although Bulgaria ranked at a top position for energy 'cheapness' in Europe, it also had a considerable share of 'energy poor' consumers (NSI, 2008, cited in CDS, 2010). A series of new legislative acts, regulating energy price and dealing with other energy related issues, were adopted by Parliament (including transposition of EU law). The period also witnessed the closing down of the two oldest energy blocks of *Kozloduy* NPP in 2004 as negotiated with the EU. Electric utilities as well as medium and small scale cogeneration plants with district heating services were privatized.

The beginning of the **fourth period** (2007-2017) was marked by the accession of Bulgaria to the EU; receiving European funding support helped in mitigating the effects of the global financial crisis and the European debt crisis; the fight against corruption and for promoting the independence of the judicial system came to the focus of public attention and motivated joint citizens' action.

There was a considerable effort at all levels in the country in that period aimed at improving energy efficiency (EE). Municipal networking and international networking supported through EC programmes enabled a broad range of activities, e.g. the MODEL project (2007-2010) coordinated by Energy Cities, successfully addressed several topics: (a) the development and implementation of Municipal Energy Programs and annual Action Plans in the pilot municipalities (aimed at minimum 10% energy consumption reduction in the municipal sites), so that they could provide a policy model for other municipalities; (b) the promotion of activities for strengthening knowledge and skills and for drawing public attention to possible action in the energy efficiency field; (c) the establishment and strengthening the Energy Management Units (EMUs) in the pilot municipalities; (d) the establishment a common methodology to be replicated and continually implemented throughout the country; and (e) the empowerment of a country-wide sustainable network, capable for initiating, coordinating and supporting the implementation of municipal energy policies aimed at saving energy and reducing CO_2 emissions (Dimitrova 2016). The National Energy Efficiency Action Plan 2014-2010 was adopted in 2014 (SEDA 2014).

Energy efficiency issues are also among the targets of the practical implementation of the National Strategic Reference Framework (NSRF) for the period 2007-2013 (EC 2007). Two EC finding missions undertaken in 2013 estimated significant improvements in energy use in industry. The relatively high share of RES (13.8% in 2010; 16% targeted for 2016) was estimated as a success. Yet, pending challenges of inefficient energy transformation and use in the residential, service and transport sectors were outlined. The slow modernization of the district heating companies (resulting in high energy bills), the patchy insulations of individual apartments due to the individual ownership and the inappropriate regulatory framework on prices were identified as major shortcomings alongside a missing comprehensive energy policy, low consumer confidence, and ineffective protection of vulnerable consumers (EC Finding Mission 2013).

A joint initiative was undertaken by the Ministry of Regional Development and Public Works (MRDPW) and the United Nations Development Program (UNDP) "Demonstrational Renovation of Multifamily Residential Buildings" (2007-2011); later on the "Energy renovation of Bulgarian homes" Program (2012-15) was launched. The OPRD 2014-2020 Investment Priority "Providing Support for Energy Efficiency, Smart Energy Management and the Use of Renewable Energy in Public Infrastructure, Including Public Buildings and Housing" was opened in 2017. The Methodological Guidelines on Updating the Active Regional and Local Development Strategies and Plans, published by the Ministry of Regional Planning and Public Works (MRDPW 2009), promoted integral approach to regional and spatial planning and could be considered an effective instrument for integrating EE considerations at all the planning levels (Dimitrova and Nakova 2012).

During this period a number of events resulted in considerations about future difficulties for the energy supply and focused societal attention to the topic of existing and planned conventional and alternative energy sources in the country: in accordance with the pre-accession obligations of Bulgaria to the EU two more units of *Kozloduy* NPP were closed down in 2007; a gas crisis developed in the country in early 2009 due to hampered gas supply

resulting from the tension between Russia and Ukraine. In the same year Bulgarian society witnessed a corruption scandal on the high political level, which was related to the undertaken construction of a new hydropower plant. Growing tensions and heated societal debate were related to possible energy sources to use in future – there were protests against the exploration and extraction of shale gas in North-Eastern Bulgaria in 2011; an already initiated project for a new NPP was stopped and a referendum was held in January 2013 on "developing nuclear energy in the Republic of Bulgaria by building a new nuclear power plant".

The undertaken contradictory steps and the lack of a clear concept about energy priorities at the national political level resulted in the inefficiency of the Bulgarian energy system; the high energy bills and the lack of transparency in energy pricing caused broad public discontent and led to citizens' protests in February 2013; the protests led to the fall of the government due to its inability to cope with the energy reform and its socio-economic consequences. Many speculations appeared in the national media around the current state of the energy system and the energy price structure in relation to the 'green', 'brown' and nuclear energy perspectives. There was a persistent focus on increasing the share of renewable energy sources; yet there was no clear message on the RES concept from the national level - in 2014 the National Energy Regulator significantly reduced the purchase price of solar energy for new projects, which blocked the further introduction of renewables.

The energy poverty issue came higher on the agenda during the financial crisis and especially in 2013 when the rising electricity price for households was politicized. The high level of energy poverty in the country was linked to the overall impoverishment of the population (Staykov 2015). The share of energy-poor households in Bulgaria is substantially higher than in the other EU member-states. Even though there is no exact statistics, it is considered that the high share of poor people and the lowest GDP in the EU, combined with low energy efficiency, results in many people having difficulties in paying their bills. About 39% of the households in the country report that they cannot cover their energy needs and therefore qualify as energy poor. 34% of the households prolongation of the payment of their heating bills and 44,9% could not reach adequate heating comfort. In the meantime, almost 13% of the households inhabit dwellings with leakages or moistures premises (mainly walls) (Panayotova 2016). According to a recent study energy takes 14% of the overall spending of Bulgarian households; yet, the poorest 20% of the population are reported to spend 17.4 %, while the richest 20% spend 11,9% (Georgiev 2016). Thus, more than 80% of the households could be qualified as energy vulnerable according to the definition of the World Bank (2016), where "energy vulnerable households" are those spending more than 10% of their income on energy. An undertaken simulation of the behaviour of energy poor households outlines a broad variety of possible negative impacts of energy insufficiency on people's everyday life and on their quality of life in general (Zahariev et al. 2016).

3.2.2. Effects on the national energy culture

There had been a general lack of transparency during the period 1984-1989 in the energy field - even the news about the nuclear catastrophe in Chernobyl in 1986 came from abroad. No official public information was available about the overall international and national context and about the rationale of the decisions taken. All that led to uncertainty and rumours about the causes of the electricity schedule and to a general feeling of vulnerability and of lacking security. Certain individual attempts were made and "do it yourself" solutions were introduced for better coping with emerging everyday difficulties in the short term, yet no search for long-term alternative solutions to conventional fuels and energy technologies was undertaken.

The profound changes in early 1990s resulted in a variety of conflicting worldviews and a general lack of common societal values; the segmentation and atomization of society were further deepened during the following decade. The collective models imposed 'top-down' under socialism, were rejected and a deep crisis of daily management of commons evolved at all levels. Uncertainty and non-transparency as well as lack of political predictability about

the steps, related to the liberalization of energy market and shared with the general public road map were observed (Nejkov 2018). The energy topic was continually used during that period as an instrument of power and political pressure.

Energy supply was initially, and still is, largely considered by the large majority of people in the country a public service to be provided by the State at the lowest possible price with no concern about the impacts on public finance or the environment and on people's health. The two electricity schedules in 1984/85 and 1991 caused dissatisfaction with the emerging discomfort in everyday life; that was expressed in non-formally spread anecdotes and jokes. A rather closed expert and political discourse about the complex challenges related to energy was not neither accessible nor understandable to the broad public. Public debate on the complex issues staying in the core of the events was missing or populist and simplistic – aimed at identifying easy short-term solutions rather than conceptualizing real problems.

The daily interruptions of electricity supply in the winter of 1984/85 and the introduced limitations to households' energy consumption after that caused a lot of hardships at the individual and collective level as they were hampering a broad range of everyday activities (lighting, cooking, heating, stopping lifts in high-rise buildings, watching TV, etc.); a lot of changes were imposed in everyday life of most households and resulted in a feeling of crisis, uncertainty and vulnerability; yet that did not by itself bring any considerable change to the energy culture in the country in the short term. In the early 1990s people were queuing for hours for all kinds of primary goods and raw materials. Due to the deepening economic problems and the uncertainty about electricity provision, households were turning to the most primary means of providing light (candles and gas lamps) and heating; to using alternative sources (batteries, accumulators, generators) to provide electricity mostly enough only for radio and TV appliances. A general shrinkage of energy and electricity use was observed in the country due to the closing industrial enterprises; all the limited number of short term action of the households motivated by the schedule could be characterized as reactive ones. Families re-organized their way of life, so that they could mitigate the discomfort caused by the lack of energy that was required for everyday activities: thermal energy (cooking time and manner, ironing, washing, cleaning, heating of a common premise and gathering of the whole family in one dwelling for the time of the restriction); light (re-scheduling activities that would require light – preparation of homework, time for reading, sewing; going back to primary light sources – candles, gas lamps, etc.). In the period 2000-2006 most households faced problems with the growing prices of heating services and with non-transparent accounting and pricing methods. Many households and communities among the poorest ones found their only way to cope with energy poverty in electricity thefts; there were sketches and popular songs reflecting that energy poverty culture. The recently privatized electricity-distributing companies faced a massive non-payment of electricity bills in neighbourhoods populated by the Roma ethnic minority. They reacted by introducing highly lifted (difficult to access) electric switchboards or distant controllers; large Roma communities were thus excluded from any access to the electricity network in a largely discriminative way (Babourkova 2010).

Two major tendencies developed in parallel after 2007: poorer households were turning to conventional sources of heating such as coal and wood with a considerable negative impact on the air quality; in parallel, well-off and entrepreneurial people turned to renewable sources (biomass, geothermal and solar technologies) turning more independent from the unreliable energy policy and unpredictable electricity prices. A growing number of households in the multifamily blocks of flats started disconnecting from the district heating networks and shifted to individual means of heating (e.g. air-conditioners); it additionally decreased the efficiency of the outdated district heating system. The scattered external isolation of separate flats in the prefabricated multifamily blocks of flats resulted in "patchworks" on the facades that were indicative for the deepening social fragmentation inside the blocks but also for the lack of opportunities for joint action. There was alongside a difficult process of emerging self-organization motivated by concerns about the environmental impacts, poverty and social vulnerability of certain groups, the demographic crisis and the ongoing brain drain in the country. Despite the initial administrative difficulties, collective self-organized action was gaining momentum; many homeowners managed to register condominiums and to undertake rehabilitation supported by the national and EU funding programmes with the crucial mediating role of the municipalities.

Households' energy consumption on the macro level have remained stable in the long run; in parallel, the majority of households have increased their energy efficiency and have channelled their savings towards measures providing better comfort, wider use of electric appliances and air-conditions in everyday life (SEDA 2012). The increased households' income levels, coupled with the rising annual temperatures in the country (by 0.8 degrees for the period 1990-2000) have been the drivers for air conditioners becoming a part of the households' everyday lives and for the increased electricity consumption during the summer months. In the cases of growing household income increased electric energy consumption resulted from searching for higher energy efficiency and comfort. The registered preferences for buying new appliances (spreading technological innovation) additionally increased electric energy consumption (BAS 2017).

Energy prices have been considered an important political issue in Bulgaria and sometimes (as in the protests in 2013) connotations are made to a collective perception of wrong governance and corruption. Since 2013, due to the social unrest and protests, the public policy has been focused on the mitigation of the burden of the electric energy price paid by the end users. The National Regulator prohibits the transfers of spending for electricity purchase to the end users (as done by the National Electricity Company); that is considered a subsidy targeted to all types of consumers, regardless their income level or level of energy vulnerability (World Bank 2016). The mandatory purchase of renewable energy from the distribution network is one of the elements that have led to significant growth of the final price of the energy consumed by households and businesses in recent years. The difference between the market cost and the subsidized one is covered by the National Electric Company (NEC), which partially passes the cost of the losses to the final consumers. Furthermore, before 2010 the electricity market in Bulgaria was having some of the highest hidden costs among EU member and candidate states. Even nowadays (2018) hidden costs include poor bill collection rates; excessive losses due to inefficient operations or theft from the power system; and losses from tariffs set below cost-recovery rates. (CDS 2010, quoting World Bank collected data).

It is nowadays difficult to outline a particular "national energy identity" of Bulgarians. At certain moment in the past it seemed relevant to imagine Bulgaria as an energy hub based on the nuclear and coal powered plants as well as the pumped storage hydropower plants. Yet, several ambitious projects about transnational gas corridors and interconnectors, which had to provide energy independence on a broader scale beyond the national market, were recently cancelled. Closing the *Energy* Chapter (Chapter 14) of the pre-accession negotiations by taking the obligation for closing the nuclear power plant caused certain dissatisfaction and disappointment due to the feeling that the chance for keeping the national energy independency has been missed. There was a lot of controversial information on ongoing processes and hidden agendas alongside controversial attitude to the State and to private energy enterprises. Lacking transparency and citizen control over the energy system and all related choices was considered a bottleneck in the process. Statistical data from various sources and various thematic reports (World Bank 2016) outline the big share of energy vulnerable households and the considerable share of households below the line of energy poverty as the two important characteristics of society that have an impact on energy memories and shape national energy culture.

There was a clear shift from centrally planned and managed large-scale schemes of mass energy provision to atomization of consumption; energy-related problems were part of the general crisis of the collective approach to the management of common assets such as utility networks and housing condominiums. A strong shift in people's mind sets was underway - any collective action was considered ineffective and/or unreliable; strong preferences were emerging towards individual action and self-reliance in searching for outcomes. T**he protests against the electricity bills** brought people into the street and helped them realize the value of common goods and services - and of common action as well; and stronger awareness was acquired about the more complex interrelations, costs and benefits, efficiency and equity issues at least among the better informed about the future; bigger responsibility not only for your own bill and consumption but also for the one of the collective entity and even the societal one.

3.2.3. The long term effects on the national energy memory

Through the Discussion Group organized in Sofia we were interested in learning about the participants' energy memories and their perception on energy related challenges in their personal life in the period 1984-2017. We were aware that the period was one of profound societal changes undergone by Bulgarian society, which deeply influenced practices, norms and material culture but also values in general. We were careful not to presuppose the focus of the discussion and not to provoke people's attempts for giving the "right" responses. Overall 12 participants of different age and gender and with different cultural, social, economic background) were invited to share and discuss their memories. Three groups of questions were sent to the participants in the invitation letter: (1) When and on what occasion did you come to think about the energy you use? What was the most important moment for you / your family during the last 30 years with regard to energy? (2) What was the most difficult moment that made you change your energy use and how did it influence your quality of life? (3) Are we reasonably using energy today? What do we need in Bulgaria today in order to be more energy efficient – technological innovations, regulations, educational campaigns or something else?

The key events - the electricity schedules (3 hours with and 3 without electricity) and the rise of energy prices, , were reflected in the memories of the discussion group participants in close relation to place-specific lifestyles and energy behaviour:

"I came to Sofia from the countryside and I think that in my town the electricity schedule started earlier than in other places. I remember no difficulties with heating, yet I don't remember any excess of heat and opening the windows to cool the rooms. I have no negative memories of the schedule anyway, it was even fun. We rather heated single rooms and it was easy to feel when a door was not closed. We usually relied on electricity and burning wood for heating – wood is more difficult as one has to carry it up from the basement." (R11)

"We lived in Varna when I was a child, it was never too hot anywhere, there were times when there was no money and the whole family slept in one room, not to heat two rooms or more". R13

The participants often mentioned the difference between the countryside and the capital city of Sofia, the energy (electricity and heating) supply of which had always been a national priority:

"Then comes the Sofia period, when one goes to the Student town and here it is really a great thing for a person who has not lived on district heating. So, one does not care about saving hot water and electricity at all." (R7)

"I was born in a village and I had to leave my home when I was quite young, so I had no choice on heating. The rented flat in a prefab building in the town was scarcely insulated and it was quite cold in there. Coming to the student hostel in Sofia I felt like entering paradise – windows opened and the central heating working at maximum, all the possible lamps switched on; just nobody thought that there should be any saving." (R10)

"In the Student Town it was really a different world; I never imagined I would be able to take a shower as long as I wanted without running out of hot water. The same thing was with the heating - it was always warm there; until getting back to your native town and to the stove - and it just gets warm when you have to go to bed, which is not very good and effective. (R11)

"I clearly remember the electricity schedule of 1985 as I lived then on the 16th floor – when the electricity was switched off there was no lift, no water (relying on pumps) and no central heating – nothing. And it reminded me of the opposite situation before that – the heating centrally set to a maximum and all of us staying with half opened doors or windows to cool the room" (P4).

The 'transition' period 1989-1999 is still broadly remembered by Bulgarian people as the time of re-distributing and privatizing national wealth in a most non-transparent way, which brought about from both within the country and from abroad the 'major economic players' of today with access to Bulgarian national resources. The second electricity schedule was introduced in 1990-91.Participants' memories differed in different age groups:

"Although my mammy has mentioned an electricity schedule in the winter of 1984 when I was just born, I myself remember quite well the schedule in early 1990s. I was a child then and our favourite TV episodes of the Ninja Turtles were usually interrupted by the schedule. My father was then smart enough to bring the battery from the car so that we would not miss the film." (R3)

"I live in a large prefab housing estate in Sofia. My first memories of concerns about energy were related to the electricity schedule of the 1990s. I rather found it fun and I even remember at school our teacher was asking whether we had written our homework in a candle light or had been fast enough to do it within the hours with electricity".(R5).

"Well, with regard to the electricity schedule, I also remember it but I was too young then to think about energy spending; on the contrary, it was for me an exceptional event, it was top interesting – firstly, all the family gathered around some light, neighbours were coming and telling interesting stories and that was for a child a marvellous experience. […] All my neighbours, my parents, too, experimented with different types of stoves. There was, of course, the "Chudo" (Miracle) stove and the storage heaters that accumulated heat when there was electricity and it was warm after that." (R7)

"I remember it the same way: stopping the electricity started a party – candles were burning, the neighbours were gathering, somebody bringing a guitar, children were playing together. It was cold, but we, kids, enjoyed the excitement." (R13)

"I remember the electricity schedule of 1991-92 very well as I was then listening to the news on the radio and I had to rely on batteries; it was important to have endurable ones, also for the music on the cassette recorder. I kept the room warm with an oil stove and I relied on candles for the light. There was an initial shock when it started about what we were going to do during the two hours of darkness. Then I understood that there were a lot of things to do even in the light of a candle – I estimated the romantic side of it and I sometimes miss it." (R12)

Yet, the electricity schedules had their long-term impacts even on the energy culture of children:

"The electricity schedule was for me as well the turning point in becoming aware of the need to save energy. I was probably 7-8 years old and could not understand how it was possible not to have electricity in the net. So I was going around the flat and switching off the lamps all the time as I thought that would keep some electricity for later on." (R1)

The rising of district heating prices motivated the search for cheaper and more effective heating solutions on behalf of the energy vulnerable groups:

"Then the bills we got were really too high for our family budget, and then it was decided to discontinue the use of the district heating and to switch to electricity - and there was again the joy in my family that we would finally be able to control energy use – to know how much we use and how we save. So I remember coming home after school and after work, waiting for the apartment to warm up, yet it was not the case on the 14th floor and with problematic wooden window frames; and actually mould began to appear, it was a long struggle with it, until finally we decided on heating the two rooms with convector heaters, which are set to a certain degree and not switched off at all - and this is our way of heating to the present day." (R5)

The identified key events differently shaped today's energy practices of different user groups. The identified long-term effects are related to various energy related aspects: technological changes, politics and policies, regulations, infrastructure, cultural/symbolic meaning, user preferences and climate change. There is anyway generally increased awareness about the benefits of increasing energy efficiency and motivation for searching relevant soft and infrastructure measures to achieve it; particular steps strongly depend on people's professional background and capacity for action:

"Seven years ago we decided to leave an apartment on the 16th floor at a large housing estate to a house at the foot of Vitosha Mountain, an old villa we rented; this coincided with the warmest winter (2011–2012), in January the temperature was 20^{0}C every day, but then in February it was -10^{0}C every day, and with 2 meters of snow. A sumptuous winter it was and the villa was not isolated, no energy efficiency measures except for the PVC windows, but it did not help – an old house from the 1960s and a gas installation. Thanks to these temperatures and the poorly insulated house, my January bill was BGN 650 (EUR 350), provided we kept the temperature between 14^{0}C and 17^{0}C maximum. […] in the second autumn I bought one big nice stove with a big glass and 5 cubic meters of wood and since then we use the mixed system. […] In the evening, when we get home, the stove burns, it is cosy in the living room and in the dining room; we eat, drink, enjoy and then go to bed in the cold bedrooms at 13-14^{0}C. I really like this model. And my energy bill is to say BGN 150. (EUR 75)". (R4)

"At home, I've put automats on the doors to close, not to stay open. Also from this winter I installed smart radiator valves - they can be programmed, just telling them "I want at 6 o'clock in the morning the temperature to be 22 degrees and the electronics alone judge how the temperature is out, how fast it will get warm inside. The idea is that the software itself determines when to start heating the radiators so that the temperature could be 23 degrees at 6 o'clock in the morning depending on how cold it is outside. I do not know yet whether it will have an effect on the bill, but it's comfortable because we sleep at 18 degrees, we wake up in the morning warmly; I also made them shut off during the day when we are not at home. [...] I've put sensors, at least in the bathroom, because they constantly forget at home to turn off the bulb, and I put on a sensor that when there is movement, then the lamp lights up. (R11)

Energy needs and consumption patterns had been changing in the course of individual and households' lifespan development due to changed number of inhabitants, aging, etc.

"I've lived in a single family house for 40 years. I've had all kinds of heating at home. […]. Then we took a loan and installed the local heating (relying on coal). It was the best period with the heating as it was warm everywhere. Then we made insulation of the house and changed the window panes and it was wonderful as we were many of us at home. Now we are just the two of us, we are getting old and there is nobody to take care of the coal." (R8)

It is difficult to distinguish an explicit lasting effect of the electricity schedules on the societal discussion of energy today. The first and second electricity schedules provided sound arguments for the proponents of smart and liberalized energy system; the diversification of energy sources and removing dependency chains from Russian energy lobbies were also claimed urgent.

3.2.4. Discussion and conclusions

There was a general transition during the whole period of the current study (1984-2017) from traditional industrial practices related to the usage of conventional fuels and energy produced and distributed by the State and consumed in low-efficiency appliances, to a slow uptake of contemporary relatively efficient appliances using a

mix of predominantly conventional energy sources but also some using alternative and renewable sources. Before the first electricity schedule the country relied upon a centralized large-scale energy production and distribution system; the technical infrastructure was managed by State enterprises. The energy-extensive industry and households were supplied by an inefficient distribution network. The energy system was strongly dependent on imported resources - oil and gas (from the Soviet Union) at times of profound and unpredictable political changes. The resource situation in the country was characterized by general scarcity of liquid fossil fuels and gas, and abundance of low calorific coal, geothermal energy, biomass and sun (not adequately utilized); wind sources are difficult to utilize because of being mainly along major bird corridors. Regional differences in heating modes and heating sources were also visible: wood in mountains and rural areas; coal in plains, rural and urban areas; and central heating in large urban areas. Emerging environmental problems were addressed by the complex environmental permits for coal power plants, rejected permits for shale gas extraction, the referendum for new nuclear power plant, etc. A fast growth of renewable energy sources observed up to 2013, yet the decreasing internal and external demand and export quantities led oversupply most of the year; the green energy was intentionally interpreted by politicians as a major problem of the energy supply of the vulnerable social groups.

The electric energy consumption as a main household energy source increased its share in the total energy consumption from 42% in 2000 to 65% in 2014. The gas crisis in 2009 additionally led to increased electricity consumption by households due to missing energy alternatives for heating and other needs (Byanova 2013).

The gas crisis in 2009 additionally led to increased electricity consumption by households due to missing energy alternatives for heating and other needs. At the time of the electricity price protests in early 2013 an overall diversification of energy sources was evolving alongside a decreasing electricity demand - due to the closing down of outdated industries but also to investment made into more efficient ones; the slowly increasing yearly energy demand of the households resulted from a number of contradictory tendencies - generally shrinking population but a smaller number of household members; household appliances of greater efficiency but also increasing in number; undertaken insulation measures but aging residential buildings; introduction of more efficient heating systems but also disconnection from district heating and shifting to electricity, coal and wood. The complex environmental permits were introduced in the country, yet the thermal power plants on coal were still in operation; Bulgaria officially complied with the Kyoto protocol and its extension, yet the efficiency the newly built hydropower plants was not explicitly proven. Speculative investments and developments were oriented towards various forms of State aid, including public procurement, funding and subsidies for RES (micro hydro power plants, wind- and photovoltaic parks). As the agreements with Russia on revived or new large scale projects had to comply with Bulgarian commitments to the EU energy policy, a lot of project developments were cancelled (*Belene* NPP, *Burgas-Alexandroupolis* Oil Pipeline, *South Stream* Gas Pipeline vs. *Bulgaria-Greece* Gas interconnector, *Balkan* Gas Hub 'and the new blocks of *Kozloduy* NPP).

An increasing demand and dependency of transport on oil and gas was observed on behalf of both industry (less use of rail services also due to the smaller size of enterprises and their new locations) and households (shift from public to private transport and increasing motorization). Although electric mobility was generally seen as an solution, there was a too large share of coal-based power plants in electricity generation. Energy efficiency measures and renewable energy sources were officially estimated as important in meeting the demand of the households and SMEs, yet slowly introduced.

The time between the two electricity schedules witnessed fast non-formal changes in societal **attitudes and values** – neoliberal ethics was rising within a mix of patriarchal nepotism, remnants of the communist 'ideal' and a 'wild' capitalism of exploitation, corruption and thefts. The undertaken formal changes in legislation prioritized private property and its restitution without any sound analysis of the resulting complex consequences to be expected in the physical environment - collective residential complexes, large industrial estates and urban technical infrastructure. The reform in the energy sector between 1997-2004 failed to provide the declared "social protection and social guarantee" due to the rapid rise of electric and heating energy prices and the drop off of

social subsidies thus burdening the end users (Tzvetanov and Bosev 2005). EU regulations were rapidly transposed into the national legislation of Bulgaria at the time of the rising electricity prices, yet often additionally reshaped and applied in ways beneficial to particular political and economic groups, thus their initial concept being totally distorted. For these groups the EU accession of the country was mostly seen as an access to EU funds through a formal response to legislation and reforms insisted upon by EU institutions. Nevertheless, the period after 2007 was one of enormous practical work done at the municipal level with positive results broadly acknowledged (Dimitrova and Nakova 2010).

At the time before the two electricity schedules the use of electricity and heating sources was provided through societal discipline centrally imposed by the State. Thus the efforts for overcoming emerging difficulties on the supply side were provided by technical professionals and experienced managers in the energy system and its competent institutions. Later on the prices of the electricity and of some accessible primary energy sources (wood and coal) had been kept low due to the overall high poverty level and of energy poverty in particular. The energy price issue was politically exploited; although EU policies were officially taken for granted and with almost no debate there has been strong silent resistance in the executive bodies. Postponing the key decisions for liberalization of the energy market, less energy dependence and more climate and environmentally friendly primary production benefited the monopolist enterprises. Long-term views on the financial and health impacts related to the energy system were largely ignored in the public discourse and often replaced by the focus on “easy” solutions such as new nuclear plant or additional capacity at the existing one (independency of the energy system and cleaner production being claimed). The initial penetration of renewable energy sources in the sequence from micro hydro and wind ones to photovoltaics in the decade 2005-2015 was largely distorted by subjective and non-transparent funding preferences and inclusion into the electricity grid. Even the triumphal figures on the achievement of the *Europe 2020* objectives, used by the government as an argument to justify the change of pace, are questioned by many critics, as significant part of the result is due to the massive use of firewood for heating homes. "The use of outdated technologies and the 'energy poverty' of the country are passed off as a sign of progress" (Martino 2015). The contradictory political signals and regulations led to societal scepticism and distrust to both conventional and alternative sources.

The ECHOES discussion group registered a broad variety of memories, where the energy topic was intertwined in all aspects of personal and societal life. The shared vivid memory of the energy abundance and thermal comfort in the student hostels in Sofia, where nobody was expected to take a personal responsibility for the energy consumed, was in a way the memory about a broader societal perception under socialism about energy being growingly abundant and accessible and energy provision being the responsibility of the State. The “electricity schedules” were identified as key events among other turning points framing four historic sub-periods within the period 1984-2017, mainly framed by the political system development. The introduction of the “electricity schedule” was the most often mentioned event – during the discussion it was clarified that two different periods in time were addressed - the winter of 1984-85 and the early 1990s. Participants’ memories differed in their focus and in the interpretation of similar events as people belonged to different generations and experienced the events at different moments in their life and in different roles – some as children and others as parents.

The first **electricity schedule** (in the winter of 1984-5) brought a changing perspective of the world. It was a first large-scale indication about a serious disruption in a societal system that had been promising “a bright future”. For the first time people realized that energy could not be taken for granted; they were inventing and sharing ways for overcoming inconveniences and using alternative energy sources, yet the interruptions of electricity supply were considered only occasional and it was still broadly considered that the State should be able to cope with the problems in due time. The second **electricity schedule** (in early 1991) came at a moment of growing political instability and evolving societal crisis; an overall disruption of the technical and social systems maintaining the normal functioning of society was going on in the country. It was increasingly obvious that people could not rely on the State any more - they had to take their own responsibilities for living with the energy limitations and for adapting to unexpected energy deficits that were most likely to last. The key events left their traces on the personal energy memory of the discussion participants also as an indication that public authorities

could not be trusted as the population was never informed about the real situation with energy supply and about intended major energy projects.

The electricity schedules had their long-term impacts on energy culture in the country, yet no generalized national '**energy identity'** could be recognized. Energy memories seem to be group specific and depending on the level of information, awareness, and attitude towards energy issues; current energy practices of different groups in society depend on their professional background and their capacity for undertaking action. The reported further energy behaviour of the discussion group participants after the experienced key events depended on their diverse paths in life. All of them in some way tried to take the opportunities provided by emerging framework conditions that promoted efficient or low-emission energy choices, yet the memory about the identified key events had a rather limited impact. These events were not considered 'serious' enough to affect next energy related decisions and behaviour over time at the national level. Yet, the persisting habit of households for keeping candles, lanterns, electricity independent heating equipment in stock is to a large extend linked to the memory of the electricity schedules. Although at the cultural level the right to energy was valued as a basic human need, different participants had different subjective qualifications about the temperature levels required to provide thermal comfort at home.

In the light of today's challenges, memories both create opportunities and act as barriers. If properly analysed and interpreted, the energy-related experience accumulated during the past 30 years may be expected to lead to a more resilient society and economic agents regardless of the choices made by the State at the macro political level. The choices at the micro level are still getting momentum; people already insist on being better informed about broader considerations and small scale alternatives. The distrust to the State, to the national monopolists and to the collective consumption models sometimes hinders the smooth introduction of new energy services and other innovations.

The findings of the desktop research and discussion group results are indicative of a significant rupture in passing energy memories from one generation to another in Bulgaria. The needs and lifestyles of the generations who experienced the two electricity schedules as grown-ups strongly differ from these of the younger generations – the former had been concerned about the disturbance of daily routine activities and safety but also experienced a personal cultural shock of realizing that the State is not reliable any more even in providing basic services; the latter had been worried about disrupted communications and about charging various electronic devices. The discussion group kept an atmosphere of (sometimes self-ironical) storytelling about surviving a difficult period. It also indicated that fading energy memories tend to get a romantic connotation related to youth or childhood memories. Most of the participants in the group were focused on what they remembered (usually the emotionally positive experiences) rather on what and when had happened. In a way the discussion on energy memory also turned out to be about the lessons learned on the need for taking personal responsibility for one's action far beyond the energy field.

3.3. Norway

3.3.1. The key events

The Norwegian team identified three events in recent Norwegian history that have arguably been important in shaping the contemporary Norwegian energy culture, and which we believe have contributed to a national energy memory. Keeping with the central idea of the energy memories concept as outlined in chapter one of this report, these events may be regarded as combining political, social, cultural and technological elements. Thus, they may be recognized as key impulses that produced *"a multitude of political, administrative, cultural and other consequences that still shape debates and practices today*". The selected events unfolded over time, sometimes several years. The first event is the discovery of oil and the beginning of the Norwegian oil and gas industry, which took place from 1969 to the mid -7s. Second, we are interested in the 1973-74 oil crisis. Third, we focus on the "Alta case", the largest controversy over hydropower construction in Norway, often dubbed the birth of the modern Norwegian environmental movement.

Finding oil – the beginning of the "petroleum fairytale"
The 1973-4 oil crisis
The "Alta case"

Finding oil – the beginning of the "petroleum fairytale"

We believe that being an "oil nation" is an important element of Norwegian energy culture, and that the first years of this political and technological development are important in the national collective energy memory. The oil industry changed Norwegian society quickly and in some areas dramatically. Norway became a very rich country where large investments and technological development were made. By the end of 1994, the state income over the previous 25 years of petroleum industry surpassed 546 billion NOK (adjusted for currency values in 1993). The revenue from oil and gas has placed the average Norwegian citizen among the richest in the world. However, the country also became more vulnerable politically as well as economically, because oil prices would play such an important role in the economy (Tamnes 1997: 186).

The "oil history" of Norway is typically presented as beginning in 1958 when Geological survey of Norway wrote to the state department that there was in fact no possibility of finding coal, oil or sulphur on the continental shelf outside the coast of Norway. Nevertheless, when the Dutch located gas reserves in Groningen in 1959, this sparked interest and enthusiasm in many parts of the world, and attentions turned toward the North Sea. Despite the geological investigation's negative conclusion, therefore, interest was sparked and in 1962, Phillips Petroleum asked permission from of the Norwegian government to conduct searches in the North Sea, wanting licence for the parts of the sea that were located in Norwegian sovereign territory. Phillips offered 160 000 dollars per months, but the government did not grant their demand, as it was viewed as an attempt to gain exclusive rights. This prompted a judicial process culminating in May 1963 when the Norwegian government proclaimed sovereignty over this part of the continental shelf, and legislation was passed granting the Norwegian state ownership, stating that only the King (in practice, the government) had the power to grant permissions for searches and recovery. Foreign companies were granted permissions to conduct preparatory searches and seismic investigations that same year, but not for actual drilling. In December 1969, Phillips reported findings at the Ekofisk area. This later proved to be one of the largest ocean reserves ever found. Production commenced in 1971, and several findings of oil and gas reserves followed in the years to come (regjeringen.no).

The 1973-1974 international oil crisis

I had one of those rationing cards. A rationing card for gas. I had just gotten my driver's licence, I was at high school and then the crisis happened and we were not allowed to drive on the weekends. We had to use the spark. I had not thought about it before I saw that picture!

The oil crisis of 73-74 arose in the wake of the war between Israel and Egypt and Syria, often called the Yom Kippur or October war. Arab oil exporting nations boycotted countries supporting Israel in the war, and in 1973, the member nations of OPEC, the organization of oil exporting countries, raised the price of petroleum by 70% and planned to cut production by 5% per months until Israel had withdrawn from the occupied areas. In January of 1974, prices were increased further. The increased cost led to attempts at rationing in several countries, including Norway. In November 1973 moreover, production on Ekofisk nearly stopped completely due to bad weather having damaged crucial equipment and production equipment being refitted. For two months, Philips did not produce anything (Skjeldal and Berge 2009: 70).

The Alta case, 1968-1982

Hydropower was first harnessed for electricity in the 1870s. The Norwegian landscape and climate are very well suited for this type of energy, and hydropower was what transformed Norway into a so-called energy nation, playing an important part in the modernisation of the country. From approximately 1905 to 1990 the development of hydroelectric power in Norway, so-called "white coal", was a politically driven process and until the 1970s, it was regarded as uncontroversial and met little resistance. In the 1970s however, environmental issues started to gain attention, and the news contained stories on polluted drinking water, lakes and rivers, dying forests and animal species going extinct both locally and internationally. Consciousness concerning the side effects of industry and "development" was growing. Between 1970 and 1990 therefore, the construction of hydroelectric power plants became increasingly controversial and an agreement was eventually reached that certain rivers and watercourses ought not to be dammed. Since 1990, there has hardly been any more development of new hydroelectric power plants in Norway. Nevertheless, it remains one of the world's leading countries in hydroelectric power (Sørensen 2007: 10-11).

The Alta-case refers to the conflict regarding the construction of a hydroelectric dam in the northern most part of Norway damming the Alta River. The case unfolded over a period of approximately 10 years, however the last 4 years were arguably the most crucial. Some consider the Alta case as the crowning event of growing environmental concerns in Norway throughout the 1970s (Ustvedt 1991: 166). It involved more people than any other environmental conservation case had ever done and remains the largest civil disobedience case in Norwegian history.

Early in 1970, it was decided by parliament that the Alta River in the region of Finnmark was to be dammed for the construction of a hydroelectric power plant. As a result, the entire Sami village Masi would be removed and its population relocated. This caused resistance among citizens of the region as well as the local government branches in Alta and Kautokeino. If dammed, the river would lose its value as a recreational area

and disrupt the river's rich salmon population. More than anything however, the enterprise of reindeer herding, undertaken by many Sami people, would suffer. Damming of the village Masi was later abandoned, yet plans for the power plant were not.

There was massive resistance to the project, and the "People's action" was founded in 1978, reaching at its height 20000 members and 85 local chapters. The organization hosted environmentalists, salmon fishing enthusiasts, activists for decentralization and the rights of local government, as well as those protesting for Sami rights. Protest camps arose and activists chained themselves to each other in order to block the passage for construction vehicles and stop the development. There were several rounds of forcible removal of activists, the largest confrontation involving as many as 600 police officers. Between 1979 and 1981, approximately 10000 people took part in camps set up in Detsika and Stilla. Demonstrations took place both in Stilla, Alta and in the capital, Oslo. Over 1000 demonstrators were given a collective 5 million NOK in fines and many were arrested. Four of the activist leaders were convicted for inciting riots and sentenced to probation and to pay high fines. In the capital, 15 young Sami people set up camp outside of the parliament building and commenced a hunger strike. There were several rounds of manifestations, hunger strikes, and several court proceedings evaluating the legitimacy of the parliament's decision and claim to the land. Nevertheless, the courts eventually sided with the government and builders, activism and resistance died out in 1982, and the power plant commenced production in 1987.

3.3.2. Effects on national energy culture

Finding oil

The effect that becoming an «oil nation» had on Norwegian energy culture and culture in general can hardly be overestimated. The role of the Norwegian oil history was also highlighted by respondents in the Norwegian group discussion. As one participant expressed:

> *"I remember from my childhood how I regarded Norway as a poor, kind of a second class country. Because we had big brother Sweden that wasn't as devastated by the war. I was born right after the war, you see. I remember the pride felt when Norway all of a sudden looked like it could become a rich country. Back then, most people regarded it as only positive. Finally, we would have an upswing. And when you look at it today, it's clear that our prosperity is due to the oil.*

Similarly, another participant stated:

> *"I was born in 1970, but I have kind of a memory of (…) my dad talking about how the Swedes had Volvo. They were innovators who could make it on their own because they were so smart. We, on the other hand, were mountain gnomes and we had nothing. Until we discovered that oil, and then everything was all right".*

Indeed, Norway's position in the 1960s has been described by some as being reminiscent of that of many poor countries in the global South with potential petroleum resources. The country did not have independent oil and gas competence, and the country had limited means of investment. Initially therefore, foreign companies dominated the petroleum and gas enterprise in the North Sea. However, the state had a mission to build Norwegian industry and competence in the area. National control, the development of higher education

programmes and competence in gas and petroleum, as well as state participation were important key words for the country's petroleum related politics in the 1970s. The state owned Oil Company "Statoil" was founded in 1972 and the government founded the "State oil directory" the same year. As stated by The Norwegian oil and gas association in their account of petroleum history: "*wise decisions made early on are the reason why Norway today is one of the best countries to live in in the world, and that the country is a world leader in several oil related areas*" (Norwegian oil and gas, 2010). Similar ideas were expressed in the Norwegian discussion group: "*The reason for the prosperity also has to do with the state's involvement (…) Denmark did it completely differently, selling their whole lot to Maersk. And now they are left with nothing*". And:

> *"It was a stroke of genius that they let Philips, Esso and those guys produce, then money comes pouring in to the country as a consequence. There were some wise people in charge. Those who set up the 200 mile border too, so that the fields became Norwegian. My dad was very preoccupied with that. It's what made it our oil"*

Arguably therefore, finding oil and the starting years of oil recovery in the North Sea is important in Norwegian energy memories, not just due to the financial gain and the supply of petroleum that it assured, but because the early "oil history" in Norway can be portrayed as a "national sovereignty victory story". Indeed, there was a strong belief among the discussion group participants that we would not "be where we are today" if it were not for the petroleum industry.

The OPEC oil crisis

There had been a significant increase in passenger car traffic in Norway since the production of petroleum at Ekofisk begun. During the crisis however, horses reappeared in the streets as restrictions on passenger car use were put in place. Indeed, all gas stations in the country closed on weekends as well as on weekdays after seven in the evening. From December 1973, using motorized vehicles on weekends was further banned. Gas rationing was envisioned from January 1974, but this was not carried out as winter that year was unusually mild and the population had horded and rationed so successfully that restrictions were no longer considered necessary by February (Norwegian oil and gas association, 2010).

An emblematic image from this period is a picture published in the national newspaper VG, of the then king, King Olav, as he rides the public tram to go skiing in the outskirts of Oslo in the winter of 1973. He is depicted attempting to pay for his ticket, like any other passenger. This picture, we suspect, holds many meanings in the Norwegian collective memory – not least as an image of a very accessible and popular king who was "not much different" from his subjects. With regard to energy, however, there may be two main interpretations. It can either be seen as a curiosity or an unwelcome reminder of an assumed backward and underdeveloped past where Norwegians were poor and had to travel collectively and in poor conditions. Alternatively, not least for the environmentally conscious – a movement building around that same time, the king using a public mode of electrified transportation can be seen as exemplary.

A long-term result of the crisis was the increased independence of the OPEC countries from multinational petroleum companies, and closer energy collaboration between Western countries through the international energy agency (IEA), founded in 1974. This put the development of alternative sources of energy (nuclear in particular) high up on the agenda (Lundberg 2017). Also in Norway, it appears that public, electrified means of transportation gained some momentum in the wake of the crisis. Internationally, energy saving measures became a priority. In Norway, this primarily took the shape of energy economization, known in Norwegian as ENØK. Because Norway had such a rich access to energy sources – hydropower especially, it was

seen as unnecessary to focus on saving energy. Rather then, the goal became to optimise the energy usage financially. According to a largely market economic line of thought, it was also assumed that this would indirectly cause some energy saving (Sørensen 2007: 31). At the same time, petroleum from politically stable places came to be regarded as more valuable, and search and exploration of new fields skyrocketed in Norway. Moreover, the increase in the price of oil ultimately led to greater national revenues (Skjeldal and Berge 2009). The oil industry in combination with the international economic downturn of the 1970s contributed to extensive transformation Norwegian industry and export. The tank shipping industry, which until the crisis had experienced a golden age, suffered due to the crisis and never fully recovered (Tamnes 1997: 186-9). Nevertheless, according to Statistics Norway, economic development in Norway has been clearly more beneficial than in the greater Europe after the 1973-74 oil crisis (Statistics Norway 1996).

The Alta case

The Alta case has many facets and attracted interest from several sides. On the one hand, it became a question of nature conservationism versus energy industry developments. This is evident in some of the news reports. A report made for the national broadcasting channel, NRK in the 1980s states this explicitly. After explaining the point of view of a protester who argues the need for conservation, continues to say: “But, we do want to turn nobs that lighten our loads in daily life”, as the image on the screen turns to someone turning on a kitchen aid apparatus and a vacuum. The reporter then concludes, “The conflict between conservation and consuming remains as unsolved now as it did 10 years ago” (NRK.no). Equally as important – or even more so - at the time, the Alta case was a question about the indigenous Sami minority’s rights, and the case contributed greatly to the visibility of the minority population on the national scene. “Aldri mer Alta” – Never again another Alta is an important slogan for the Norwegian environmentalist movement and is considered as having had an important role in shaping environmental attitudes in the population. It has also had a large impact on power plant development since (Naturvernforbundet.no).

3.3.3. Long term effect on the national energy memory

Finding oil

In an information video by the Norwegian Oil and Gas association, it is stated that “Norway became an oil nation. And we? Well, I guess we became oil sheiks. But on our own terms.” (Oljehistorien). Continuing, the voice-over takes us through the names of some of the current oil platforms, most of which are named after famous Norwegians or are taken from folk tales. As the platforms and boats are shown against the sunset, she states; “Fantastic names. Norwegian names” (Oljehistorien). It is portrayed somewhat as a David and Goliath story, therefore, where “little Norway” outsmarted multinational companies (and the Americans). Moreover, the history of the oil and gas industry in Norway is often phrased as “oljeeventyret”, which translates to either the “oil fairytale” or the “oil adventure”. Although the latter sounds more plausible in English, the metaphor in Norwegian is clearly associated with folk tales and sometimes employs plays on words from old Norwegian fairytales. Importantly, Norwegian folk tales were originally collected and put into writing during the era of national romanticism and were among other things, a tool for nation building and national identity creation. An example of such use with regard to the oil industry is the heading “1963-74: The national oil fairytale (or adventure). We found, we found!” (Thesen and Leknes 2010: 52). “We found, we found” is a reference to the folk tale hero Espen

Askeladden, a poor, underestimated and disregarded man, who throughout various tales proves himself resourceful, clever (sly) and brave. These traits always grant him victory, and in one of the most famous tales, Espen Askeladden's victory is assured through his collecting items that others deem worthless, exclaiming each time "I found, I found!" We find the same type of representation in the former Oil Company "Det norske" and their short film "The Norwegian oil adventure 2012" which won two Cannes Corporate Media & TV Awards Dolphin Trophies and was part of their annual report for 2012 (Det norske). Statoil employs exactly the same style in their 2012 information film (Statoil.no). Both films present the company's achievements as an old folk tale using both images from fairy tales (a storybook, trolls etc.) and the rhetorical style of a fairy-tale. Indeed, the fairytale (alternatively, adventure) metaphor is repeated in all accounts of Norwegian oil history, ranging from newspaper and media coverage to scientific journal publications (Skjeldal and Berge 2009: 11). This romantic understanding of the petroleum industry however, is only partially shared by the participants. Instead, we found that there is a significant ambivalence among the group discussants concerning the place or role of petroleum in Norwegian memory and identity. Whereas the older participants appear more connected to the memory of Norway as a poor country finally catching a break;

"My generation might be quite affected by the fact that we felt poor and then we became right. So we feel we have the right to enjoy all the energy. Because we can afford it."

Among the younger participants, the feeling was quite different:

"I can't remember Norway being poor so I feel like… I feel like I might not deserve it and I feel a bit guilty".

The guilt comes from a conflicting and hypocritical image of Norway as a "green energy nation" which puts itself forth as morally superior to other nations, whilst profiting greatly from exporting polluting "black energy" to these same countries. Phrases questioning whether in fact it was a good thing to have found the oil, or attempting to justify it by stating:

"I think most Norwegians are really glad that we did it back then. Despite the fact that we think the way we do today, in terms of the environment... I don't know what would have happened if we knew what we now know back in the 60s".

Among the younger discussants, there were significant feelings of guilt and worry about the environmental effects of the oil, as well as a sense that Norway had come to its riches the "easy way" and thus somewhat undeservedly. Moreover, they expressed that they dreaded being confronted with Norway as a petroleum nation in an international setting or whilst abroad.

Another lasting idea regarding the petroleum industry is connected to that of hydropower as well (see event 3.), namely that it may have hindered inventiveness and caused inertia with regard to the development of new renewable energy. Nevertheless, the most important long term effect of becoming an oil producing nation, according to the participants in our discussion group, relate to the "side effects" that the petroleum industry had on Norwegian society and industry in general, namely that this industry prompted knowledge creation, innovation and competence building in a range of different sectors. For example: "We took the opportunity to become a world leader in a variety of fields, like sub-sea work and such. It's had repercussions that we perhaps didn't even imagine back then." Several participants suggest that while in the beginning of the industry, it may have been simply the value of the oil that appeared important, in the future, the knowledge and competence acquired in related industries and fields may be remembered as equally important.

The oil crisis

Earlier research has highlighted the importance of the oil crisis for the development of new national policies for energy efficiency, or as these policies have been dubbed in Norway: energy economization (e.g. Sørensen 2017). The emergence of the energy economization doctrine in the wake of the oil crisis has later become part of the government enterprise ENOVA, who are now a key agency for advancing new technologies associated with energy efficiency and energy generation within buildings and transport. Thus, the crisis has arguably been formative for important elements of contemporary Norwegian energy culture. However, a bit surprisingly, our discussion group participants did not regard the oil crisis of 73-74 as particularly impactful or important. Even the participant who had a rationing card stated:

> *"That whole thing with the traffic during the crisis wasn't experienced as anything problematic. Those who needed dispensation got it. You just couldn't go for that Sunday drive, maybe. It wasn't a big deal"*

Indeed, it was suggested that the crisis affected mostly car traffic in Norway, and not so much electricity (and thus heating), and consequently did not make much of a lasting impression. Instead, comments like the following were made: "*Those events with petroleum have affected us little, and they are mostly about air pollution and driving*" and "*We are so used to being wasteful. We didn't learn much from the crisis*". One participant, however, remembered the picture of the king on the tram and associated it with an image of Norway as a country of solidarity, where everyone participated to the common good no matter their station.

The Alta case

> *"In my family, it is important because I have a relative who worked for the Norwegian energy and hydroelectric company during that time. So, it's like a family history. Every time we pass a dam, we say, "Well, this is pretty too!" In my family, we are taught that damming is not so bad, because my uncle was behind much of it in the 60s and 70s"*

For the participants who remember the Alta case, the multiple interests represented in the case made it more difficult to understand at the time. The younger participants have few or no memories of the event itself. Talking about the case however, raised questions about the price of clean power. There is a general knowledge that this event became a turning point in energy politics. However, more than anything, the Alta case became an entry point to a discussion about hydropower in Norway in general. Indeed, hydropower and its perceived role in Norwegian energy culture emerged as the most important aspect of the discussion. Hydropower was repeatedly pointed to as significant in Norwegian energy culture, in the understanding and marketing of Norway as an energy nation (in direct contrast to the petroleum industry) and in the habits and energy consumption of Norwegians. One participant made this observation:

"I have kind of an ambivalent relationship to the Alta crisis because I grew up thinking that hydropower was something really amazing and great. How fortunate are we here in Norway to have hydropower! A classmate of mine used to say that any water that isn't going through a pipe is wasted water. That was kind of the message from our childhood. But then, gradually people started to have a more nuanced picture of it, and that Alta thing came at a time where people were increasingly aware that there were several sides to these constructions other than simply that it was great to have a lot of hydropower"

Another stated that

I remember it very well. However, I didn't pick a side, because by nature (…) I like those kinds of large constructions. It's fascinating to look at. Maybe it has something to do with our father taking us for a hike close to Sunndalssøra where the power plant dams for the aluminium works were located. I became very fascinated by that. And in retrospect (of the Alta case), I can't decide what's better or worse. To dam and destroy nature or to have pure power. We won't get it for free in any fashion. It comes at a price, and I realize that I can't make a decision about it.

According to the participants in the discussion group, the cheap hydropower supply has made Norwegians complacent about their energy consumption. References are made to both Swedes and Danes who are pointed to as being much more conscious of consumption through their everyday actions, such as switching off lights when leaving a room or not letting the water run in the tap. Indeed, hydropower is arguably as important for Norwegian energy culture as oil. The participants had mixed feelings about what they perceived to be a certain Norwegian self-satisfaction with running on "green energy" from hydropower, when in fact the country simultaneously exports and profits from oil and gas. Some of the participants also felt that since electricity has been relatively inexpensive due to the vast hydropower, Norwegians in general have not been motivated to save energy or to use it efficiently. "We are a pretty spoiled nation that's used to cheap hydropower and which, on top of that became rich from oil. After the war we have been able to use almost unlimited power". As mentioned with regard to the petroleum industry, there is also an idea that the affordable and stable hydropower thwarts innovation: "A lot gets stranded already at the concept stage, I think. Because you constantly have to balance it against hydropower."

3.3.4. Discussion and conclusions

Our pre-identified key-events did not stand out in the way we had expected. As previously stated, hydropower emerged as the topic about which the participants had the most to say. The dilemma between ruining nature and having clean power, as well as the ambivalent position of Norway as an energy nation that produces both hydropower and petroleum stood out as important. Surprisingly, the oil crisis did not appear to have made much of an impact on the collective memory or on energy culture. Regarding petroleum, there was a clear generational difference between those who remember (either first hand or through their own parents) Norway as a poor country before the oil, and those who do not. Nevertheless, it was surprising to learn that the participants did not appear to identify much with the petroleum "fairy-tale". This could be the result of the group composition. We also suspect that the effect and role of the petroleum industry on Norwegian energy culture and memory might be engrained to a point that people think of it as uninteresting or self-evident, and that this could account for at least some of the lack of interest in this "event" in Norwegian energy history.

An element that came up was the "overforbruksmåler", the electricity meter used in Norway until the 1960s or 70s. This was connected to the tariff structures at the time, where one pre-purchased a certain amount of electricity. If a household consumed more, the excess electricity was more expensive. Whenever this was about to happen, a lever would indicate it – much in the same way as a speedometer in a car indicates speed. The meters were typically installed in the kitchen or living room, so people could easily access the information. The reason for the meters was to avoid overloading the grid. The participants who remembered this device, remembered how, if the lever began moving toward "excessive consumption", one had to turn off devices and appliances around the house, or that various electricity consuming tasks had to be planned in order not to occur at the same time. The group expresses that this system is on its way back through smart metering and new differential tariffs, yet this time it is less due to scarcity (or grid weakness) but due to environmental concerns.

Here, there is an impression that people in many other countries (e.g. Spain is mentioned) have been doing this for years, but that once again, due to the extensive and inexpensive green hydropower as well as undifferentiated tariff structures, Norwegians have not had much use for it. The energy supply is described as constant and unproblematic. Most of the participants remember frequent blackouts from their childhoods; however, these are much rarer in recent years. “Electricity crises” are regularly reported on in the media, however this, the respondents say, relate to price and not to supply.

The participants were quite keen to talk about environmental issues, new renewable energies such as photovoltaics, air pollution due to travel and car use. The respondents repeatedly chided themselves for not being more environmentally conscious in their actions, for favouring comfort and convenience over what they perceived as morally right. This might be indicative of our current situation in which people are increasingly becoming aware of and concerned about environmental issues – not least with regard to their own consumption and carbon footprint. We also suspect, however, that the group arrived with certain expectations given the topic of the ECHOES project and the researchers conducting “energy research”, which may have affected the topics raised – that they talked about what they thought we wanted to hear.

A few significant personal and regional energy memories emerged during the discussion. One such “smaller” event was the winter of 2010 in the region of Trønderlag. This was the coldest winter in several decades, and two of the respondents had bad memories of struggling to keep warm due to their financial and living situations at the time. This had affected their memory and perception of electricity prices greatly, yet it did not appear to have influenced their actions much. One respondent remembered well the disappointment they felt when it became known that woodstoves were bad for the environment. Another respondent brought up the topic of paraffin stoves, fondly remembering their smell and having to fetch paraffin as a child. Furthermore, the group collectively remembers when air travel first became cheap, and reflect upon how this has made travelling, for both work and leisure, much more common and frequent. A possible interesting avenue for continuing work on energy memories might be to explore memories that appear less connected with major national or international events and that connect more closely or explicitly to peoples’ everyday lives and activities.

3.4. Spain

This report is the result of 20 unstructured interviews with different professional background, age and gender, as well as a group discussion with 9 participants celebrated on February 15, 2018 at the TECNALIA premises in San Sebastián, Spain.

The key events shaping the energy memory of the interviewed – and processed further during the group discussion, belong to three distinct categories or "components" of energy memory, as summarized in Figure 4 below: renewables off-take, crisis and conflict situation and energy use (related to equipment and comfort).

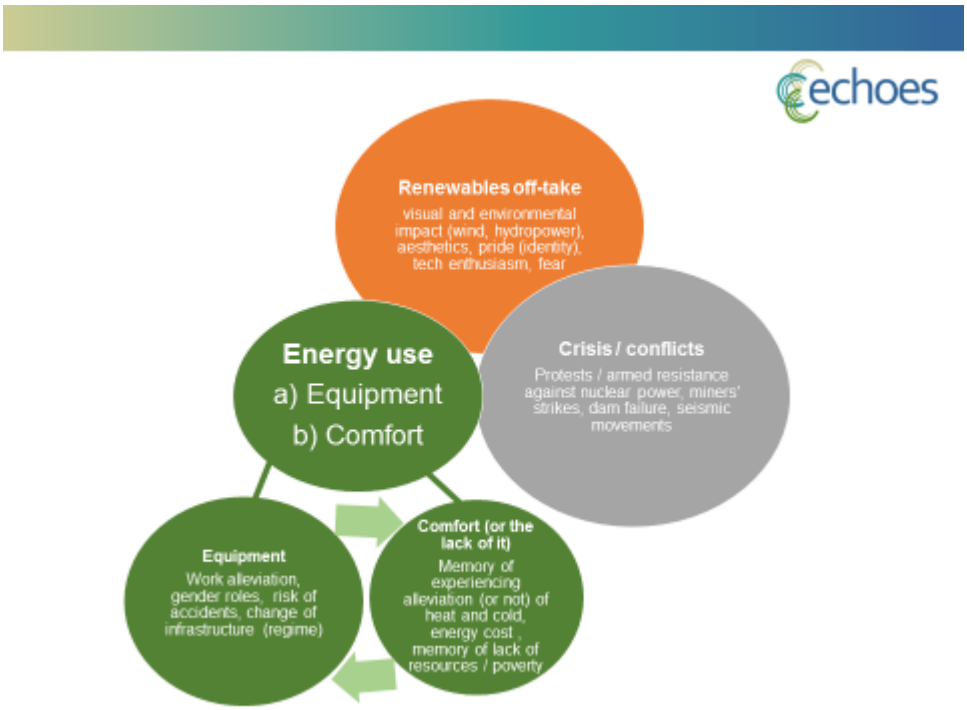

Figure 4: Components of energy memory in Spain

Memories related to daily energy use and the perception of renewable energy were widely discussed during the workshop, as explained at the end of this document. During the workshop, the interviewees and discussion group participants referred the following key events:

Hydropower development
Nuclear power

3.4.1. The key event

Hydroelectric energy (included under "Renewables off-take" and under "crisis / conflicts")

Hydropower development

Hydropower has played a major role in the development of the Spanish electricity sector since the beginning of the 20th century and new capacity has been added continuously, with the strongest increase in capacity taking place between 1951 and 1971 under the Franco regime (1939 – 1975), as shown in the figure below:

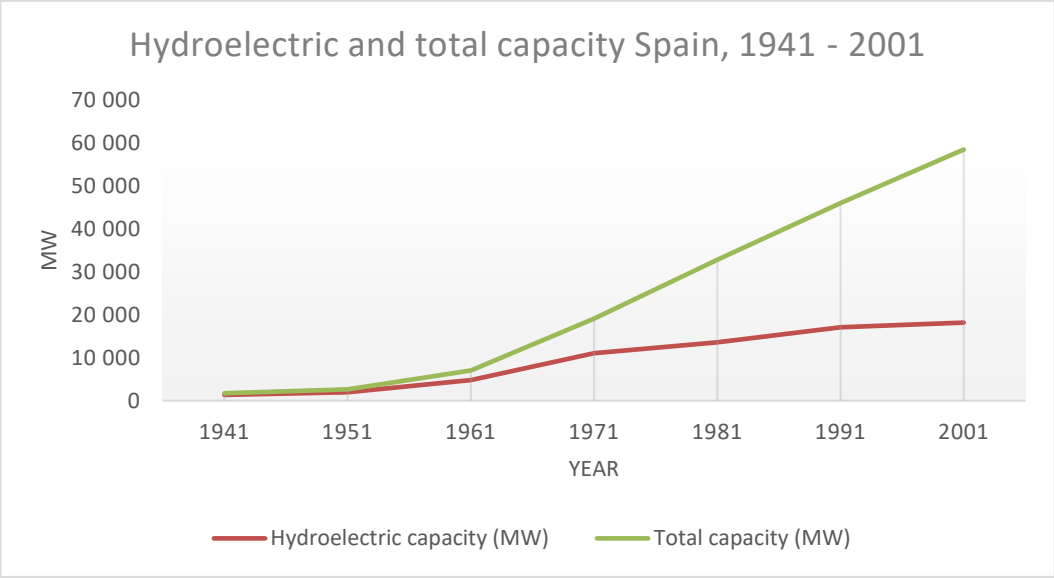

Figure 5: Hydroelectric and total capacity Spain 1941-2001

(Source: own elaboration based on Espejo Marin and García Marin (2010)

Hydropower constituted the main source for electricity production during the period of electrification in Spain (Ibeas n.d.), which started in 1881 with the creation of the first electricity supplier and the first public street lighting installation in the region of Cantabria. It took another 80 years for Spain to deploy regional networks and reach full electrification (around 1960), due to the devastating social and economic impact of the Spanish Civil War 1936-39, and the following decades of economic isolation, poverty and political repression. The development of the Spanish electricity sector is therefore characterized as "slow" and "similar to non-industrialized countries" by analysts (Bartolome and Lanciotti 2015). Spain relied to a lesser extent on thermal energy sources than its neighbours in the North of the continent, which in turn is related to the relatively low level of industrial production in the major part of the country up to the 1960ies.

During the post-civil war decades, poverty was wide-spread in Spain and, for a large part of the population, access to modern energy services was rather limited. An elderly participant in the workshop recalled that in these times "we were cold and we would use a hot brick or a heating pad to warm ourselves". When the population finally gained access to energy services, this was greeted with surprise and pleasure: "it was a miracle to have hot water and heating by just hitting one button". During the workshop and also in one of the interviews, the change from 125V to 220V that started in the 1950ies was recalled, as this change had a heavy economic impact on households (due to the need to replace expensive appliances), and it was remarked that there are still older

houses in the country that continue to use 125V. These and other observed changes led the participants to reflect on the slowness of such energy transition processes in the past, and the role that these have played in their personal live, even if they were not perceived as such at the time they took place.

Nuclear energy (included under crisis / conflicts)

Lemoniz / Lemoniz nuclear power plant in the Basque Country, Spain

The diversification of the Spanish energy mix in the 1970ies through the addition of thermal (coal, fuel) and nuclear power plants coincided with the final years of the Franco regime, the restauration of the monarchy and the "transition" towards parliamentary democracy. This decade and the next were characterized by emigration, strong protest movements, as well as the fear of a military *coup d'état*, as the attack in the Spanish parliament in 1981 and second intent planned in 1982. Some of the armed opposition movements against Franco were still active in the country, mainly the communist GRAPO and the separatist ETA in the Basque Country.

The participants in the workshop clearly recalled strong citizen protests against the planned nuclear plants in the Basque Country (Lemoniz and two other possible locations) as important events. They remembered them with a mixture of sadness (due to the killing of two engineers in charge of the construction site in Lemoniz in 1991 and 1992 by ETA, and three other workers being killed by bomb attacks) and satisfaction about the solidarity experienced during this time ("more than 1,000 people turned up to donate blood for injured protesters"). The protests had started in 1976 with the first massive and legally authorized demonstration in the Basque Country during the "transition" from dictatorship to democracy (Lopez Romo 2012). In one of these anti-nuclear protest marches in the Basque Country and Navarre, an environmental activist was killed and her name is still remembered – on June 3, 2018, the ecologist organization she belonged to organized a memorial celebration in a park in San Sebastian – Donostia, which has been baptized "Gladys Enea" by popular vote, substituting the former name of a Spanish queen (Cristina Enea).

3.4.2. Effects on the national energy culture

Hydroelectric energy (included under "Renewables off-take" and under "crisis / conflicts)

Hydropower development

The severe draughts experienced during the first half of the 1950ies led to the accelerated development of thermal and nuclear capacity from 1970 on and the decrease of hydropower contribution in the Spanish energy mix in later decades. The reliance of hydropower still permits Spain to draw on clean base load production, but also creates an exposure to weather and climate-related impacts.

Nuclear energy (included under crisis / conflicts)

Lemoniz / Lemoniz nuclear power plant in the Basque Country, Spain

In the wake of the protests and the ETA killings, the plans for nuclear power plants in the Basque Country were abandoned, but the construction continued in other parts of Spain (there are 7 nuclear power stations in Spain). The killings caused a long-lasting fear among leading employees of the affected utility (Iberduero, nowadays Iberdrola), but had no further effect on the national energy culture in Spain. Likewise, the severe accident occurred in 1989 in the Vandellós I plant in Catalonia, which forced the closure of this plant (but was not mentioned during the group discussion), did not lead to immediate changes in the Spanish energy policy, since the sector has been characterized by overcapacities in generation and lack of interconnections for decades (The Corner 2017). The Spanish nuclear adventure, however, came with a high cost for the consumer: when construction of new plants was halted in 1995, the national government accepted the electricity companies' claim to redemption of stranded investments. The corresponding costs of 6 bn Euro has been collected through the electricity bill until 2015. Now, the country still faces a deficit of 3bn euro to cover the dismantling costs adding up to a total of 8bn.

3.4.3. The long-term effects on the national energy memory

Hydroelectric energy (included under "Renewables off-take" and under "crisis / conflicts)

Hydropower development

Due to the important side effects of hydropower use and its vulnerability during prolonged draughts, the workshop participants did not consider hydropower as a renewable source, but just another form of electricity generation. The group also showed a high level of awareness of the link between the social challenge of safe water supply and energy production, which still influences the present discussion about the use of shale gas (fracking).

The workshop participants recognized that the construction of the hydropower dams had strong negative impacts on the local scale due to the flooding of large areas and the abandonment of the surrounding villages, but also had a positive impact on water management for industries in the driest regions of Spain. The participants established a very strong link between water use for hydroelectric power plants and its influence on other uses, as well as the problems caused by severe and prolonged droughts. In this context, the threat to aquifers was mentioned, the cost of water for irrigation and the discontent with the quality of water coming from desalinization plants. Positive aspects of water management in Spain were access to water reserves in regions exposed to draughts, which contrasts with the large amount of water dedicated to leisure activities (golf, mainly). The most recent conflicts around the construction of new dams and the flooding of nearby villages, namely in Riaño (province of Leon) and Itoiz (Navarre), were recalled during the discussion, along with the fear of seismic movements provoked by the dam construction in the latter case.

Figure 6: Riaño hydropower plant, the construction of which led to the partial or total flooding of 9 villages in 1987.

Author: Carlos Delgado.[13]

Nuclear energy (included under crisis / conflicts)

Lemoniz / Lemoniz nuclear power plant in the Basque Country, Spain

Opinions on nuclear energy were also linked to other events during the group discussion. One participant had first-hand knowledge about the Chernobyl accident, since he was working in Ukraine at that time, but, in his case, this did not lead to general rejection of nuclear power, since he blamed the Russian operators for the accident. A second participant believed that the accidents in Chernobyl and Fukushima had led to the improvement of safety standards at the nuclear power plants, while another participant was not aware of consuming nuclear power. The question was raised if the Spanish energy system could function without nuclear, but another participant pointed out that this was feasible, since also the coal power plants have been largely shut down in the last decades, despite of the strong protests and prolonged strikes of in the mining regions.

Nuclear power is, however, still questioned in the Basque region, as the recent discussion about and the social mobilization against the prolongation of the old plant in Garoña (province of Burgos, close to the Basque region) has demonstrated. Also, industry support for nuclear has faded and Iberdrola, for example, has openly stated that the company was not interested in the continued operation of Garoña in view of the important safety investments required for this purpose (El Mundo 2017).

The nuclear expansion phase was directly followed by a period of "dash-for-gas" in the last decade of the 20th century, driven by the extension of the national gas distribution network and the need to reduce harmful NOx

[13] *Published under Creative Commons Attribution-Share Alike 4.0 International license at https://es.m.wikipedia.org/wiki/Archivo:Embalse_de_Ria%C3%B1o_-_01.jpg*

emissions from coal and lignite-fueled plants, which had negative effects also in other European countries. In parallel, renewable energy sources, mainly wind in the first phase, were slowly making their way into the market.

While the participants recalled the closure of the coal-fired power stations, the loss of jobs and the social unrests in the mining regions – taken as an example for the feasibility of a change of regime - they made no mention of the rapid spread of gas power plants. The switch to flexible gas power plants to cover peak loads that took place the 1990ies – combined with the specific regulation of reserve capacity in Spain – has strongly influenced electricity prices in recent years and led to strong price hikes during times of high demand and low renewable energy production levels, but this relationship was not mentioned neither during the interviews nor during the workshop.

On the contrary, the first confrontation with wind power plants was clearly remembered, albeit in very completely different ways. While, for some participants, these plants represented hope for change and made them "feel proud of the installation of renewable energy in Spain", another participant saw them as "aberration, because of the environmental impact of wind turbines in our mountains".

Such negative impacts were not reported in the case of photovoltaics. For PV, the participants discussed the contradictory policy measures in Spain and determined that "there is a loss of confidence in photovoltaic energy and uncertainty for investors".

3.4.4. General Discussion and Conclusions

It became very clear from the interviews and group discussion conducted in the Basque Country (Spain) that large-scale events constitute components of the collective energy memory, but, as such, do not explain an individual person's attitude towards certain forms of energy generation. All interviewees and participants referred incisive experiences that impacted their perception of energy and many of these experiences were related to the *use* of energy, rather than energy generation. Factors mentioned here were related to risk or health hazards, the cost of energy and the experience of prolonged periods without access to certain energy services, an experience shared by the older generations in Spain, which, along with high energy prices, can lead to energy-saving attitudes and preference for austerity: "I recall my parents telling me to switch off the lights over and over again" (younger workshop participant).

The benefit of the group discussion – as appreciated by the participants – were insights gained on the historical development of energy, such as the contribution of energy to increased comfort well-being and decreased work load, but also the recognition of how the energy history of the country is still reflected in the price that households pay for their energy services. However, when asked at the end of the meeting about which of the three components of energy memory had the strongest influence on their present attitude towards energy, the participants were almost equally divided between "renewable take-off" and "crisis / conflicts".

Year	EVENT
1852	First use of electricity
1875	Electrification under way. In many rural areas, cooperatives are founded to enable access to the networks, some 200 still exist nowadays

1881	First electricity supplier established
1901	First energy statistics (61% of electricity of thermal origin, 39% hydropower, % climbs to 81% by the end of the 1920s and excess capacity)
1936-39	Fascist military coup and armed resistance (civil war), followed by 40 years of dictatorship
1944/45	Severe draught and energy deficit, government impulses interconnection of grids and legal framework guaranteeing investment and stable income for generators (1953), thermal (fuel-oil) capacity is added to reduce dependence on hydropower (down to 50%) in 1970
1968	First nuclear power plant "Zorita" online
1969	First LNG terminal in Barcelona, to supply industrial district in Tarragona
1970 – 73	Consumption of natural gas has increased by 12, but limited to industrial consumers in Catalonia
1972	Foundation of Enagas, first distributor of natural gas in Spain
1973	Oil crisis, but new fuel-oil plants come online until 1976
1974 - 85	Transition from the Franco Regime to democracy
1978	First 10-year energy plan (PEN) in Spain
1979 -1990	second oil crisis, to reduce dependence, coal and nuclear plants enter into service between 1980 and 1990 and consequent overcapacity
1982	first wind generator online in Spain (in Tarifa, Cadiz), result of Spanish R&D initiated in 1979
1984 (march)	first wind mill comes online in Vilopriu, Cataluña, designed by the Ecotècnia cooperative (anti-nuclear ecologists, pioneer project, w/o regulatory framework for connection). In April 1984, the first wind park is inaugurated, also in Cataluña
1985	The gas transport distribution network is extended to the rest of the Spanish provinces, to reach 80.097 km in 2012.
1990 onward	"Dash for gas" in electricity generation in Spain
1991	First energy plan including renewables

1994	First wind park online in Navarre (El Perdón), promoters Ingeteam and EHN, now Acciona, plus public research laboratory CENER – "we've been pioneers"
1997	First favourable legislative environment giving priority to renewable energy ("special regime")
1998	Wind supplies 20% of all electricity in Navarre
2005	Wind power production higher than hydroelectricity in Spain
2011	Conservative government makes retroactive cuts to subsidies for renewable, paralyses investment in wind and solar

Table 4: Milestones in the development of the Spanish energy sector

3.5. Turkey

3.5.1. The Key Events

For Turkey, we analysed three phenomena that we can refer to as key events shaping and affecting the energy memories. Chronologically, the key events cover a time range from back to 1950's until the very recent years. One of the three key events, mass urbanization, has its roots back in the 1950's, is still partially continuing with a more diminishing effect. The other one, Turkey's plans of installing nuclear power plants dates back to 1960's, with pretty low profile since then, however it is now back in Turkey's agenda in the recent years. The third key event refers to the introduction of the use of natural gas as a response to increasing energy demand from households and as an alternative source of energy in Turkey's energy mix portfolio.

We believe that these key events have effects on energy memories of individuals regarding various aspects, with a coverage ranging from social and cultural to political and economic aspects.

One can conclude that, the impacts of the key events on energy memories are more on the individual level and tend to decay over time, unless the key event is 'cultivated' by several media or the actual key event is one that persists over time.

Mass Urbanization

Turkey's Story with Nuclear Power

Turkey's Energy Transition: The Era of Natural Gas

Mass Urbanization

Defined as a progressive increase in the population of cities and towns contrary to rural areas, urbanization is mostly caused by an assumption that urban areas provide enhanced political, economic and social opportunities to residents such as better health care, education, and transportation services as well as new job opportunities (UN-Habitat 2016). Multiple factors influenced Turkey's growth-oriented and inclusive urbanization process. Firstly, Turkey allowed its markets to work with policies in the 1980s ensuring economic liberalization through the flow of new domestic and foreign private investment. These elements were quite attractive for rural migrants. Secondly, a metropolitan municipality regime adopted in 1984 constituted the administrative framework which would be essential to successfully manage fast growing cities across their economic footprint (The World Bank 2015).

In Turkey's history, labour migration has been experienced to coastal cities where market access is relatively easier. The coastal metropolitan cities have been known as residential areas with spatial concentration of population (Karam 2015). Over the last decade, major metropolitan cities such as Istanbul, Ankara and Izmir have encountered with a decline in the share of urban population whereas relatively less congested metropolitan cities in Central Anatolia have a high share of urban population growth (The World Bank 2015).

Owing to urbanization and massive immigration to urban cities, shanty towns become the main settlement area of immigrants, resulting in social and economic problems (Ooi and Phua 2007). Lack of public services and lack of

access to electricity are regarded as the main problems of the residents of shanty towns (Lee 2006). “Massive populations in informal settlements use illegal hook-ups to the electrical grid and directly affects electricity consumption while not being officially accounted for in population estimates.”(Haefer 2014). The same situation has also been observed in Turkey. The fact that residents in informal settlements cannot have an access to proper electricity services, they have a tendency to illegal electricity usage. If energy consumption increases in an uncontrollable manner, an ecological collapse will be the ultimate consequence (Mulligan 2013). In case there is a continuous increase in global energy demand, global temperatures might rise by more than 2° C, which contradicts with the targets to alleviate the impacts of global warming (IEA 2013).

Turkey’s Story with Nuclear Power

“Currently, a nuclear power plant is tried to be constructed in Turkey. The construction of a nuclear power plant is probably seen as a remedy for dependency on Middle East. Whether such an attempt is a correct step or not is also a matter of debate.”

Discussion Group Turkey, Male Respondent, Specialist in advertising

The debates on the potential use of nuclear power in Turkey date back to 1955. On the same year, Turkey became a signatory of the international Atoms for Peace agreement. In 1956, Turkish Atomic Energy Authority was established with the objectives: “... to determine the basis of the national policy and the related plans and programmes in connection with the peaceful utilization of atomic energy for the benefit of the State …” and “…determine the general principles to be complied in all kinds of prospecting, exploiting, purification, distribution, import, export, trade, transport, use, transfer and storage of nuclear raw material…” (TAEK 2018). The first nuclear reactors that were established happened to be small reactors (from 250 kW_{th} upto 5 MW_{th}), mostly for scientific research and experimentation and also for the use of the health sector. This initial progress did not receive noteworthy interest or reaction from the society (TAEK 2012).

The first efforts to build a nuclear reactor started in 1965, with a 400 MW_e planned capacity. Due to the high investment and financing needs of the nuclear power plant and the economic difficulties that Turkey faced over those years, the plans did not progress until 1976. On that year, Akkuyu (Mersin) licensed for a nuclear power plant. However, the investment was cancelled because of the financial problems of the contracting company (Biresslioglu 2012).

The rather longer-term plans emerged in 1980s, that coincide with the political and social transformation that Turkey went through. Detailed feasibility for two nuclear power plants were constructed, the first one in the earlier-planned Akkuyu, this time 4800 MW_e and the other in Sinop, with a capacity of 4600 MW_e (Biresselioglu 2012). During the 1980s, the Turkish government took courageous steps in many areas, mostly on the path to a liberal economy.

However, the well-known Chernobyl Accident that happened in 1986 at the Chernobyl nuclear power plant in Ukraine caused a setback on these plans. The accident killed 30 persons that were working in the power plant or

attended the incident. Thousands of people were affected by the radiation exposure and cases were reported over 20 years following the incident (World Nuclear Association 2018).

Finally, in line with Turkey's new energy policy that aims to build up energy diversification by focusing on local resources and setting up ambitious targets to decrease import dependence in energy (Hürriyet Daily News 2017), more severe steps were taken starting from 2013 to engage a Russian company, JSC Rusatom Energy International for the Akkuyu nuclear power plant construction (World Nuclear Association 2018).

Turkey's Energy Transition: The Era of Natural Gas

Natural gas is has been an important source of energy in the global energy mix for more than last fifty years. Natural gas which is a kind of energy that comes from the combination of various gases is a relatively clean fuel that cannot be compared with coal, lignite and fuel oil. That is because it is a flammable, odorless, colorless and light air gas (Demirbas 2010).

The history of natural gas in Turkey has started exactly in 1970 when the reserves of natural gas were discovered for the first time. In terms of increasing industrial need of energy sources, natural gas is used initially in cement factories (PETFORM 2018). However, the amount of reserves and production of resources could not be expanded in the short term. This led Turkey to be a natural gas importer soon afterwards.

In 1986, the Petroleum Pipeline Corporation (BOTAŞ) took the first step with a Soviet Union export company, Soyuzgaz, and signed a 25-years natural gas purchase agreement, followed by contracts with Russia, Iran and Azerbaijan as pipe gas; with Algeria and Nigeria as liquified natural gas (LNG) in order to increase resource diversification and security of supply, in 1988 and 1995 accordingly (Biresselioglu 2016; MENR 2018).

Thereafter, in 1987, the first natural gas import was realized in Turkey. The first place that started using imported natural gas, both domestically and commercially, was Ankara, in 1988 (PETFORM 2018).

In addition to these developments, when it comes to the 1990s, air pollution has started to show its ugly face also in Istanbul, as the investments are very prolonged, and the people are not sufficiently informed about natural gas. According to the world standards, a maximum of 150 microgram/m³ sulfur dioxide content, which must be present in one cubic meter air, has risen to 2,330 micrograms/m³ in Istanbul in the winter of 1993 (UCTEA Chamber of Mechanical Engineers 2003).

Within this conjuncture, Turkey has extended the use of natural gas in order to prevent the increasing population and environmental pollution in Istanbul, one of the most crowded cities in the world. After the first part of the investment was completed, the first natural gas was supplied to subscribers in January 1992 (PETFORM 2018). Since April 1994, natural gas usage has become widespread with an intensive promotion and incentive campaign based on reducing pollution in Istanbul. Those who remember the air of the city prior to the use of natural gas are very well aware of what this fuel means for Istanbul and of how important it is for Istanbul to have no air pollution problem today.

3.5.2. Effects on national energy culture

Mass Urbanization

Turkey's rapid urbanization has caused Turkey to experience demographic and economic transformation with increasing urban population, which also has a direct impact on energy consumption (Karam 2015).

Since 1950s, rapid urbanization in Turkey's major industrial cities, also known as Anatolian Tigers, has caused energy demand to increase in multiple sectors such as agriculture, transportation and power market as a result of economic growth and development. However, rising energy consumption implies that more CO_2 emissions and environmental pollution will be experienced in urban areas. In the discussion group conducted within the framework of the project, one of the respondents has reacted:

"As the immigration from villages to urban areas increases, the crime rates increased to some extent. These people cannot adapt to the city life and they are also ignorant in energy consumption."

Discussion Group Turkey, Female Respondent, Professor

Lack of awareness and unconscious usage of energy resources are the major reasons of increasing CO_2 emissions in urban areas that are vulnerable to population increase. In particular, young generations in urban cities do not pay attention to energy consumption. The respondents in the discussion group explain their opinion regarding young generations' energy consumption patterns:

"I think our generation is the last generation that has such an awareness. New generations and young people do not have enough conscious about excessive energy consumption."

Discussion Group Turkey, Male Respondent, SME Owner

"Energy culture is shaped by the characteristics of a society. Working hours and the time spent at home shape the energy consumption pattern of a society."

Discussion Group Turkey, Female Respondent, Professor

As the number of people that immigrate to urban cities increases, the number of employees and working hours spent at working place directly rise. This means increasing energy consumption during peak hours.

Turkey's Story with Nuclear Power

"It is clear that Turkey is not so successful in the implementation of many different systems. For this reason, nuclear energy creates anxiety among public. It is thought that we will not be successful in nuclear energy as well."

Discussion Group Turkey, Female Respondent, Professor

"I cannot understand why everyone objects to nuclear energy. I think people should be informed about both the advantages and disadvantages of nuclear energy."

Discussion Group Turkey, Male Respondent, SME Owner

"Nuclear energy is the first association [regarding energy memories] for me. At the beginning, nuclear energy highly created a negative impression. However, I changed my opinion after making a research in this field. We heard many negative comments about the establishment of a nuclear power plant in Akkuyu particularly from Greenpeace. Therefore, from my point of view, energy memory is associated with nuclear energy. However, currently, I have more positive opinions about nuclear energy."

Discussion Group Turkey, Female Respondent, Ph.D.Student

Until 1965 when the plans to build a nuclear power plant in Turkey, the initial progress in the field of nuclear energy did not receive noteworthy interest or reaction from the society. Thereafter, the issue was on and off the agenda for 5 to 10-year periods, mostly in the agendas of the policy makers and the energy industry. However, mostly because of this intermittent process, the nuclear energy issue was never really a significant part of the energy memories. Still, there were always pro-nuclear and anti-nuclear camps, but both remained to constitute marginal in number, thus without a real diffusion into the energy culture.

Turkey's Energy Transition: The Era of Natural Gas

As an effect on national energy culture, natural gas has been chosen as the most prevalent energy resource by the Turkish policy-making bodies since the 1990s until today. The most important criteria for choosing natural gas is strictly its effect on reducing air pollution, as well as its elasticity of usage in terms of both electricity generation and heating (Biresselioglu, 2016). Not surprisingly, increasing its importance as a primary energy source, both in total energy consumption and electricity generation, today natural gas itself has a share of more than 35% (EMRA 2017).

"For instance, the large cities such as Ankara and Eskisehir used mostly coal for heating, which caused high levels of air pollution. Turkey attempted to decrease air pollution and improve air quality in Ankara."

Discussion Group Turkey, Male-Respondent, Specialist in advertising

Increasing the ratio of natural gas in the national energy mix is seen as a matter of debate for the countries with the lack of reserves. Yet, natural gas prices were relatively low and reasonable during the late 1990s, comparing to the period after the year of 2000. According to the article studied by Biresselioglu (2016), this situation has also led natural gas fired power plants to be effective in terms of their costs. Additionally, the study also highlights that natural gas fired power plants is also seen as an effective choice since they are capable of answering urgent energy needs and they are more flexible comparing to different types of power plants (Biresselioglu 2016). On the other hand, renewable energy technologies, such as wind, solar, geothermal, biomass etc., excluding hydro, have not been key issues in the energy agenda in Turkey, since their potential has not been fully developed. Additionally, it is also crucial to mention that the increasing share of natural gas also had an inevitable direct impact on energy consumption of Turkey. Nevertheless, the most important and significant impact was on

electricity generation while natural gas fired power plants which has a share of 35% of the total electricity generation as of the end of 2017 in Turkey (MENR 2018).

While witnessing the global oil crisis in the 1970s, Turkey was also experiencing an era of the industrialization, accompanied by an energy transition. Coal was the main energy source both for the Turkish industry and in terms of heating, by also causing increasing air pollution too. One of the respondents from the discussion group related to the energy memory theme also argues the emphasis of the energy transition as follows:

"In terms of energy transition, the fundamental purpose in Turkey has been oriented to decreasing air pollution and enhancing air quality."

Discussion Group Turkey, Male-Respondent, Specialist in advertising

Along with the sprawl of the urbanization at the same time, a need to seek alternative energy resources also emerged accordingly. The negative result of the urbanization in terms of the air pollution, is also mentioned by a discussion group respondent as:

"However, when the immigration from rural areas to urban regions became widespread, the shanty town increased, resulting in higher air pollution levels due to the consumption of all types of coal."

Discussion Group Turkey, Male-Respondent, Specialist in advertising

3.5.3. Long term effect on the national energy memory

Mass Urbanization

Upon urbanization movements and increasing energy consumption, the concept of energy efficiency has become a fundamental issue in Turkey. Regarded as a key point to ensuring a safe, reliable, affordable and sustainable energy future, energy efficiency remains at the core of Turkey's energy policies (IEA 2017). However, one missing point is that energy efficiency cannot be properly ensured in a country where illegal electricity usage tends to increase rapidly. The respondents' opinions regarding illegal electricity usage are as follows:

"On the one hand we mention energy efficiency and decrease of energy consumption. On the other hand, we face with illegal electricity usage. It is not important whether these illegal electricity users purchase energy efficient-appliances or not."

Discussion Group Turkey, Male Respondent, Specialist in advertising

"We have to pay for the illegal electricity consumption in our own electric bills. Such an idea always disturbs me."

Discussion Group Turkey, Male Respondent, SME Owner

The impacts of rapid urbanization in Turkey are not only restricted with shanty towns and increasing illegal electricity usage. Transportation sector is also a significant factor in urbanization process with respect to energy consumption. More residents living in urban cities imply more private vehicles and increasing fuel consumption. Urbanization in Turkey is one of the major drivers of private car usage and rising energy demand in transportation (Jones 1991; Arvin et al. 2015). Therefore, the public transportation tools are tried to be encouraged in Turkey to decrease the adverse impacts of urbanization. The respondents' evaluations regarding public transportation in urban areas are as following:

"The use of public transportation vehicles and non-diesel fuelled vehicles can be a good attempt for the transition to a low carbon economy. For instance, some countries will phase out all diesel-fuelled vehicles until 2020s and gasoline power until 2030s."

Discussion Group Turkey, Female Respondent, Professor

"Personally, I prefer public transportation vehicles. However, people might resist using public transportation due to negative incidents such as harassment and molestation."

Discussion Group Turkey, Female Respondent, Professor

"These negative incidents including harassment and molestation probably constitute a problem in public transportation. On the other hand, I cannot reach the destination that I want to go with a single bus in X city. Due to the fact that using buses take a long time in X city, I prefer my private car. In London, the subway stations are so widespread that the transportation is quite easy. If the same system is implemented in Turkey, I will definitely use public transportation."

Discussion Group Turkey, Female Respondent, Professor

"The preference to use public transportation depends on the conditions where you live. If the urban planning is well designed, citizens might benefit from the opportunities more."

Discussion Group Turkey, Male Respondent, Specialist in advertising

With the urbanization process, the industrial structure has started to change due to economic development. In this regard, fuel consumption of per worker and per unit of output has increased to a great extent, which means the share of fossil fuels automatically rises, resulting in higher greenhouse gas emissions (Jones 1991).

Consequently, it is clearly seen that urbanization movements since 1950s contributed to Turkey's economic growth and development. However, they also have negative impacts on energy consumption and greenhouse gas emissions by triggering global warming.

Turkey's Story with Nuclear Power

"From my point of view, nuclear energy requires a certain technological infrastructure. In Turkey, around 300 people died in a coal mine where any technology is not required. When we say energy memory, the first things that come to my mind are Chernobyl nuclear accident and coal burning stoves"

Discussion Group Turkey, Female Respondent, Professor

"There were always negative comments about nuclear energy. These negative impressions probably stem from nuclear accidents such as Chernobyl explosion. Later, I learned that nuclear energy is the most sustainable and clean energy resource."

Discussion Group Turkey, Female Respondent, Communications Coordinator in a Tourism Foundation

One major event, the Chernobyl incident raised a considerable amount of attraction on nuclear power plants and nuclear energy. Since Turkey did not have running programs for the use of nuclear energy at that time, the effect was mainly limited to a sense of 'fear' from nuclear power that could generate deadly incidents.

The Chernobyl incident was particularly significant for the long-term energy memories in Turkey, first because of the geographical proximity of the Black Sea Region of Turkey to the area of the accident that may cause exposure through the spread of radionucleids. Increased incidences of cancer have been reported (Gokmen, G. et al. 1996). Second, the accident affected the energy memories of the society since there is an ever-increased and carried-on perception of nuclear power plants as a source of potential threat to the society.

"Why did such a big nuclear accident occur in Japan?The nuclear accident experienced in Japan was caused by a failure of design."

Discussion Group Turkey, Male Respondent, Specialist in advertising

Although it happened more recently, the Fukushima Accident in 2011 had very little effect on energy memories in Turkey. The incident happened after a major earthquake that caused tsunami, which in turn damaged the cooling of systems of nuclear reactors in Fukushima, Japan (World Nuclear Association 2017). One reason for this incident not affecting the energy memories in Turkey is that the region that the accident happened is geographically very far from Turkey, and this diminishes the perception of associated risks considerably. Moreover, primarily due to quick evacuation of the accident site, the accident was not related with any deaths and did not remain in the agenda of the Turkish people for a long time. In Turkey, the media coverage of the event was limited. The effects of the Fukushima incident on the industries and the supply chains was an issue of debate for professionals, and did not spread to the society.

Introduction of Natural Gas as an alternative Energy Source

Renewable energy sources were a substitute energy source at first, but the comparably high investment costs do not allow the Turkish government to invest in them. In these circumstances, natural gas was an optimal choice for Turkish energy market both for industry and household use.

Boosting the rapid urbanization in the mid-1980s like other developing countries, it is also crucial to mention that Turkish economy also started to experience a transformation from an agricultural to an industrial one. This shift has been accompanied by an increasing trend in energy consumption. However, the level of energy consumption in Turkey could be relatively low compared to its young population. The fact is that, the result will be an increasing energy demand in the near future (Biresselioglu 2012).

Up until today, 73 out of 81 provinces are supplied natural gas; where 9 provinces have been provided gas supply in 2002 and before, 64 provinces between 2002 and 2013, 5 provinces with ongoing constructional work, 3 provinces with ongoing engineering studies (MENR 2014). This accelerating increase in natural gas consumption is also a clear explanation of the higher dependency on imported fuels, which is currently reached almost 98% (The Economic Policy Research Foundation of Turkey 2013).

This high level of dependency has emerged as a threat to national energy security, one of the notable long-term effects on Turkish energy memory. Accordingly, this import-dependent position of Turkey in terms of natural gas, as well as oil, is a matter of subject in official document such as strategic plans and lying on the top of the agenda of Turkish government. By adopting diversification principle in terms of both energy sources and suppliers, a decreasing share of natural gas especially in electricity generation is become a prominent and a vital issue among long term targets of the Turkish state.

Besides, Turkish government also believes the importance of private sector involvement in the natural gas market. By liberalizing the natural gas market, along with the adoption of Natural Gas Market Law Nr. 4646 in 2001, Turkish energy market history is aimed at witnessing increasing energy security level principally in terms of the security of supply. It is also expected to contribute to the level of economic competitiveness to be increased in Turkey while the costs of the industrial sector are decreasing in the long term.

3.5.4. Discussion and conclusions

Both the desk research and the discussion group study pointed to similar events as key events as affecting the energy culture in Turkey. However, we have concluded that the energy memories phenomenon has its own way of working.

We had long discussions about including the deregulation of the energy market as a key event. As individuals with a background on energy related subjects, we tend to believe that the developments in the energy market, including deregulation, of course, have a great potential to shape the energy culture, hence, the energy memories. Nevertheless, it turns out that, although sufficient time has passed for the impacts to be observed, these have found very limited place regarding energy memories. That is, the society has not taken these events 'serious' enough to affect their behaviours, decisions, perceptions regarding energy-related issues. Unfortunately, we do not have concrete ideas on why this is so, although we have several thoughts on it.

The first factor is related with the overall perception of energy issues. As it also emerges as a theme in ECHOES project's Work Package 6 , individuals usually take energy as granted, and have the tendency to overlook energy issues within their daily struggle. Energy generally comes into the picture by events that are marked with building renovations, price increases, blackouts, or accidents.

The second factor that we believe to be important for energy memories is the decay of energy memories over time. Based on our study in Turkey, we believe that energy memories are not transferred from generation to

generation. This results in different age groups of the society to have very much different energy memories. The generations that have lived through the periods of wars, economic crisis and blackouts always show more interest in energy efficiency and have more 'living' energy memories.

One other aspect is that energy memories are very much on the individual level. This can also be associated with the culture, level of information, awareness, and attitude towards energy issues.

An important factor related with energy memories is the cultivation of memories. As with many subjects, for instance, the media coverage is a significant determinant for energy memories. Once any key event, any event is publicized by the mass media, it has much higher chances of sustaining for a longer time. Formal and informal education also act as catalyst for cultivating energy memories.

Although decentralization, local communities, local production are becoming as important dimensions regarding energy, it appears that energy memories do not exhibit a localized pattern, they are rather on the national level.

Having started in 1950s in Turkey, urbanization has direct impacts on political decisions as well as economic and social reforms. The effects of urbanization besides the industrialization process during 1970s have been increasing incrementally. Upon the immigration from rural areas to urban cities, the structure of metropolitan regions has started to change due to new economic activities, job opportunities, industrial developments and rising population. In this regard, the energy demand in the industrial sector and energy consumption of residents tend to increase to a great extent. During this period, Turkey's national energy supply was based on coal, which is an indigenous type of fossil fuel. Even though coal is an indigenous source, it creates risks and hazards with respect to environmental concerns such as air pollution. Besides, urbanization movement in Turkey triggered the settlements in shanty towns. As a consequence of informal settlement, illegal electricity usage became a hot topic and major problem. Furthermore, urbanization process also paved a negative way for increasing fuel consumption of transportation vehicles.

The Turkish government made several attempts for the use of nuclear energy with the primary aim of strengthening Turkey's energy security. The society, however, was concerned with the risks related to nuclear power. Security issues and environmental threats were raised as issues against nuclear power. One other controversial issue is that the contractor for the first nuclear power plant is a Russian company, and Turkey is already highly dependent on Russia for oil and natural gas (Biresslioglu 2012).

Turkish policy makers were reinforced to make a decision based on the transition to a low carbon economy in Turkey. Accordingly, a transition to natural was experienced for the sake of decreasing air pollution, especially in the most industrialized cities known as Anatolian Tigers such as Istanbul, Ankara and Bursa.

All these developments in terms of urbanization and energy transition have still been on the agenda of the Turkish government with respect to security of supply and environmental issues. Besides, these milestones since 1950s in Turkish energy market history have significant long-term effects on the national energy memory and national energy culture. These long-term effects can be clearly observed in the responses of ECHOES project discussion group participants as personal memories.

4. CONCLUSIONS

4.1. Relevance for the Energy cultures approach

Epistemologically, the „energy memory“ approach shares the goal of gaining a systematic understanding of the energy cultures framework (Stephenson et al. 2010). In terms of heuristics, “energy memory” converts a static framework into a process. As described by Abbott 2004), the idea behind the “Stopping and Putting in Motion” heuristic is making static analytic strategies dynamic and vice versa. Adding the historical dimension to the energy cultures concept turned out to enhance the potential knowledge gain dramatically. A particularly concise example is the development of a commonly shared “anti-nuclear” culture in Austria. Such a culture can be described statically, but incorporating the national historic background and considering the role of different energy sources and corresponding key events adds analytical strength and might make it easier for policy makers to act upon insights on national energy cultures. Since energy cultures are constantly shaped and re-shaped, they are also susceptible to political action (see chapter 4.4.).

In several country studies presented above, it was demonstrated how energy memories influenced one or more aspects of the national energy cultures. A range of the key events discussed in this report have been transformed into memories about how the energy cultures of involved countries became constituted as they did, and consequently also how old energy cultures became de-stabilized. As an example, the **Norwegian** case study highlights how the discovery of oil was fundamental in shaping what has been described as a comfort-oriented energy culture. This is related to the construction of large structures for extraction and distribution of oil, institutions and company structures for distribution of wealth, as well as practices related to various forms of consumption. The narrative about Norway as an energy nation has been re-told countless times as a petroleum “fairytale” through official documents, advertisements, lobby work etc. On a more subtle level, discussion group participants have memories of these events literally transforming Norway, both in a very local and intimate way (e.g. how Norwegians live and work), and on a macro societal level (what constitutes “Norway”). Thus, this event, and the memory of it, indeed is the recollection of how a new Norwegian energy culture was formed. The **Austrian** recollection of the construction of the Kaprun hydroelectric power plant serves a similar function in a narrative about the advancement of modernity and progress, forming one core element of pride of the newly emerging state.

In other accounts, energy memories serve to highlight both how energy cultures have been constructed, but also how old energy cultures have been de-stabilized. The role of **Turkish** mass urbanization can serve as a case in point, where memories appear ambivalent. On one hand, they led to a radical de-stabilization of existing ways of life and related ways of using and producing energy. On the other hand, this mass urbanization is also highly generative, as it assembles new material, practical and normative elements, in a new spatial nexus, in turn constituting a new variant of Turkish energy culture.

The consideration of the stabilizing or destabilizing role of energy memories for energy cultures may also be viewed in a systemic context: Like every system, an energy culture is also concerned with system maintenance and stability. To this end, the cultural sub-areas materials, norms and practices tend to support and reinforce each other. In this sense, "comfort orientation", i.e. the quest to offer or obtain "comfort", can be interpreted as a quest for stability. If collective memories are generally shared within large parts of a society, they tend to strengthen the stability of a social energy culture, as explained in Chapter 1. Examples of this could be the establishment of institutions, organisations, legal frameworks, infrastructures (material culture), or the postulation and maintenance of corresponding social norms by institutions, media, etc.

However, if certain key events lead to changed memories that no longer make sense for society in the current situation, these newly emerging memories have a destabilising effect on energy culture and the system tries to achieve a new stability, including reaching a new "comfort zone".

4.2. Development of collective energy memories and their impact on national energy attitudes and consumption patterns

The assessment of the energy memories' impact on national energy cultures turned out to be more complex than expected. Especially two major challenges must be kept in mind when interpreting the findings: Firstly, the availability and identification of non-biased historic reports can be problematic since the roles of political actors, media, and scientific experts can be very diverse in the context of energy-related key events. Secondly, the group discussions did not only identify collectively shared energy related memories on a national level, but also more individual memories that are linked to key events but did (for different reasons) not develop into collectively shared memories. Since collectively shared memories and their potential impact on societal level is the key interest of our methodological approach, and secondly, as the national discussion groups were not representative for the respective societies, individual memories are taken into consideration only secondarily.

In the national case studies, countries chose quite a broad selection of "key events": from punctual, partly catastrophic events to long lasting transition phases of a societal system. In total, 7 punctual events and 8 events covering a certain period were selected.

Energy historic key events with an unquestionably connected and still existing shared memory on national level could not be identified in all countries. For example some of the selected cases in Austria turned out to have a connection to a collectively shared and still existing memory in accordance with the operational concept in terms of a national energy identity, while the cases selected in **Norway** apparently did not resonate in terms of still being perceived as key events. Although the finding of oil in Norway had a massive impact on the economic situation in the country and the memory connected to the "petroleum fairytale" is very strong, it turned out to be limited to generations who personally remember Norway as a poor country. The same situation was found in **Spain**, where the elderly participants clearly recalled times of poverty and lack of access to essential energy services, such as hot water, while the younger participants only established a link between energy and different levels of comfort, but not basic needs. Similarly the case of Kaprun in **Austria** was only formative for generations who personally remembered the key event or were influenced by the "cultivated memory" over the next 1-2 generations only. On the other side, memories about the Austrian citizen protests against nuclear power (Zwentendorf) and the planned hydropower plant in Hainburg obviously survived several generations and are still considered "key events" among young adults who were not even born then. This is supposedly due to the fact that these cases had an extremely strong and lasting impact at socio-political level (see Connerton's "structural amnesia" (Connerton 2008). Over time, emotional memories, which are limited to certain generations, are joined by general attitudes as a product of more rationalizing processes.

The interpretation that emotionally intense phases of power imbalance and protest are crucial factors in the question how and if events are commonly remembered (across generations) is also supported by the case of **Spain**, where citizen protests against planned nuclear power plants in the Basque Country were mentioned by group discussants as important events. Especially a mixture of sadness about the deaths of engineers and workers due to ETA and bomb attacks on the one hand, and satisfaction about the experience of solidarity on the other hand, were recalled – the fact to be personally concerned by a (national) key event, respectively to experience strong emotional impact by such an event seems to strengthen the memory effect at the personal as well as at the collective level (this was observed in several case studies).

Although emotions and public relevance turned out to be important factors for the development of an energy memory in general, they were found to be no guarantee for the development of an energy memory according to the concept, as the issue of energy poverty demonstrated: The experience of energy poverty had been or still is, in different periods and intensities, a topic in all assessed countries and of high public relevance. Despite this potentially strong emotional impact, no corresponding energy memory at national level could be determined in

any of the countries. However, energy poverty proved to be helpful in answering the question about factors potentially responsible for turning individual memories into collective memories. Based on some empirical results, the aspect of “collective/ vs. group affectedness” could be one of the reasons, why experienced energy poverty turns into a collective “Energy Memory” or not. For example, in **Bulgaria**, with strong memories on changing energy poverty and energy access, the electricity schedules had their long-term impacts on energy culture in the country, but did not generate any national ‘energy identity’. Energy memories and also energy practices there seem to be strongly group specific - similar to **Turkey** - and depending on the level of information, awareness, and attitude towards energy issues. Since (energy) poverty tends to be a phenomenon that is associated with shame and thus often remains in private, public awareness about its prevalence and an exchange of views can hardly develop. According to that hypothesis, collective remembrance would require a feeling of collective affectedness.

It is important to keep in mind that the focus of the “Energy Memory” approach is clearly set on the question how key events influence energy cultures on a collective level over time. This historical/longitudinal perspective is believed to provide a central supplement to the energy cultures framework. Regarding the analysis of changes over time, observations, self-reports and historical records provided (with certain limitations) a suitable data basis for two components of energy cultures: *material culture* and *energy practices*. An analysis of the third component, *cognitive norms*, is instead at the moment not feasible due to a lack of data that covers past developments in the social psychological dimension.

One essential question regarding the content of “Energy Memories” is especially interesting: Do energy-related events really create energy-related memories? In fact, many of the discussed cases are symbolically connected to other components of the respective events (questionable practices by governments, a new understanding of democracy, perception of physical threat, construction of identity etc.). For example, the two events Zwentendorf and Hainburg in **Austria** were, besides an expression of changing social values in which an ever-growing section of the population sought to move away from established (energy) economic patterns of thought, also closely connected to a public call for a more active democracy through informed participation. As a result, approval procedures in Austria became more complex, and approval procedures took longer, especially for hydroelectric power plants. The Austrian energy industry therefore opened up other fields of activity (consulting, also for major projects abroad, as in Hungary, etc.) (Wendering 2016). The controversial floodplain near Hainburg became part of the "Danube Floodplain National Park" in 1996. Also the case of the Basque Country (**Spain**) shows how the struggle of the anti-nuclear movement was embedded in a broader political transition, i.e. the claim for transition to democracy after 40 years of dictatorship, and paved the way for the uptake of renewable energy decades later.

In some cases, key events (for example in citizens' protests) are mainly a symptom in which current social developments and trends are reflected. Thus, key events and “Energy Memories” must always be discussed in consideration of their cultural and political context. With regard to the question how “Energy Memories” are developed and cultivated, a number of questions are the subject of special interest: Who, which social group, especially in the case of controversial events, shapes collective ideas and memories through their definitions? Who filters what is important and what is unimportant? Which events and persons are in the foreground? Who has, as Uhl (2010) says, the "power of interpretation over the past"? Besides the central question how energy memories emerge and affect attitudes and behaviour, the question about how fast a once established “energy memory” decays is similarly important if the systematics should be fully understood. Based on the research conducted in this task, one can assume that the amount of people that share a certain memory within a society is one core factor for the stability of the specific memory over time. Other factors are the intensity of memory cultivation by media and the social background of the relevant public. Media are a social actor group that undoubtedly has a strong stake in “turning events into key events” and “cultivating memories”, as they are filtering information, choose the intensity of information, choose the wording, evoke emotions, and sometimes set campaigns. The examples of **Turkey** and Austria may illustrate this role in concrete cases.

What consequences can be drawn from the experiences of the work on Task 5.4? In summary, we consider the confrontation with the new concept of energy memories as broadening and beneficial to the existing perspective. Memories are a good method to reflect on one's attitude on day-to-day energy behaviour and in this purpose they are an interesting starting point for less controversial discussions, because differences, if rooted in personal emotional reasons like memories, are easier accepted by other discussants. Memories can be used as benchmark for reflection on personal behaviour in relation to national averages. In the scientific work, the Energy Memories contribute to broadening the discussion away from the traditionally very technology-focused perspectives, and they direct the viewpoint of the social technology discussion, which is otherwise centered on TODAY, away to the significance of history, which influences the status quo. With regard to the primary interest, i.e. the gain of knowledge about how energy related attitudes in society were coined by "Energy Memories", the approach proved to be extraordinarily promising. The newly developed concept not only offers the chance of obtaining a more comprehensive, more holistic picture of the dynamics of energy cultures; it also raised a number of questions that will be investigated in later scientific research.

4.3. Experiences with the energy memory approach in empirical practice

The experiences made during the empirical implementation of the energy memory approach were at a first glance rather unspectacular. However, the following description provides a potentially helpful insight into the course of the research process, its methodological characteristics and its limitations.

Part I: Desktop research

The first step of the empirical process, desktop research, strongly relies on the study of secondary literature, which tends to be challenging due to the naturally enormous amount of potential sources. Therefore, it is very useful to first make a selection of those key events that could potentially be considered for a study in the sense of an "energy memory" on the basis of prior knowledge, comprehensive literature, explorative interviews or a pilot study. During our work, the first two options were mainly used.

After the selection of cases, (subsequent) sources were in some cases either not easily available or suspected to be biased, which significantly increased the time required. The fact that many of the ultimately included sources were the result of historical research, underlines the interdisciplinary character of ECHOES. However, the foci in purely historical publications usually differ considerably from what is in the centre of interest for Social Science and Humanities (SSH) studies with an energy-specific emphasis. Thus, the amount of information derivable from historical literature which is relevant from an "energy memory" perspective must not be overestimated. It has emerged that it is useful to view historical sequences through the eyes of the "Energy Cultures" with its three components "*material culture"*, "*energy practices"* and "*cognitive norms"* (Stephenson et al. 2010) from the very beginning. However, as pointed out before, this procedure has clear limitations due to the fact that historical data about psychological parameters in the context of certain events is practically not available. The major part of the cognitive and normative factors must therefore be addressed during the second step, group discussions.

Part II: Discussion groups

Besides the well-known challenges of finding suitable participants and bringing them together at a certain time and place for discussion, one special requirement had to be met during the recruitment: The avoidance of unintentional priming. While it is unlikely to attract potential discussants by not giving any information about the topic(s) to be discussed, any kind of information that anticipates too many details may inadvertently initiate a reflection by the participant beforehand which might have an influence on what can be observed. It is difficult to

estimate where the ideal balance between "arousing interest" and unintentional influence lies. With reference to this problem, the exact wording of the invitation text was left to the respective national partners.

During the group discussions, *individual* energy related memory turned out to be a useful starting point to open up a broad discussion of personal experience. After short phases spent on discussing individual memories and perceptions, the exchange started to develop a stronger focus on the collective understanding of the happenings during the period around the key events. Strong emotions like fear, physical threat, or the perception of injustice were amongst the most dominant, and most of the time explicitly mentioned, factors during the group discussions.

In two countries (Austria and Norway) the group discussants were confronted with selected key events based on preliminary findings from the desktop research in the beginning. More precisely, the researchers presented the participants some examples of what they believed to be key-events together with the notice that this selection has only exemplary character. The participants agreed upon the presented examples as key-events in both countries and no dissent was stated. However, this absence of contradiction should not be overvalued or interpreted as indicating a perfect preselection. In both cases it is not possible to determine whether the key events would have been addressed by the participants even without their mentioning by the discussion leaders. This methodological heterogeneity is not expected to have significantly influenced the way how the key events were discussed, but it leads to some uncertainty with regard to the question whether all events which represent key events from the participants' point of view were discussed. The discussion group in Spain was confronted with a selection of themes that had been derived from the previous round of interviews (the three "components" of energy memory explained in the chapter on Spain), but not with specific, preselected key events. This led to a broader reflection on energy history and the importance of historical developments for the present, including the off-take of renewable energy, which was considered just as influential as crisis events or conflicts.

Regardless of how the key events were selected (either by researchers during desktop research or by discussants in the group setting), their discussion uncovered diverse reports and reflections about personal behaviour, which again initiated a discussion about choices and behavioural patterns on meso- and macro-level. Observing the development of a common understanding of the role of energy related key events in a group setting offered us the opportunity to not only observe the consequence of energy related historic events, but to also develop an understanding regarding the factors that led to the development of a commonly shared memory.

4.4. Energy memories as a way to make the energy cultures approach more policy relevant

Implicitly, one of the key goals of the European Commission is to transform or re-configure energy cultures across the EU Member States in such a way that the goal of cheap, accessible and sustainable energy for all Europeans is reached. The funding of the ECHOES project itself testifies to this, as does the funding of countless technology projects. In a surprising way, the exercise of exploring energy memories might also provide clues with respect to if and how one might strategically work to advance this transformation in Europe.

The above mentioned clues are found in examples from our cases that illustrate how the past becomes re-examined and scrutinized in new ways, e.g. in light of our contemporary environmental problems and societal developments. Using the energy cultures approach, a case in point here is the dissonance between the practices and material aspects of the already discussed Norwegian petroleum "fairytale", and the normatively oriented discussion of the Norwegian discussion group in which a feeling of shame was conveyed concerning the nature of this fairy tale. This is particularly interesting in the ECHOES context, where the project has an overall focus on "choice". What this discussion suggests is that in the Norwegian context, many practices and material elements

still cater for non-environmental individual choices. The discussion, however, points to a potential destabilization of the normative aspects of the existing energy culture.

This suggests that pro-environmental choices, in this context, could be nurtured through targeted political action, e.g. by re-arranging material elements that produce conditions for new kinds of practices. An example could be the introduction of smart energy technologies that communicate to their users not only in terms of savings and kilowatt hours, but which communicate through cultural and context specific cues, e.g. tapping into the sort of "shame" expressed by Norwegians and converting it into viable new practices.

Policy makers should ideally be aware of the nationally relevant collective memories in the energy sector. The knowledge of existing energy memories that have a strong background influence on present energy cultures, enables policy makers to set activities in the compartments of energy culture (e.g. material and norms related actions). If these activities are conducted in the "spirit" of the existing memories, because policy makers classify them as beneficial for innovative energy strategies, there is a higher probability that this intervention will be widely accepted. On the contrary, when it comes to "unlearning" outdated, unwanted energy cultures, the policy maker is required to address, and no longer actively maintain, but demythologize memories that consolidate this energy culture. Complementary to that, they should try to think - as far as possible - about promoting key events/ sites of memory that can lead to the development of new "supportive" memories.

What we potentially observe in the above discussed case in Norway, is how discussions about past memories, coupled with discussions about contemporary practice and materiality, might allow us to identify energy cultural "cracks" or ruptures, i.e. instances of energy cultural instability. Obviously, key events do not only play a role as striking and potentially decisive points in a time course. They may also become the pivotal point of targeted policy measures that take advantage of destabilised energy cultures in which the three components "cognitive norms", "material culture" and "energy practices" are no longer fully compatible. This perspective illustrates the potentially transformative (but not always utilised) potential of key events. As the example of Norway shows, an established energy culture can become incompatible with new, higher-level requirements: In concrete terms, the Norwegian energy culture can be understood as "comfort-oriented", in which the common notions of a "good life" are associated with high energy consumption. If this "comfort-oriented" culture collides with new norms in the context of climate change, feelings of guilt can arise at the individual level (see also Aune et al. 2016). The Norwegian focus groups also showed evidence of a certain form of shame about the "petroleum fairytale". Both elements are suspected to be coupled with political potential: Individuals seem to be searching for viable, but fair ways of acting upon the "abstract" problem of climate change. Others (e.g. Throndsen and Ryghaug 2015) have made similar observations: in focus groups conducted by these scholars, participants expressed a willingness to act, but only if they feel that others contribute similarly, or if they feel that it is plausible that their actions actually contribute to tangible positive change. Hence, the Norwegian "comfort culture" might be described as being under pressure due to a change in the normative dimension. In the energy memories focus group, this was on the one hand expressed as personal shame, but on the other hand, it was also expressed as a kind of political quest to find new ways of acting. It was also expressed as a request for policies and technologies that cater for and enable choices emerging from interests beyond purely economical and individual motivations. This clearly demonstrates how decision makers could utilise the "crack" between "material culture" and "energy practices" on the one side, and changed "cognitive norms" on the other side for supporting the energy transition by supporting a "material culture" in which the newly developed norms can result in (sustainable) energy practice.

As an example from Germany demonstrates, sometimes a realistic perception and discussion of the actually existing innovative capacities of national economies and societies in political discourse is only enabled through "cracks" in energy cultures. For instance, the German government took the nuclear catastrophe in Fukushima in 2011 as an opportunity to decide to phase out nuclear power completely by 2022[14], although it had decided in

[14] Newspaper article about phase out by 2022 (June 2011) http://www.sueddeutsche.de/politik/gesetzespaket-zur-energiewende-kabinett-beschliesst-atomausstieg-bis-1.1105474 (27.06.2018)

2010 to extend the operational lifespan of older nuclear power plants on the argument that there were *"no alternatives"* (*"Alternativen[:] Keine."*[15]). In this specific case, the (international) key event "Fukushima" apparently led to a "crack" in the German "energy culture", where the material culture and energy practice of using nuclear power were no longer compatible with the changed norms and public perception. The "crack" was taken as an opportunity to initiate a faster transformation towards *"safe, affordable and eco-friendly"*[16] energy sources than this had been originally planned.

As the Spanish example shows, it is of course not only possible that "cracks" created by key events are used as starting points for sustainable transformation, but also to only fill these cracks in order to stabilise an existing energy culture. During the second oil crisis, a number of additional coal and nuclear power plants entered service in Spain with the aim of reducing oil dependence. This reaction to a key event resulted in a reinforcement of the existing, "non-renewable" energy culture. In terms of energy cultures the "crack" that occurred during the oil crisis can be outlined as a stable arrangement of "cognitive norms" and "energy practices" that were facing a threatened "material culture", caused by limited availability of one of its crucial resources. By substituting one non-renewable energy source by one or more non-renewable alternatives, the "non-renewable" energy culture was quickly stabilised.

In contrast to the above examples, the Turkish case provides a good example of a transition where a more systematic approach of communication and policy-design would have been useful but was not implemented. The empirical implementation of the "Energy Memory" approach showed evidence of a lack of awareness and information in large parts of the society. Turkish energy culture is thus strongly influenced by subjective and individual/local perceptions. Interestingly, the shift to natural gas (which was mandatory for many households and industries) was communicated as a nationwide transition to "cheap and clean" energy, which in the end turned out to not correspond to this simple description in terms of pricing and practice. Instead of this reduced type of communication, policy makers could have guided society through the process of change by disseminating a broader set of information with a foundation in all three elements of energy culture, facilitating a more systematic understanding of the rationale behind the decision.

In Bulgaria, during the pre-accession phase until the so-called fourth period (2007-2017), marked by the accession of Bulgaria to the EU, access to international cooperation and EU funding has enabled fundamental policy maker actions to transform the energy system. This included not only the shift to renewable energy sources, but also the fight against corruption and the promotion of civic engagement. A growing number of demonstrative and operational production units based on renewable energy sources were put into operation with massive introduction of new alternative technologies (usually accessible to few foreign investors and nationally influential political-economic groups with financial and political capacity), yet with controversial impacts. This led to discouraging results both for the functioning of the energy system (financial and distributional burdens) and with the environmental impacts over vulnerable ecosystems and landscapes. This example shows that policy makers (at different levels) reacted strongly to a crack, and set actions especially on the materials component of energy culture (new technologies). However, inaccuracies in implementation, on the one hand, but also developments at the normative level (e.g. environmental awareness raising), meant that a long-standing "energy memory", namely the lack of trust in energy suppliers and political groups, continued to exist and no new stable energy culture could be achieved.

It is essential for the targeted use of "cracks" in energy cultures to recognise societal developments and trends as early as possible and to understand them as precisely as possible. The "Energy Memory" approach enables the

[15] Draft bill: Amendment of the German Nuclear Energy Act (September 2010): http://dip21.bundestag.de/dip21/btd/17/030/1703051.pdf (27.06.2018)

[16] „Key points" of the German 2011 energy concept https://web.archive.org/web/20111116042621/http://www.bundesregierung.de/Content/DE/__Anlagen/2011/06/2011-06-06-energiekonzept-eckpunkte,property=publicationFile.pdf

development of such a systematic understanding. It can thus make a decisive contribution to finding socially and politically sustainable decisions that allow the successful implementation of sustainable energy cultures, compatible with the goals set out in the Paris Agreement throughout Europe.

Though there is a need to explore this further, this might have implications for how the European Commission thinks about the funding of energy innovation projects in the future. As it stands, such projects typically aim to develop technical solutions that work economically – irrespective of energy cultural context. However, it might be strategically wise – through explorations of energy memories and contemporary elements of specific energy cultures – to identify energy cultural "cracks" in which new technology projects can be used as lever to further processes of energy culture de-stabilization.

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Figures

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