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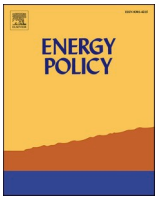

Time, history and meaning-making in research on people's relations with renewable energy technologies (RETs) – A conceptual proposal

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ABSTRACT

The research field of the social acceptance of renewable energy technologies (RETs) has shown that people as central actors in current low-carbon energy transitions relate to RET projects and associated processes and infrastructures in diverse ways. These relations depend on the local context and history in which RET projects are deployed. Despite being an everyday reality for all actors involved, the experience of time has not been of central concern for this research field. References to temporality in social acceptance work are both omni-present and frequently vague, used as a mere backdrop to the main story; most research has examined local residents' responses at a specific moment in a project's life cycle; some consider RET projects as independent from histories of infrastructure and place and people's relations with RETs as void of past experience. This paper advocates for a deeper engagement with time in the field. Based on a milestone literature review highlighting how time and history have been tackled in analyzing local residents' relations with RET projects in specific case contexts so far, we propose differentiating physical from historical time dynamics and by developing this distinction we offer a first conceptual framework for considering time in people's relations with RET projects. Through this, our proposal contributes to recent critical work in social acceptance research of RETs and provides analytical tools for researchers who intend to approach the temporal embeddedness of people's relations to RET projects.

1. Introduction

Central to current energy transitions are renewable energy technologies (RETs), introduced to lower global carbon emissions driving a changing climate. These technologies are not only tangible objects as they become concrete infrastructures entering everyday life but they confront people[1] with social and environmental change (Batel and Devine-Wright, 2015). The field of research on the social acceptance of RETs[2] has primarily been interested in the ways in which societies envision, implement and live with renewable energy projects and associated processes and infrastructures, including how local residents make sense of the social change these bring along.[3] This field has grown into a distinctive area of research (i.e. Walker, 1995; Wüstenhagen et al., 2007; Ellis and Ferraro, 2016; Rand and Hoen, 2017, Batel, 2020a) that initially and for a long time tried to understand why opposition to RETs arises mainly among local communities living close to RETs deployment sites but also increasingly how local responses stem out of how socio-environmental justice issues are considered in the deployment

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[1] In this paper, we look primarily at local residents' and communities' relationships with RET projects. This has so far been one of the most focused dimensions of the acceptance of RETs and has therefore clear implications for how RETs impact on communities' lives. We refer to 'residents' or 'communities' when discussing specific cases or processes. When we refer to broader phenomena, such as history, collective memory or meaning-making, we also refer to 'people' in more general terms.

[2] We understand the 'social acceptance of RETs research' to be an energy social science subfield interested in understanding people's relations to and interactions with RETs projects, infrastructures and associated processes as well as in how these are shaped by socio-political, market and community dimensions (Wüstenhagen et al., 2007).

[3] An important context in which local residents relate to these are their responses to project proposals, their experience of projects being implemented and, later on, living with the resulting infrastructures. However, our use of the term 'responses' is not limited to these specific situations (in the sense of 'reactions to' projects) but rather describes 'relations with' these. 'Responses' here refer to meaning-making processes of people affected by the deployment of specific RET projects in particular places. These meanings are socially co-constructed and individually and collectively experienced.

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processes of RET projects (Batel, 2020a; Levenda et al., 2021; Dunlap, 2021). Certain social and environmental consequences anticipated in the planning process and created with the deployment of RETs have immediate impacts on local socio-ecological systems, ranging from the submersion of villages and agricultural lands by large-scale hydropower dams (Kirchherr et al., 2018) to visual impacts on landscapes created by wind turbines (Phadke, 2010) and related health and psychosocial impacts (Pohl et al., 2018). Other consequences of energy infrastructure deployment, however, may be unanticipated, may not be immediately noticeable and may only arise after construction (Rudolph and Clausen, 2021), may have accumulated long-term psychosocial impacts (Luís et al., 2015; Walker et al., 2015) and may find their way into local residents' consciousness only decades later (see i.e. Batel and Küpers, 2022). It appears that, no matter how fast or slow RETs-induced change occurs, these energy infrastructure projects are not sketched onto blank canvas. To the contrary, the socio-historical and lived contexts in which current low-carbon energy transitions take place deeply impact individuals' and communities' relations with these projects, as authors interested in pre-existing and changing people-place relations have shown (Devine-Wright, 2009; Bailey et al., 2016; Van Veelen and Haggett, 2017). However, and despite the fact that time more generally and history specifically have always played a role in people's responses to RETs, time has rarely been identified, conceptualized and explored explicitly as a key lens and analytical tool to frame and understand residents' meaning-making of RET projects and infrastructures (Baxter et al., 2020; Johansen, 2021; Creamer et al., 2019). Concepts of time and history are scattered across publications but how these factors may shape the way people feel, think and act when confronted with RET projects has largely been underexamined.

This paper aims to offer a brief narrative review of cross-disciplinary milestone articles that use time and history in social acceptance of RETs research and neighboring fields, as well as to propose a conceptualization of temporal dimensions that will help further research on people's meaning-making of RET projects, infrastructures and associated processes. For this, we draw from different calls and proposals that have already been made to consider the role of time and history in social acceptance of RETs research (Ellis and Ferraro, 2016; Batel, 2018; Baxter et al., 2020) and in broader energy transitions (Geels, 2002; Fouquet and Pearson, 2012; Hirsh and Jones, 2014; Malm, 2016; Gismondi, 2018; Hasenöhrl and Meyer, 2020; Moss, 2020; Sareen et al., 2021; Walker, 2021). Particularly, energy transitions research has shown that unpacking the diverse temporal dynamics of changing energy systems is crucial as the world is going through current low-carbon energy transitions (Geels, 2002; Sovacool, 2016; Labussière and Nadaï, 2018; Daggett, 2019). Recognizing the multiple temporalities in which energy transitions unfold and how they are experienced by local residents helps analyzing how certain energy transitions may become successful projects for organizing life in the ongoing climate crisis – as well why others might not (Avelino, 2021). However, and while energy transitions studies explore the roles of time and history mostly in terms of macro-level processes, their roles in another key dimension of social acceptance of RETs – community acceptance (Wüstenhagen et al., 2007) – are often overlooked, despite the fact that most research on the social acceptance of RET so far has precisely tried to understand or even overcome community opposition (see Batel, 2020a and also Wolsink, 2018 for a critique). As such, taking inspiration from energy transitions literature, this paper aims to contribute to further inspire a 'temporal turn' in research on the social acceptance of RETs – namely by conceptualizing the role of temporal dynamics of social acceptance processes at the micro- /local level of communities' and individuals' relations to RET projects and infrastructures.

The discipline of history itself has experienced a 'temporal turn' generating time-related sensitivity among history scholars: "it is a commonplace that time is not a neutral, universal substance in whose emptiness something called 'history' unfolds, but a contingent cultural construction whose shape, structure, and texture have varied" (Clark, 2019:4; see also Pierson, 2011). In turn, energy scholars have also started demonstrating recently how "treating energy as an object of timeless human desire has obscured the historical particularity of energy as we know it" (Daggett, 2019:3; see also Malm, 2016; Fressoz and Bonneuil, 2017). It is this sensitivity for the multiple roles of time, people's diverse perceptions of it in its relation with energy projects and infrastructures, as well as for the social constructedness of time and history that needs to make its way into social acceptance of RETs research.

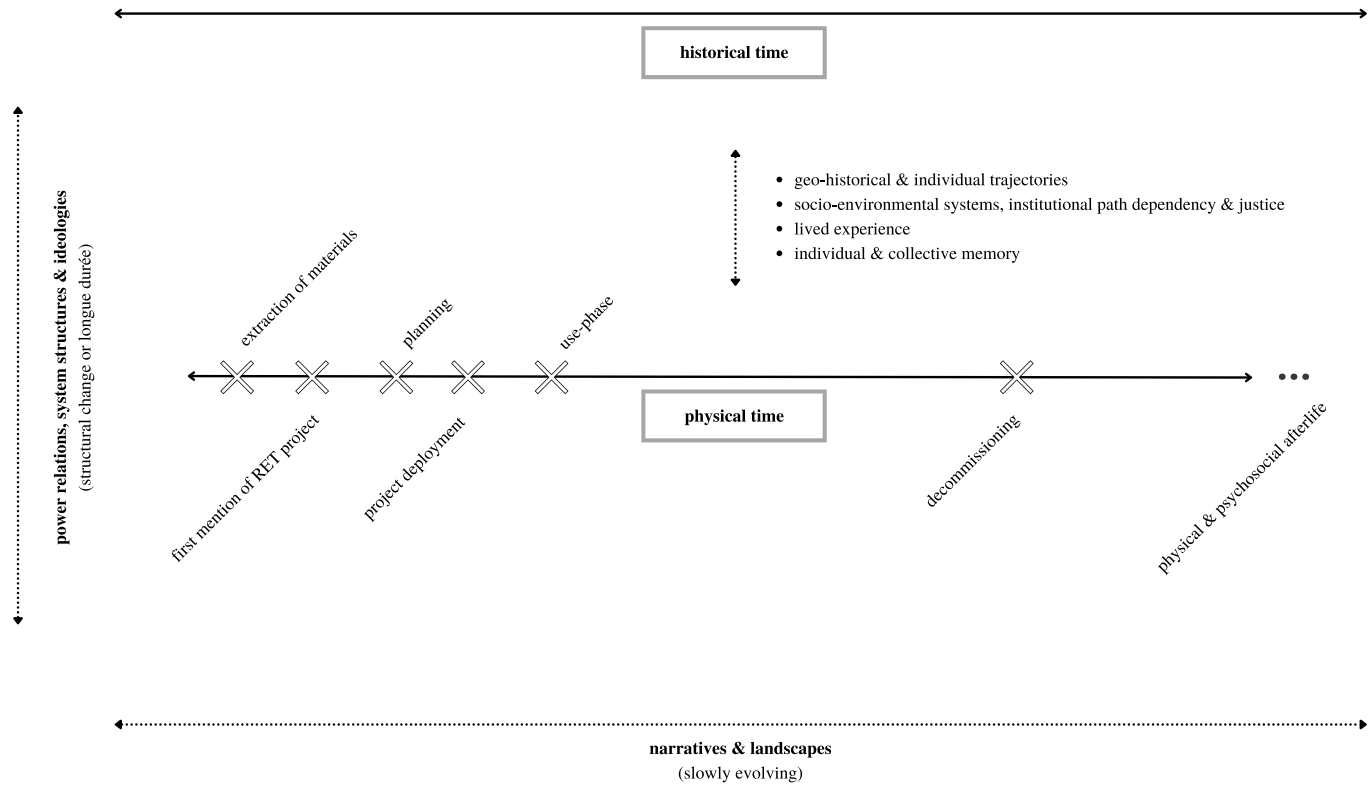
In this article, we are therefore interested in conceptualizing better ways of understanding how time and history around RET projects are made sense of by individuals and groups in response to specific RET projects and infrastructures. While experiences of temporality at this micro-/local level are profoundly shaped by larger structural forces including time as a "disciplinary force within capitalism that underpins relentless change" (Castree, 2009:39) and related socio-environmental systems, institutional path dependencies (Unruh, 2000) and structural power relations (see Fig. 1), as energy transitions studies have shown, it is equally relevant to understand how those materialize and operate at the micro-/local level of everyday meaning-making, lived experiences and attachments. These experiences may be transported across time and be transformed into history, through collective and individual memories, and contribute to shape responses to current RET projects. In sum, what can be gained from this proposal is, at the very least a more systematic understanding and use of time dimensions and related concepts in research on people's meaning-making of RET projects. At best, such temporal awareness may further recently evolving critical approaches in social acceptance scholarship that seek to analyze the complex ways in which residents' responses to RETs are socially co-constructed and embedded in socio-historical processes and power relations. As such, this proposal aims to contribute to these critical approaches to the social acceptance of RETs (Batel and Rudolph, 2021), as it is only by considering the socio-historical and temporal embeddedness of decision-making processes and infrastructures that any forms of justice, inclusion and democracy can be achieved (Batel and Küpers, 2022). Increasing the awareness of distinctive temporal dimensions in social acceptance research will then enable scholars to develop new (or rephrased) research questions, thus exploring how people's current relations with RET projects have come about. The results of these endeavors may inform policy-making and planning practices that put people at the center of current low-carbon energy transitions.

2. Materials & methods

Our main objective for this paper is to provide a brief overview of how temporal dynamics have been dealt with in social acceptance literature, specifically in those publications that investigate local residents' relations with RET projects in specific case contexts. In order to do so, we undertook an exploratory narrative review of milestone publications.[4] We made this methodological choice based on the lack of a substantial body of work engaging with time and history (Sovacool et al., 2018). In addition to reviewing social acceptance of RETs literature that engages with time and history, we also reviewed articles from other energy social science and humanities fields[5] where temporal dynamics have already been unearthed more carefully. In total, we

[4] 'Milestone' publications are referred to in this article as those dealing with time and history in social acceptance processes around energy infrastructure projects, not necessarily milestone papers for the field of social acceptance of RET research as a whole.

[5] These are energy social sciences and humanities areas of research that do not specifically subscribe to the social acceptance label but are preoccupied with people-place-infrastructure relations in a socio-historical or temporal perspective, i.e. energy history, energy anthropology or energy justice literature.



•••	physical & psychosocial afterlife continues after decommissioning
✕	specific dates along the RET project timescale
◆·····▶	socio-historical factors shaping RET deployment & responses

Fig. 1. The RET project time scale in the context of physical and historical time dynamics.

reviewed 100 milestone publications across these fields (Table 1).

In our review, we identified peer-reviewed English-language publications that explicitly employ temporal concepts as well as those using theories, concepts and case studies that are implicitly referencing temporal processes in the past and the present[6]. For this, several search terms were chosen, namely: 'social acceptance', 'renewable energy technologies', 'history', 'time', 'temporality' and 'memory' as well as related terms. In addition, we used the references presented in the identified publications for further snowballing. The focus of our milestone review was on the more recent and growing body of literature on the social acceptance of RETs, this is from 1995 onwards (see Batel, 2020a; but also Wolsink, 1989, 1994 for previous references to time in social acceptance research). For clarity, and despite the complexity of these concepts and phenomena, we here understand 'time' as the "clock time" defined by modern Western societies (Castree, 2009:38); 'history' as narratives about the past of places, groups or projects; and 'memory' as what is remembered and passed on, individually or collectively, across time and space.

3. Main findings: distinguishing between physical time and historical time

The exploratory and narrative milestone literature review we conducted suggested that there are two key time-related strands of theoretical and/or empirical research on social acceptance of RETs and associated fields. One strand highlights the importance of physical time as directly associated with a RET project or proposal and residents' responses to that specific project or project proposal (i.e., Windemer and Cowell, 2021; Rudolph and Clausen, 2021). While most research within this strand has focused only on people's responses – and namely opposition – when a project is announced, as will be further discussed below, more recent research has already begun to expand that focus to traditionally neglected parts of the life cycle of RET projects (Windemer, 2019). The other strand of research has analyzed the relevance of historical time, discussing how the past experiences of individuals and/or communities, their memories, attachments to the local area and other energy infrastructures and related processes, shape their current responses to RET projects or proposals (i.e., Sherren et al., 2016; Batel and Devine-Wright, 2017). As we will argue in more detail in the next

[6] Both are immediately based on lived experience which is why, for the purpose of this article, we will not look at future time. The future is well worth studying in social acceptance processes but requires its own set of theoretical and conceptual underpinnings (Adam and Groves, 2007). However, as future, present and past are intrinsically intertwined and as meaning-making practices such as collective remembering are indeed oriented towards the future (Wagoner, 2015), future time is always already present in socio-historical approaches to social acceptance processes. Further conceptual and empirical research will undoubtedly be required to paint a full temporal picture.

Table 1
Reviewed publications related to time and/or history and social acceptance of RETs.

	Authors	Date	Title
1.	Wolsink	(1989)	Attitudes and Expectancies about Wind Turbines and Wind Farms.
2.	Wolsink	(1994)	Entanglement of onterests and motives: assumptions behind the NIMBY-theory on facility siting.
3.	Gipe	(1995)	Wind Energy Comes of Age.
4.	Walker	(1995)	Renewable energy and the public.
5.	Unruh	(2000)	Understanding carbon lock-in.
6.	Wolsink	(2000)	Wind power and the NIMBY-myth: institutional capacity and the limited significance of public support.
7.	Geels	(2002)	Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study.
8.	Debary	(2004)	Deindustrialization and museumification: from exhibited memory to Forgotten history.
9.	Bell et al.	(2005)	The 'social gap' in wind farm siting decisions: explanations and policy responses.
10.	Devine-Wright	(2005)	Beyond NIMBYism: towards an integrated framework for understanding public perceptions of wind energy.
11.	Wolsink	(2006)	Invalid theory impedes our understanding: a critique on the persistence of the language of NIMBY.
12.	Ellis et al.	(2007)	Many ways to say 'no', different ways to say 'yes': applying Q-methodology to understand public acceptance of wind farm proposals.
13.	Van der Horst	(2007)	NIMBY or not? Exploring the relevance of location and the politics of voiced opinions in renewable energy siting controversies.
14.	Wolsink	(2007a)	Planning of renewables schemes: deliberative and fair decision-making on landscape issues instead of reproachful accusations of non-cooperation.
15.	Wolsink	(2007b)	Wind power implementation: the nature of public attitudes: equity and fairness instead of 'backyard motives'.
16.	Wüstenhagen et al.	(2007)	Social acceptance of renewable energy innovation: an introduction to the concept.
17.	Barry et al.	(2008)	Cool Rationalities and hot air: A Rhetorical Approach to Understanding Debates on Renewable Energy.
18.	Devine-Wright	(2009)	Rethinking NIMBYism: The role of place attachment and place identity in explaining place-protective action.
19.	Aitken	(2010)	Why we still don't understand the social aspects of wind power: a critique of key assumptions within the literature.
20.	Devine-Wright & Howes	(2010)	Disruption to place attachment and the protection of restorative environments: a wind energy case study.
21.	Phadke	(2010)	Steel forests or smoke stacks: the politics of visualisation in the Cape Wind controversy.
22.	Fouquet & Pearson	(2012)	Past and prospective energy transitions: insights from history.
23.	Barry & Ellis	(2013)	Beyond consensus? Agonism, republicanism and a low carbon future.
24.	Raman	(2013)	Fossilizing renewable energies.
25.	Hirsh & Jones	(2014)	History's contributions to energy research and policy.
26.	Batel et al.	(2015)	Towards a better understanding of people's responses to renewable energy technologies: insights from Social Representations Theory.
27.	Batel et al.	(2015)	The role of (de-)essentialization within siting conflicts: an interdisciplinary approach.
28.	Luís et al.	(2015)	From dry land to water: psychosocial impact on the lakeside villages of the Alqueva dam.
29.	Marques et al.	(2015)	Local identity as an amplifier: procedural justice, local identity and attitudes towards new dam projects.
30.	Walker et al.	(2015)	Adding insult to injury: the development of psychosocial stress in Ontario wind turbine communities.
31.	Bailey et al.	(2016)	Using a narrative approach to understand place attachments and responses to power line proposals: the importance of life-place trajectories.
32.	Castán Broto	(2016)	Innovation territories and energy transitions: energy, water and modernity in Spain, 1939–1975.
33.	Delicado et al.	(2016)	Community perceptions of renewable energies in Portugal: impacts on environment, landscape and local development.
34.	Ellis & Ferraro	(2016)	The social acceptance of wind energy.
35.	Jenkins et al.	(2016)	Energy justice: a conceptual review.
36.	Malm	(2016)	Fossil capital: the Rise of Steam Power and the Roots of Global Warming.
37.	Sarrica et al.	(2016a)	One, no one, one hundred thousand energy transitions in Europe: the quest for a cultural approach.
38.	Sarrica et al.	(2016b)	Flooded by a wall of water: parent–child reminiscing about local environment and unwanted changes.
39.	Sherren et al.	(2016)	Learning (or living) to love the landscapes of hydroelectricity in Canada: eliciting local perspectives on the Mactaquac Dam via headpond boat tours.
40.	Sovacool	(2016)	How long will it take? Conceptualizing the temporal dynamics of energy transitions.
41.	Sovacool & Geels	(2016)	Further reflections on the temporality of energy transitions: a response to critics.
42.	Batel & Devine-Wright	(2017)	Energy colonialism and the role of the global in local responses to new energy infrastructures in the UK: a critical and exploratory empirical analysis.
43.	Fressoz & Bonneuil	(2017)	Growth unlimited: the idea of infinite growth from fossil capitalism to green capitalism.
44.	Goodchild et al.	(2017)	Storytelling as oral history: revealing the changing experience of home heating in England.
45.	Heffron & McCauley	(2017)	The concept of energy justice across the disciplines.
46.	Malone et al.	(2017)	Stories about ourselves: how national narratives influence the diffusion of large-scale energy technologies.
47.	Rand & Hoen	(2017)	Thirty years of North American wind energy acceptance research: what have we learned?
48.	Van Veelen & Haggett	(2017)	Uncommon ground: the role of different place attachments in explaining community renewable energy projects.
49.	Wheeler	(2017)	Reconciling windfarms with rural place identity: exploring residents' attitudes to existing sites.
50.	Batel	(2018)	A critical discussion of research on the social acceptance of renewable energy generation and associated infrastructures and an agenda for the future.
51.	Dunlap	(2018)	The 'solution' is now the 'problem:' wind energy, colonisation and the 'genocide-ecocide nexus' in the Isthmus of Tehuantepec, Oaxaca.
52.	Gismondi	(2018)	Historicizing transitions: the value of historical theory to energy transition research.
53.	Janhunen et al.	(2018)	The acceptability of wind farms: the impact of public participation.
54.	Kim et al.	(2018)	Korean traditional beliefs and renewable energy transitions: pungsu, shamanism and the local perception of wind turbines.
55.	Kirchherr et al.	(2018)	Mapping the social impacts of 'Damocles projects': the case of Thailand's (as yet Unbuilt) Kaeng Suea ten dam.
56.	Labussière & Nadaï	(2018)	Energy Transitions. A Socio-Technical Inquiry.
57.	McCauley et al.	(2018)	Energy justice and policy change: an historical political analysis of the German nuclear phase-out.

(*continued on next page*)

Table 1 (*continued*)

	Authors	Date	Title
58.	Pasqualetti & Stremke	(2018)	Energy landscapes in a crowded world: a first typology of origins and expressions.
59.	Payera	(2018)	Understanding social acceptance of geothermal energy: case study for Araucanía region, Chile.
60.	Pohl et al.	(2018)	Understanding stress effects of wind turbine noise –t he integrated approach.
61.	Wolsink	(2018)	Social acceptance revisited: gaps, questionable trends, and an auspicious perspective.
62.	Carse & Kneas	(2019)	Unbuilt and unfinished: the temporalities of infrastructure.
63.	Creamer et al.	(2019)	Community renewable energy: What does it do? Walker and Devine-Wright (2008) ten years on.
64.	Daggett	(2019)	The Birth of Energy: Fossil Fuels, Thermodynamics and the Politics of Work.
65.	Enns & Bersaglio	(2019)	On the coloniality of "new" mega-infrastructure projects in East Africa.
66.	Fortier et al.	(2019)	Introduction to evaluating energy justice across the life cycle: a social life cycle assessment approach.
67.	Healy et al.	(2019)	Embodied energy injustices: unveiling and politicizing the transboundary harms of fossil fuel extractivism and fossil fuel supply chains.
68.	Johansen	(2019)	Local support for renewable energy technologies? Attitudes towards local near-shore wind farms among second home owners and permanent area residents on the Danish coast.
69.	Kim et al.	(2019 (1))	Wind, power, and the situatedness of community engagement.
70.	Kim et al.	(2019)	The memory of place disruption, senses, and local opposition to Korean wind farms.
71.	Walker et al.	(2019)	Are the pens working for justice? News media coverage of renewable energy involving Indigenous Peoples in Canada.
72.	Windemer	(2019)	Considering time in land use planning: an assessment of end-of-life decision making for commercially managed onshore wind schemes.
73.	Batel	(2020a)	Research on the social acceptance of renewable energy technologies: past, present and future.
74.	Batel	(2020b)	Re-presenting the rural in the UK press: an exploration of the construction, contestation and negotiation of media discourses on the rural within post-carbon energy transitions.
75.	Baxter et al.	(2020)	Scale, history and justice in community wind energy: an empirical review.
76.	Cuppen et al.	(2020)	When controversies cascade: analysing the dynamics of public engagement and conflict in the Netherlands and Switzerland through "controversy spillover".
77.	Hasenöhrl & Meyer	(2020)	The energy challenge in historical perspective.
78.	Lord et al.	(2020)	Timescapes of Himalayan hydropower: promises, project life cycles, and precarities.
79.	Moss	(2020)	Remaking Berlin: A History of the City Through Infrastructure, 1920–2020.
80.	Pellegrini-Masini et al.	(2020)	Energy justice revisited: a critical review on the philosophical and political origins of equality.
81.	Velasco-Herrejón & Bauwens	(2020)	Energy justice from the bottom up: a capability approach to community acceptance of wind energy in Mexico.
82.	Avelino	(2021)	Theories of power and social change. Power contestations and their implications for research on social change and innovation.
83.	Batel & Rudolph	(2021)	A critical approach to the social acceptance of renewable energy infrastructures.
84.	Devine-Wright et al.	(2021)	Induced seismicity or political ploy? Using a novel mix of methods to identify multiple publics and track responses over time to shale gas policy change.
85.	Dunlap	(2021)	Does renewable energy exist? Fossil fuel technologies and the search for renewable energy.
86.	Hoicka et al.	(2021)	Reconciliation through renewable energy? A survey of Indigenous communities, involvement, and peoples in Canada.
87.	Johansen	(2021)	Blowing in the wind: A brief history of wind energy and wind power technologies in Denmark.
88.	Lai	(2021)	Foregrounding the Community: Geo-Historical Entanglements of Community Energy, Environmenta Jjustice, and Place in Taihsi Village, Taiwan.
89.	Levenda et al.	(2021)	Renewable energy for whom? A global systematic review of the environmental justice implications of renewable energy technologies.
90.	Mang-Benza et al.	(2021)	New discourses on energy transition as an opportunity for reconciliation? analyzing indigenous and non-indigenous communications in media and policy documents.
91.	Müller & Morton	(2021)	The space, the time, and the money. Wind energy politics in East Germany.
92.	Normann	(2021)	Green colonialism in the Nordic context: exploring Southern Saami representations of wind energy development.
93.	Rudolph & Clausen	(2021)	Getting used to it, but … ? Rethinking the elusive U-curve of acceptance and post-construction assumptions.
94.	Sareen et al.	(2021)	A matter of time: explicating temporality in science and technology studies and Bergen's car-free zone development.
95.	Van der Horst et al.	(2021)	Energy justice and social acceptance of renewable energy projects in the Global South.
96.	Walker	(2021)	Energy and Rhythm: Rhythmanalysis for a Low Carbon Future.
97.	Windemer & Cowell	(2021)	Are the impacts of wind energy reversible? Critically reviewing the research literature, the governance challenges and presenting an agenda for social science.
98.	Batel & Küpers	(2022)	Politicizing hydroelectric power plants in Portugal: spatio- temporal injustices and psychosocial impacts of renewable energy colonialism in the Global North.
99.	Dunlap & Marin	(2022)	Comparing coal and 'transition materials'? Overlooking complexity, flattening reality and ignoring capitalism.
100.	Gergan & McCreary	(2022)	Disrupting infrastructures of colonial hydro-modernity: Lepcha and Dakelh struggles against temporal and territorial displacements.

sections, it might be relevant then to conceptualize the role of time in people's meaning-making practices of RET projects and infrastructure as follows (Fig. 1).

3.1. Physical time dynamics

3.1.1. Opposition obsession?

In their influential report on the state of social acceptance research on wind energy, Ellis and Ferraro suggest that social acceptance research should focus more on the dynamic relations that residents have with RET projects (Ellis and Ferraro, 2016). They describe these relations as evolving over time in a wind energy era when many wind farms have been operating already for years while others are still in the making. They highlight that stronger commitment from researchers is needed specifically with people's experiences at different project stages. This aspect has been largely neglected by research on the social acceptance of RETs arguably due to its initial entanglements with the now outdated NIMBY (Not In My Backyard) explanation for local opposition (Wolsink,

2000, 2006; Bell et al., 2005). Research has long tended to examine the peaks of residents' opposition to RET projects when it arises and/or is most vocal, given most of this research's inscription in the ethos of overcoming or easing opposition to RETs (Aitken, 2010; Batel, 2020a). The well-known U-curve of social acceptance (Wolsink, 1989, 2007b) is one of the first approaches to explicitly conceptualize the role of time in a project's acceptance, by suggesting that acceptance is high before local residents become aware of a specific RET project (see i.e. Marques et al., 2015) in a specific socio-geographical area, that it decreases when the project is announced to the public, only to then increase again "some reasonable time after construction" (Wolsink, 2007a:2698). Despite this and earlier work recognizing the diverse temporal dynamics at stake in people's responses to RETs (see i.e. Gipe, 1995 and Devine-Wright, 2005) this persisting traditional interest in strong and early opposition does not account for a project's life cycle beginning before and extending far beyond the announcement stage (see Fortier et al., 2019; Rudolph and Clausen, 2021). It further lacks exploring why responses evolve or how they may be connected to broader societal processes or events beyond a given project. In addition, this narrow focus ignores the complex realities of people's responses between two extremes. An overenthusiastic focus on opposition and/or support fails to depict that different stakeholders' as well as local residents' relations with RET projects are highly diverse and that how they relate to these is not set in stone (Ellis et al., 2007; Batel, 2018). This well-known and shortsighted obsession of social acceptance research with active opposition as only happening when a project is announced (Van der Horst, 2007) can be overcome, namely by diversifying the methodological research repertoire and designing empirical studies that step away from traditional cross-sectional analyses, such as longitudinal studies involving the same participants over a time period spanning from the planning stage to some years into the use phase of an energy infrastructure; but also by scrutinizing notions of familiarization after the infrastructure has been constructed. As Rudolph and Clausen (2021) put it, "premature and unquestioned presumptions of post-implementation acceptance in terms of adaptation and familiarization over time […] may easily be distorted to legitimize and open the door for further developments in the future. Hence, this may lead to a normalization of past procedures that accompany depoliticized acceptance" (Rudolph and Clausen, 2021:70).

3.1.2. Beyond project phases

From a policy and planning perspective, RET projects materialize in different project stages that are defined by common industry practice and financial constraints. This way of looking at infrastructure deployment is often at odds with the perception of other stakeholders, for instance the local population, whose everyday experience of a place, including everyday routines and ancestral practices, may be profoundly altered (Gergan and McCreary, 2022). Taking into account such diverging perceptions of time as well what happens before and after traditional project stages, emerge as central topics from the literature.

As Janhunen et al. (2018) show, the need for local participation in RET projects extends far beyond the planning process when plans materialize into tangible infrastructure that communities continue to live with. Something similar has been shown by Delicado et al. (2016) highlighting the need for continued examination of factors for social acceptance during the use phase of RETs infrastructure. Also, Wheeler (2017) explores the long-term impacts that wind farms can have on local residents after installation and how "experiential factors" such as place attachment and rural identity are related to local residents' responses changing over time in England (2017:127). In the same vein, Sherren et al. (2016) show how living with a Canadian hydropower project motivates community members to renegotiate its role in their community, despite the traumatizing experience of its construction process decades earlier. Nevertheless, apart from such scarce examples, examining the dynamics of the social acceptance of a specific RET project over time, such as based on longitudinal studies from the time before a project is proposed to after it has been constructed or even decommissioned are still the exception in social acceptance research (Johansen, 2019). This focus needs to shift as infrastructures are ageing and i.e. wind parks, solar farms and hydroelectricity projects are already part of contemporary history – as are continuing and relentless cases of resistance and activism against these, i.e. against wind farms that continue to be imposed on local communities, as reported by different researchers throughout time, such as in the Isthmus of Tehuantepec in Oaxaca, Mexico (see Howe and Boyer, 2016; Dunlap, 2018; Velasco-Herrejón and Bauwens, 2020; van der Horst et al., 2021). Inspired by Carse and Kneas (2019), we argue that limiting research to "dominant time maps of capitalist modernity — linear, homogeneous, and focused on short-term accumulation" and the resulting creation of "project time" (Carse and Kneas, 2019:11) is counterproductive for the field of social acceptance research that is increasingly recognizing the importance of the dynamics of people's responses to RET projects.

3.1.3. Life cycles & broader boundaries

Reaching beyond an energy project itself, recent research on RETs and conventional technology projects has increasingly highlighted the relevance of considering the whole life cycles of technologies and/or projects, and their global socio-environmental impacts or embodied energy injustices, as put by Healy et al. (2019). Setting not only a larger spatial but also temporal frame for the impacts and injustices related to RETs provides the opportunity of further interrogating how these projects are connected to multiple places and temporalities, globally. A long-term view on reversibility of wind farms was recently published by Windemer and Cowell (2021) who provide a framework for further research focused on societal interactions with renewable energy infrastructure towards its end-of-life and beyond project phases (please see also Windemer's contribution in this issue for a deeper look into the end-of life applications of wind farms). Infrastructures and the responsible industries may have an impact on livelihoods, cultures and identities beyond the here and now, all the way from the extraction of the raw materials needed for the physical infrastructure, the associated construction and deployment phases, during their use and maintenance phase and up to their disposal and material afterlife (Raman, 2013; Batel and Devine-Wright, 2017; Dunlap and Marin, 2022). Such injustices embodied in RETs take place over time and may be exacerbated if the temporal boundaries of a life cycle analysis for RET projects are set too narrow. Moreover, there is not only a need for extended life cycle analyses of RET projects in relation to injustices, and their psychosocial afterlife but also for taking into account different social acceptance processes in different spatial temporalities throughout this life cycle. In sum, focusing on physical, quantifiable temporal dynamics has proven useful when measuring time in RETs, policy-making, project planning and processes surrounding RET project deployment because it captures many of the immediately visible real-world impacts of such projects. A project's timing or duration are likely to be relevant factors shaping local residents' responses to it. However, overly positivist approaches risk to miss the diversity and depth of people's relations to such projects, as shown already by Ellis et al. (2007) in a case study on public discourses surrounding a Northern Irish offshore wind farm proposal. Numerical data can be useful for instance to take a brief and superficial snapshot of residents' reported rejection or support to a given project - but has severe limitations as it does not give further information on the 'why' of those responses, and on people's experience and meaning-making with RET project deployment. Those articles focusing on time in the shape of "project time" also amputate RET projects from their historical roots, rarely explaining how they materialized from an idea into infrastructure. Now, a detailed project genealogy may not always be necessary but it would hold a promising potential for all those RET project cases where injustice to and exclusion of certain stakeholder groups are diagnosed and, as can be seen in a rapidly growing assemblage of conceptual work (i.e. Jenkins et al., 2016; Heffron and McCauley, 2017; Pellegrini-Masini et al., 2020; Van der Horst et al., 2021) and case studies (i.e. McCauley et al., 2018; Velasco-Herrejón and

Bauwens, 2020) on energy justice, these issues are recurring and evolving themes in social acceptance studies.

Further, the complexity of RET projects, involving many actors at different societal levels and points in time, creates challenges of synchronicity: different stakeholders may perceive time in diverging ways along moments of project-planning, public consultation or political activism. Müller and Morton (2021) call this "colliding time-scales" (68), a phenomenon they illustrate in a case study on wind energy deployment in Eastern Germany. The realization that temporalities differ and that project time does not necessarily have the same meaning for all stakeholders involved (Lord et al., 2020) raises the question how different temporalities come about, and specifically of how capitalist temporalities – that look at time as "emptied of content and extracted from historical context […] ready to be populated with the products of progress" (Adam and Groves, 2007:13) – impact on how time as history is represented by different stakeholders. It is this historical awareness that can make us contest certain taken for granted ideas such as that "the laws of energy are [not only] responses to natural forces" but also "semantic entities" (Daggett, 2019:46) that are mobilized in a universalizing, imperialistic, and technocratic politics of work and waste in the history of neoliberal capitalist societies. The (energy) past of a given place or community and associated meaning-making practices potentially shaping current responses to RET projects is what we turn to next.

3.2. Historical time dynamics

3.2.1. Considering meaning-making and collective memory

Crucial in acknowledging the structural and everyday embeddedness of the social acceptance of RET infrastructures, "further considering the role of time and history in energy transitions and the deployment of RET" (Batel, 2020a:3) has been emphasized as one of the conceptual avenues that the social acceptance field should follow.

Even before this shift in focus and increased critical (self-)awareness, manifested also in several attempts of summarizing the history of the research field itself (Aitken, 2010; Ellis and Ferraro, 2016; Batel, 2018; Batel, 2020a; Batel and Devine-Wright, 2015; Rand and Hoen, 2017), the past has always been present in social acceptance research. Still, despite some authors referring to history explicitly (Sovacool and Geels, 2016., Delicado et al., 2016; Baxter et al., 2020), most contributions still discard the opportunity for then transforming this acknowledgement into a more concrete analysis, and specifically at the micro- /local level of individual and community responses to specific RET projects and infrastructures.

It is not surprising that in times of the current climate crisis much of the social acceptance of RETs research is present- and future-oriented. However, historical energy transitions research shows that there is much to be learnt from energy history – as Daggett (2019) puts it energy genealogies allow to uncover (to 'remember') other ways of doing and relating to energy. But further than this, it is not energy history alone that will give insight into social acceptance processes. To the contrary, which larger socio-historical processes may shape local communities' relations to RET projects and how these may be a product of past experience are crucial questions that remain to be asked. Applying a socio-historical approach to people's meaning-making of RETs will foster critical awareness of how people's responses to RET projects fit into the broader picture.

3.2.2. People, places & the past

People-place relations and the disruption thereof have been identified as one important factor shaping people's relations to RET projects (Devine-Wright, 2009; Devine-Wright and Howes, 2010). Inherent in people-place relations is time, as already shown by Devine-Wright (2009) in the prominent model of "stages of psychological response over time to place change" (433). This proposal describes local residents' psychological responses to place change in the context of an energy technology project and details 5 distinct phases. According to the author, the initial phase of gaining awareness of a project is followed by a phase of interpreting the implications this has for the respective place. A period of evaluating follows during which residents decide on the quality of the potential impacts of the project on their realities. Then, they start to develop coping mechanisms in order to respond to the change. Finally, this may lead to behaviors and specific actions that these residents take in response to the place change (433).

From a socio-historical perspective, this model, however, has temporal limitations as it does not necessarily take into account how psychological responses to changing places may be shaped i.e. by previous experience of place change or memory thereof (both individual or collective). In the context of energy infrastcutures, people-place-energy infrastructure relations are historically grown and tend to be embedded at varying historical depth, requiring researchers to look back years, decades or even centuries in their analyses. Work that thoroughly examines the specific role of past people-place-energy infrastructure relations in responses to renewable energy projects in current energy transitions is still largely missing.

Something similar applies to in-depth analyses of diverse cultural perceptions of and meanings attached to history, taking into account the specific socio-geographic contexts where social acceptance processes take place (Sarrica et al., 2016a), including but not limited to i.e. place-based spiritual beliefs (Kim et al., 2018; Payera, 2018).

Similarly, landscape alterations caused by RET projects, have been identified as central reasons for local residents to form opposition, for instance by Pasqualetti and Stremke (2018). These authors establish a threefold typology of energy landscapes, highlighting among other characteristics the "degree of [temporal] permanence […] ranging from relatively dynamic to permanent" (2018). Their typology shows that, while landscape characteristics can be examined individually, separating spatiality from temporality is artificial as energy transitions take place in space over time. In the same vein, the attachment community members feel towards landscapes is deeply rooted in personal and collective experience and therefore profoundly embedded in time. Places are also constructed within broader narratives of essentialization (as Batel et al., 2015 have shown for Norway and the UK) as well as colonialist narratives (Batel and Devine-Wright, 2017; Enns and Bersaglio, 2019) surviving and unfolding across the centuries.

Thus, history's power in shaping responses to RET projects is far from homogenous, surpasses national borders, and is entangled with global, national and local structural power relations such as between energy companies, the state and local communities throughout generations (Batel and Küpers, 2022). Recent cross-disciplinary scientific contributions show how people living in the vicinity of historical infrastructure projects continue to endure harm caused by these projects which are often representative of political regimes of injustice (see also Devine--Wright and Lyons, 1997). This includes research adopting a longue durée approach to the persistence of colonial thought patterns in spatial planning of infrastructures in East Africa (Enns and Bersaglio, 2019); an examination of reconciliation endeavors in the context of renewable energy projects in Canada (Hoicka et al., 2021); the exploration of Saami representations in renewable energy development in Norway (Normann, 2021); and an examination of the continuing harm inflicted on rural populations by large-scale hydropower projects in the Portuguese countryside (Batel and Küpers, 2022). An especially detailed account was recently given by Lai (2021) who describes and analyzes in-depth the continuation of historical struggles for environmental justice in a community energy project in Taiwan. Although the author explicitly uses a spatial lens, that time and space are interwoven in "geo-historical trajectories" (7) or "geo-historically produced challenges" (20) is evident. From the above case studies, it can be understood that the injustices experienced in the context of RET projects are not limited to the project cycle itself but are often interconnected with ceaseless historical trauma and struggle for social and environmental justice surfacing in specific places of RET deployment that may well continue to unfold far into the future. This brings to the fore the relevance of thinking about

the role of historical time in responses to RET projects and infrastructures through collective memory as a process of remembering and using the past to make sense of the present, such as of new RET projects.

3.2.3. Individual and collective memory & RET project deployment

The past is remembered autobiographically by individuals and collectively by groups, creating their own narratives – including narratives around energy infrastructures, such as RET projects. Diving into community and community members' memory of past infrastructure projects or other related events and processes is a promising gateway – albeit unfortunately still underappreciated – to the historical dynamics of social acceptance and allows for both historicizing RET projects and current responses to these as well as approaching long-term qualitative changes in people's responses to energy infrastructures.

As collective memory we understand memories that are co-constructed, passed on and re-shaped in social group contexts, such as local communities, across generations. Halbwachs described how beyond the "written history, there is a living history that perpetuates and renews itself through time and permits the recovery of many old currents that have seemingly disappeared" (Halbwachs, 1980:64). This passing on of collective memory gives way to intra- and intergenerational re-narration and re-negotiation forming, as Halbwachs calls it, the "living bond of generations" (1980:63). Here, collective memory does not necessarily reflect historically accurate facts (64) but "attitudes and ways of thinking from the past" (64).

This perspective is, on the one hand, helpful for understanding how previous experience with energy infrastructure projects may shape current responses to today's RET projects. We understand this way of looking at collective memory as 'vertical' as a long-term perspective has to be adopted to investigate such dynamics. Traumatic periods or events in the past are collectively remembered and may (re-)surface when people encounter RET projects they have no authorship of. A valuable early example in the context of RETs deployment is an article by E. S. Kim and Chung (2019) who show how communities come to associate wind energy projects with memories of past natural disasters and associated disruption of people-place relations in South Korea. The articles we identified above when discussing historical people-place-infrastructure relations also serve as further examples here. It is unequivocal that some of these contexts shaping neighbors' responses to RETs deployment date back to rather distant times with their own political ideologies and visions, such as the deployment of large dams during dictatorships in Spain and Portugal (Castán Broto, 2016; Batel and Küpers, 2022). Nevertheless, the political past continues to perpetuate violence over certain social groups, visible not only in continuing energy narratives but also as still tangible infrastructural artifacts. However, traumatic episodes in the past do not always lead to negative responses towards RET projects in the present: another South Korean example can illustrate this - the memory of difficult episodes may enable people to develop positive attitudes to RET projects as H. Kim et al. (2019) show in an illustration of how a time of economic deprivation was followed by residents' enthusiasm for wind farms.

The collective creation of memory narratives may, on the other hand, also take place 'horizontally' on a shorter timescale with individuals and groups having first-hand experiences as well as shaping their memory according to i.e. media coverage during their lifetime.

This perspective is a fruitful approach for exploring shorter-term historical dynamics, i.e. on people's meaning-making of RET projects that were deployed only a few decades ago.

In the light of ageing energy infrastructures re-entering public debates, collective remembering of planning and construction as well as of living with the infrastructures may give momentum to different voices in the present that may have been silenced in the past (see Batel & Küpers (2022) for an example of political activism arising around the recent sale of several large-scale hydropower dams in Portugal). Sherren et al. (2016) undertake in-situ focus groups with the aim of understanding how residents remember the construction and socio-environmental impact of a large-scale hydropower dam in the context of a possible decommissioning of the infrastructure. Here, collective and individual memory are a gateway for exploring how people perceive past decision-making around RET projects in relation to their involvement in present discussions. In addition to using collective memory to capture how people's responses to RETs may be anchored in the past in more general terms, horizontal individual and collective memory can in turn be applied to unpack RETs deployment itself. Especially at a time when infrastructures are ageing, and decommissioning and repowering are already realities (Windemer, 2019), these processes come with their own specific procedures and impacts that are likely to continue to affect local communities.

3.2.4. Collective memory, RETs & the media

The transmission and re-negotiation of memories of the energy past does not only take place in face-to-face interaction, in social groups or at the family level. Energy-related narratives are continuously created and fed into by diverse stakeholders to be shared over many media formats. The field of social acceptance of RETs research has, with some notable exceptions to date (i.e. Barry et al., 2008; Batel, 2020b; Walker et al., 2019; Mang-Benza et al., 2021), not taken media analyses to their full potential. While these existing articles are paving the way forward for further exploration of media, they tend to set narrow time frames, not necessarily diving into the vast material that newspaper, radio and TV archives or social media can provide. So far, the field of social acceptance of RETs research is still showing a strong preference for primary research. While some articles may be time-aware, i.e. by explicitly depicting a timeline of evolving narratives (see Devine-Wright et al. (2021) for a helpful recent illustration, although applied to very recent developments and from a short-term perspective), longitudinal or longue durée studies (Braudel, 1958), diving into media archives and other archival sources, i.e. from municipal or energy company archives would be necessary in order to explore evolving narratives over time (but see Batel and Küpers, 2022 for an example).

Cumulative effects of past media narratives may shape how people recall the past and as Cuppen et al. (2020) show in their work on spillover effects in Switzerland and the Netherlands, media can carry messages not only over time but also across space and shape the collective imagery beyond regional or national borders. What Malone et al. show in their article on national narratives and energy diffusion is that, if successful – as in fitting in with the visions that populations have for themselves in the context of the nation – narratives are not necessarily bound to a certain medium but will survive over time because they become part of national identities and collective national memory (Malone et al., 2017 see also Devine-Wright and Lyons, 1997; Batel et al., 2015). Because narratives can become deeply anchored in national culture, it is important not to forget that energy systems do not change in a vacuum: they are part of larger societal change processes that take place over decades and centuries transgressing national history as well as energy history. This would be a fruitful area for further research giving precious insight into the relation between the genealogy of broader political, identity- and energy-related narratives and current responses to RETs. In sum, while collective memory may not be used explicitly as a thematic lens to analyze people's responses to RET projects and infrastructures, yet, it will undoubtedly enrich research on social acceptance dynamics – and especially research on energy justice – where long-term structural power relations and related struggles tend to emerge. Further, processes of collective forgetting may also be institutionalized and memorialized in practices such as i.e. 'museumification' of abandoned industrial infrastructures (Debary, 2004) or 'patrimonialisation' (Wateau, 2004) of new hydropower landscapes. These practices may, over time, foster remembering only certain voices or aspects of everyday life in communities that underwent change, then preventing certain memories from being shared and living on collectively – potentially being forgotten. In sum, while collective memory may not be

used explicitly as a thematic lens to analyze people's responses to RET projects and infrastructures, yet, it will undoubtedly enrich research on social acceptance dynamics – and especially research on energy justice – where long-term structural power relations and related struggles tend to emerge. While collective memory has become an interdisciplinary field of study in itself (Gensburger, 2016, 2019), we accept Gensburger's reading of Halbwachs: that of memory being a "thematic entry point" (2016:407) for sociological (or, in our case, energy social science) investigation of social phenomena (in our case the social acceptance processes surrounding RETs deployment). We therefore argue that social acceptance of RETs research requires precisely this thematic entry point into the historical embeddedness of residents' diverse responses to RET projects. In terms of methods, collective memory approaches require specific qualitative empirical methods such as life-place trajectory interviews (Bailey et al., 2016), oral history (Goodchild et al., 2017), intergenerational or "joint" interviews (Sarrica et al., 2016b) and should also make use of archival sources, so far mostly neglected, but which can provide data that gives meaning-making over time a central role in social acceptance of RET research. Reformulating and asking research questions that have not yet been explored, will require the diversification of methods and materials apt to explore physical and historical time dynamics, namely in relation to the energy-related social issues identified in Table 2 and that we identified as relevant components of physical and historical time, based on our explorative milestone publications review.

4. Conclusions & discussion

In this paper, our aim was to offer a brief conceptual framework for the systematization of time and history in social acceptance research and namely, for the analysis and better understanding of residents' responses to RET projects and infrastructures. We differentiated between physical temporal dynamics that have predominantly been focused on timescales immediately surrounding RETs deployment; and historical time dynamics with an emphasis on the historical embeddedness of social acceptance processes around RET projects. We provided an overview of milestone publications that explicitly or implicitly work with conceptualizations of time in the field, due to the overall scarcity of clear time-sensitive contributions. Based on our milestone publications literature review, we argued that adopting lenses fine-tuned for physical and/or historical time dynamics can help formulating and exploring time-sensitive research questions that the field of social acceptance of RETs research needs to ask in order to approach local populations' experiences around RET projects. These analytical lenses are not time-exhaustive tools as they, too, come with their own limitations: further research does not only need to engage in more meaningful ways with time and history but it should further explore appropriate methods to capture people's experience and meaning-making of time and history in relation to RET projects and infrastructures. It would also be important for future work to review research exploring time and history in social acceptance of RETs in a more systematic way as this field of study keeps evolving. Related topics to be further investigated from a time-sensitive vantage point are, for example, the evolving dynamics of trust in social relations among stakeholders as well as in institutions and procedures around RET deployment, especially in the state and in large energy corporations. Specifically the physical time elements such as duration and speed of planning and decision-making interfere with building trust, especially in those cases where local populations already have historically difficult relationships with institutions and companies they need to engage with. Another important focus of future research should be the impacts that time and history can have on local residents as active citizens, who can also be project initiators, i.e. in community-led projects. Broader areas for further investigation also include the relations between past experience, memory and imaginaries of the energy future, as well as more clearly articulating the role of space in the relation between time, history and meaning-making regarding RET projects and infrastructures.

As already explored here, analyzing temporal dynamics and differentiating between physical and historical time can elevate and multiply the critical voices within social acceptance research that try to unpack struggles around power and justice arising or surfacing in the context of RET project deployment.

Missed opportunities for highlighting how history shapes social acceptance of RET project-related processes and specifically local residents' responses to particular RET projects are really missed opportunities for understanding complexity. The need for investigating the historical embeddedness of people's responses is closely related to the idea that conflicts in the realm of RETs rather than problems to overcome are part of a larger societal conversation on change and related structural inequalities and power relations that includes diverse and evolving standpoints (Barry and Ellis, 2013). For critical social acceptance work that wants to identify and examine power struggles and justice issues in the planning and deployment processes of RET projects (Batel, 2020b), understanding how current acceptance processes are rooted in time and history is, then, crucial.

Nevertheless, given the premise of wanting to understand how people relate to RET infrastructures within current energy transitions, calling attention to people's past and multiple actors' diverging experiences of and over time and across places is not enough. Nor is a mere historicization of RET projects and infrastructures. As Aminzade (1992) put it when discussing sociological research on temporality more generally, "studies of temporality that ignore subjectivity are incomplete" (Aminzade, 1992:469). For our examination of the use of temporality in social acceptance research, this means that neither historical nor broader temporal dynamics alone can account for how people relate to time. For instance, multiple meanings diverse stakeholders attribute to the energy past as well as to current RET projects cannot be captured with this conceptual distinction. Meaning-making of temporality is a transversal process crossing both physical and historical time as RET projects contribute to shaping people's realities.

Table 2
Manifestations of physical and historical time in RET contexts.

	historical time	physical time
trajectories	historical configurations of landscapes, communities or industries, i.e. *'geo-historical trajectories'* (Lai, 2021)	individual trajectories such as *'life-place trajectories'* (i.e. Bailey et al., 2016)
socio-environmental systems, institutions, path dependency & justice	structural power relations & ideologies exacerbated by or re-surfacing in RET deployment	struggles resulting from/around RET projects
community livelihoods & lived experiences	lived experience of historical energy infrastructures & related processes shaping current attitudes to RET projects	lived experience of RET projects & infrastructures
individual & collective memory	*vertical* collective memories of past energy infrastructures & related processes shaping current attitudes towards RET projects	*horizontal* collective memories of RET projects, & infrastructures as they shape subsequent interactions with RET projects

If people are understood as agents acting center stage in current low-carbon energy transitions, how communities make sense of RET projects as some of the most visible and tangible elements of these transitions and their perception of time and history also has to become a central issue of scientific inquiry. More research on temporality and meaning-making will bring research questions to the fore that may have been covered up with easy and more comfortable explanations that continue to fail to explain the complexity of people's responses to RET projects. Investigating how diverse perceptions of time may shape diverse responses of different stakeholders may help the field with developing more critical and holistic approaches to social acceptance of RETs, necessary for examining social acceptance as "a set of activities unfolding over time in complex, multi-layered, polycentric processes that contain countless research questions'' (Wolsink, 2018). Additionally, performing local communities' specific genealogies might allow us to better uncover and discuss "other ways of knowing and living energy" (Daggett, 2019:11). In fact, it would be relevant to further explore if it is capitalism that is imposing temporalities on RET projects and infrastructures that obstruct meaningful engagement with them and/or if renewable ways of 'doing energy' have the potential to change those temporalities into more human and non-human scaled and paced processes and corresponding infrastructures. With increased temporal sensitivity, research will then be better equipped to inform RET policies and planning practices that take communities' vast potential, their concerns and diverse experiences within energy transitions seriously and empower them further to be agents of sustainable change.

Credit author statement

Sophia Küpers and Susana Batel undertook the literature review, conceptualized and wrote this paper.

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