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Review

How to study energy citizenship reflexively? Research questions and methodologies for an elusive research object

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ABSTRACT

The energy transition crucially involves social and institutional innovations, carried by new narratives and discourses. A prominent example is 'energy citizenship'. Coined as an emancipatory counter-narrative of capable and politically involved citizens, it has also proven vulnerable to analytical dilution, ideological appropriation and narrow instrumental interpretations. Arguing for a critical but empirically concrete engagement with the concept, this paper reaches beyond conceptual discussions. Responding to methodological discussions in social-scientific energy research, we address the elusiveness of energy citizenship as an object of study: Is it a policy slogan, a set of concrete actors and activities, a social-scientific category, or all of these at once? As research may silently reproduce implicit assumptions and stereotypes about energy citizenship, we propose a reflexive methodology approach. Building on empirical investigations in a large international research project and critical analysis of recent energy citizenship studies, we identify three key reflexive methodology concerns: 1) the associated normative *ideals*, 2) the *ideological representations* of it and 3) the empirical observables, actors and *ideal-types* that it can be taken to refer to. Disclosing 9 reflexive-methodological strategies, the analysis provides concrete methodological guidance for critical social-scientific energy research more broadly.

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1. Introduction: 'Energy citizenship', an elusive research object

The energy transition involves innovations in multiple elements of socio-technical energy systems. As Wittmayer et al. [1] and Sovacool et al. [2] indicate, the importance of social innovations has become increasingly evident in recent years. This quest for new social relations and institutional arrangements is accompanied with a multitude of alternative energy discourses. Novel concepts such as energy democracy [3], energy justice [4], energy poverty [5], energy culture [6], energy inequality [7] and energy literacy [8] redefine energy issues. Calling attention to hitherto neglected aspects, these new energy discourses challenge prevailing assumptions about the social relations that sustain the energy system. Proposing alternative representations of roles, responsibilities, agency and identities of individuals in energy systems, the new energy discourses deserve attention as cracks in the dominant governmentality [9]. Signalling how and by whom energy systems could be governed differently [10], they introduce what Voß & Freeman [11] called new 'knowings-of-governance'. Representing expertise and authority differently, they challenge the claims to expertise through which energy policy issues are commonly decided [12].

A prominent example of these alternative energy discourses is energy citizenship. The seminal Devine-Wright [13] defined it as active, capable, politically involved engagement with energy matters. In the spirit of earlier deconstructions of NIMBYism [14] and the lay-expert dichotomy [15], this category challenged another energy policy cliché - the idea of the 'passive energy consumer'. Anno 2026, this stereotype has indeed been surpassed by widespread participation in renewable energy communities, practices of energy sufficiency, energy-conscious behaviours at the workplace, and a broad politicisation of energy issues [16]. Recent energy citizenship scholarship has emphasised how it comprises various civic roles and responsibilities in energy transitions [17], and how it can leverage broader institutional innovations [18], politically engaged citizenship [19] and 'just', democratic and inclusive energy transitions [20,21]. Defined as counterpart to consumerism, energy citizenship has strong progressive connotations. As promoted in mission-oriented innovation funding programs – which includes our own research -, the key task for energy citizenship research is arguably to identify, and help create, the conditions conducive to its flourishing.

Things are not that straightforward, however. Recent conceptual debates have pointed out how attempts to leverage energy citizenship remain vulnerable to reductionist [22], ideological [23] and system-confirming [19] assumptions. Notwithstanding Devine-Wright's [13] emancipatory intentions, the category may turn out oppressive instead. Critical geographers have explained how appeals to empowered, self-organizing, responsible citizenship become constraining, the less means and capacities one has to live up to that ideal, and the less privileged one is under prevailing structural conditions [24–26]. Analysing energy citizenship as an emerging governmentality in a Portuguese Positive Energy District, Nguyen & Batel [23] highlight its ideological representation of hedonistic, economically rational and materially independent citizens, inhabiting 'smart' but gentrified neighbourhoods. As Silvast & Valkenburg [22] observed well, energy citizenship research exhibits a seriously confusing mixture of normative and realist conceptualizations. Our own definition [27] incorporates this critical caution as follows: *"Energy citizenship refers to forms of civic involvement that pertain to the development of a more sustainable and democratic energy system. Beyond its manifest forms, energy citizenship also comprises various latent forms: it is an ideal that can be lived up to and realised to varying degrees, according to different framework conditions and states of empowerment."*

Reaching beyond abstract conceptual discussions, this paper calls attention to the associated methodological challenges. As Sovacool [28] discussed in the opening edition of this journal, conceptual refinement should instruct sound and relevant data-gathering. In line with Goodman & Marshall [29], energy citizenship research exemplifies the pressing gap between metaphysical-ontological and empirical-operational research issues. Following Wittmayer et al. [1] and Kluskens [30], we are concerned about the prevalence of instrumentalising research questions: Framing energy citizenship in terms of 'solutions', 'drivers' or 'impulses' for energy transitions, investigations become vulnerable to tunnel vision and normative one-sidedness. Methodologically, the key problem is the elusiveness of energy citizenship as a research object. It may be associated with certain concrete empirical phenomena, yet it is also a label, a socially constructed category. In terms of Laclau [31], it is a typical 'floating signifier': Referring to various kinds of roles, identities and social relations in energy systems, it has an ideological, reality-creating function that cannot be settled through easy conventions. And considered as science-society co-production [32,33]: Is it a policy slogan, a set of concrete actors and activities, a social-scientific category, or all of these at once? Just as citizenship more generally, energy citizenship is a communicative achievement [34]. We cannot assume in an empiricist way that we 'recognise an energy citizen when we see one'.

This paper proposes a reflexive methodology approach along the lines of Alvesson & Sköldberg [35]. Reflexive methodologies, of which we will discuss many variations, revolve around the interpretation-of-interpretations. Our research questions are: *How to study energy citizenship reflexively? How to investigate it in a way that does justice to its complexities?*

Our answers build on our own experiences in a large European research project, and on critical analysis of the wider methodological state of play in energy citizenship research. Our reflexive-methodology framework addresses three key aspects **(section 2)**. These pertain to the multiplicity of associated normative *ideals* **(section 3)**, the *ideological* assumptions about it **(section 4)** and the empirical phenomena, actors and *idealtypes* that 'energy citizenship' can be taken to refer to **(section 5)**. We conclude with an overview of reflexive-methodological strategies, also discussing broader methodological implications for social-scientific energy research **(section 6)**.

2. Energy citizenship, a reflexive methodology approach

Energy citizenship is a rather elusive research object. After discussing our own experiences as well as broader methodological challenges in energy citizenship research **(2.1)**, we develop a framework to synthesise recent reflexive methodology approaches **(2.2)**.

2.1. Conditions, drivers and factors: The need for reflexive methodology

Our analysis starts from our experiences with a large EU H2020 -funded European research project. Featuring research institutes from 9 countries, the investigations involved an extensive mapping of 596 energy citizenship initiatives, 40 in-depth case studies, thematic analyses of conditioning factors and empowerment mechanisms, a survey, scenario development, as well as various stakeholder workshops. Developing, applying and evaluating our methodological strategies, we went through alternating moments of enlightenment and despair. Whilst reflecting on our own experiences, we have also engaged with the growing body of energy citizenship research. Approaching it from a methodological angle, we have considered the kinds of research questions formulated, and the research strategies proposed. We have deepened our reflections during an international expert workshop held in May 2022 in Brussels, Belgium.

Fig. 1 provides a snapshot of the online database, showing numbers of initiatives covered per country. This mapping, guided by a standardised questionnaire on goals, strategies and development of the initiatives, yielded the larger-N evidence base typically strived for in such EU H2020 -funded research endeavours. In spirit of Geels' call for middle-range theory [36], our research started from strong commitments to identifying energy citizenship conditions, transition dynamics [37], and ways to shape desirable energy citizenship futures. The mapping exemplifies the associated quest for broad empirical evidence,

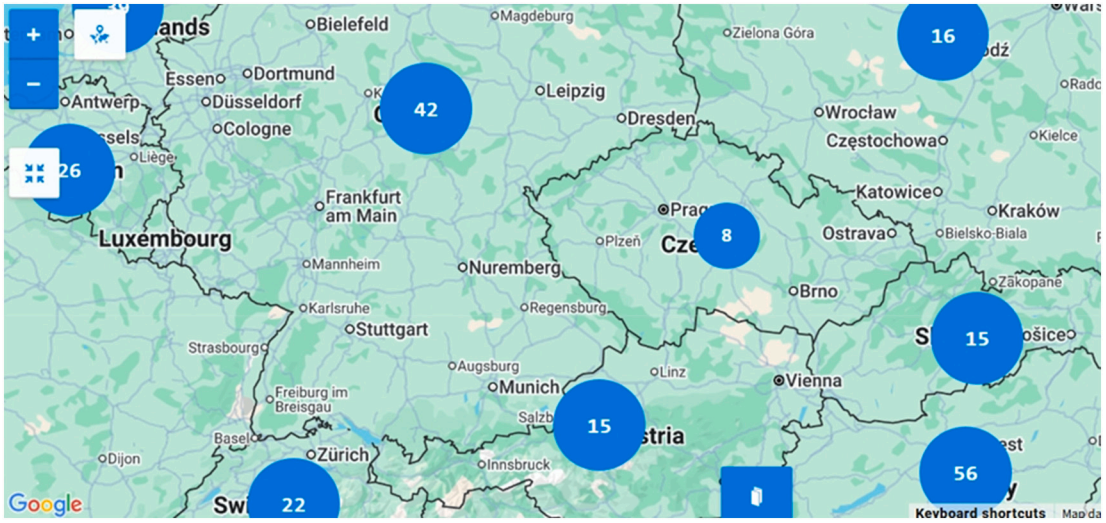

Fig. 1. Mapping of energy citizenship initiatives. Source: https://data.energyprospects.eu/

as basis for pattern identification and intervention. Another valuable effort at such larger-N data gathering is Schwanitz et al. [38], quantifying the achievements of somehow 'citizen-led' energy initiatives. Such comprehensive studies specify political-scientific time series analyses on longitudinal shifts in citizenship more generally [39].

Energy citizenship research remains remote from identifying causal 'social mechanisms', however. Psychology-oriented investigations have detailed how it is bogged down in conceptual confusion, unspecific evidence and unclear causation [40,41]. Modelling efforts have explored future scenarios of decentralized energy systems [42]. However, it remains difficult to develop solid inputs for systems modelling of 'social tipping points' [43], and to channel the social-scientific insights into integrative energy system simulations [44]. In an early methodological discussion in this journal, Lutzenhiser [45] considered how social-scientific refinements such as energy citizenship could offer descriptive and explanatory added value to the crude physical-technical-economic models (PTEM) of energy efficiency. A decade later, Kunnas & Trutnevyte [46] have charted systematically how energy and emissions modelling keeps working with strongly individual-focused variables such as technology adoption, acceptance and modal choice. Key social-scientific factors such as emotions, trust and social conformity remain underrepresented, as they are difficult to formalise.

Energy citizenship research displays a rather frenzied search for conditioning factors. Acknowledging the existence of prior relevant knowledge, this often starts from literature reviews. Clear factors and drivers remain out of reach, however. Bibliographical analysis brings out usefully for example that 'energy citizenship' is becoming more prominent than 'environmental citizenship' [47], but what do these shifting categories tell us about changing citizenship practices? Another quite fundamental confusion arises regarding the causality at issue: *Is 'the energy transition' one of its drivers* [47]*, or is energy citizenship itself a driver of energy transitions* [21,48]*?* Earlier research on energy-related individual behaviours yields a wide range of 'factors' and 'drivers' [49,50], but what, more precisely, are they drivers of? *What is the explanandum, the dependent variable, the outcome of interest?* Applying Comparative Qualitative Analysis to various 'energy citizenship cases', Schmid et al. [51] identified various empowering intermediary actors as crucial success conditions. *But what does this imply further? Does it confirm hypotheses about the importance of energy citizenship ecosystems, or should we understand energy citizenship as an institutional-level phenomenon of which these ecosystems form part?* Another mystery is the causal linkage to societal context factors, such as the 2021 energy crisis in Europe. Repoliticising energy issues, it arguably was an energy citizenship-inducing factor [52]. Posing financial constraints and inciting protectionist political priorities, it has also been identified as a dampening factor instead [53].

The key methodological problem is that energy citizenship does not correspond in any straightforward way to objective states of affairs. Referring back to Fig. 1, our empirical research ran into many doubts: *Which initiatives should appear on the map, and which not? How and why are we selecting them? Which taken-for granted assumptions about energy citizenship are our maps reflections of? Which countries are elevated into leading or following countries?* As Christley et al. [54] discussed recently, these questions keep recurring in social- scientific energy research. Research on these 'wicked' energy topics is fraught with taken-for-granted assumptions and demarcations, and we shouldn't take the empirical evidence at face value. Along the investigations we therefore shook off the empiricist belief that we 'recognise an energy citizen when we see one'. Luque [55] tellingly speaks of a 'ghost chase'. To him, citizenship is a *"speech location, an imaginary ground on which and from which one speaks 'as a citizen' in concrete places and moments. The politicising nature of these enunciations stems from its building a 'we' that does not exist outside political talk (and whose 'true' existence does not make much sense to check), (…)."* Energy citizenship refers similarly to imagined political communities, rather than concrete social groups.

The energy citizenship 'ghost chase' calls for a reflexive methodology approach. As Alvesson & Sköldberg [35] summarised it, reflexive methodology directs attention away from the plain empirical data. Observations about energy citizenship are not taken for granted as facts, but are rather appreciated as enactments and social constructions. Instead of relying on concrete energy-related behaviours with a supposedly objective existence 'out there', reflexive methodology approaches take energy citizenship more cautiously as a 'pre-constructed' object, a label given to certain social roles and governance relations. Undertaking energy citizenship research as the interpretation-of-interpretation, a key task is to reconstruct the labelling process.

2.2. Reflexive methodology: Ideals, ideological assumptions and ideal-types

Reflexive methodology shifts attention from surface phenomena (such as the spatial distribution of initiatives over Europe) towards the cultural, political, linguistic structures that shape energy citizenship interpretations. Rather than pursuing elusive 'factors', 'drivers' and instruments, it probes the assumptions underlying the 'energy citizenship' category. As discussed in the introduction, various conceptual reflections have critically examined its origins, essences, scope and political implications [17–22]. As Geels [36] pointed out however, such

critical investigations may yield 'paralysis by analysis'. Steering clear from wholesale critiques, we do not abandon the quest for sustainable or otherwise desirable energy citizenship pathways. Importantly, reflection need not drive out empirical concreteness and attempts at explanation. Even if leaving out many methodological details, our deliberately broad-scoped methodological investigation will therefore show reflexive-methodological reasoning through concrete matters of research questions and data gathering.

As indicated in Fig. 2, energy citizenship can be investigated along many positivist lines of inquiry. Typical research questions inquire into 'conditions', 'instruments' and spatial distribution. Next to these approaches there is a wider range of methodological strategies, premised on critical-realist or constructivist epistemologies. Typically questioning the assumptions underlying empirical statements and avoiding premature stabilization of energy citizenship as a research object, the reflexive methodologies lean towards the left-hand side of constructivist positions.

As Alvesson & Sköldberg [35] indicate, reflexive methodology comprises a miscellany of research traditions. Distinct examples are hermeneutics, critical theory, poststructuralism, and grounded theory. Starting from our own empirical investigations and discussing recent advances, we have identified three key clusters of reflexive-methodological approaches with particular pertinence to energy citizenship. Without claiming these to be exhaustive, they do cover a large part of recent reflexive-methodological inquiries into the topic:

2.2.1. Ideals

As Christley et al. [54] underline, reflexive methodology is particularly relevant in normatively laden energy research. It crucially examines taken-for-granted claims to 'sustainability', reveals sources of unsustainability, and identifies double-edged sword dilemmas and boundary problems. Next to this critical task of deconstruction and unmasking, Alvesson & Sköldberg [35] also indicate reflexive methodological strategies that disclose the multiplicity of normative commitments, and the mystery of ethical-politically ambiguous notions. Energy citizenship, especially in Devine-Wright's [13] juxtaposition of it against consumerism, stands out as an explicitly emancipatory concept. It appears to express a mixture of political ideals however, and this deserves scrutiny. Furthermore, Silvast & Valkenburg [22] pointed out the intermingling of descriptive and prescriptive energy citizenship discourses. Considered normatively, there are thus various layers of energy citizenship to probe. This has sparked various reflexive-methodological research questions: *What is energy citizenship to whom? What is it good for? What is 'flourishing' or 'successful' energy citizenship? Which are the key political ideals and ethical commitments that define it? Whose ideals is it representing? How to draw the line between true and false or non-desirable energy citizenship? What does it comprise?* These investigations into ethical commitments and political ideals also involves challenges of reflexive transdisciplinary research [56] and questions of positionality [57]: *How is our research promoting which energy citizenship ideals?*

2.2.2. Ideology

Next to the normative lines of inquiry, reflexive methodology also comprises questions about the ideological structures through which social categories such as energy citizenship become liberating – or oppressive instead. Such approaches respond to the confusing echo-chamber that energy citizenship research forms part of: *Is it a policy slogan, a set of concrete actors and activities, a social-scientific category, or all of these at once?* Reflexive-methodological studies have thus investigated energy citizenship as a performative concept [11,33]: Introducing assumptions about roles, responsibilities and identities, it sets a cognitive framework within which technical governance decisions on feed-in tariffs, charging stations and energy saving measures gain sense and legitimacy. Importantly, the narrative of capable, 'energy-literate' individuals may be emancipatory - but critical questions have arisen on its 'neoliberal' negation of unequally distributed means of empowerment: *How is energy citizenship socially constructed? In which ways is it a hegemonic or counterhegemonic concept? What are its key implicit assumptions and categorizations? Through which actors, actants and communication channels is it circulated? Which perspectives and identities are marginalised in energy citizenship discourse?*

2.2.3. Ideal-types

Averse to empiricist infatuations with supposed empirical facts, reflexive methodology tends to disengage from data gathering [35]. Hesitant to making firm assumptions, it is indeed vulnerable to what Geels [36] called 'reificophobia'. On the other hand, it also comes with commitments to empirical plurality, and with curiosity. A third key reflexive-methodological concern is therefore what 'energy citizenship'

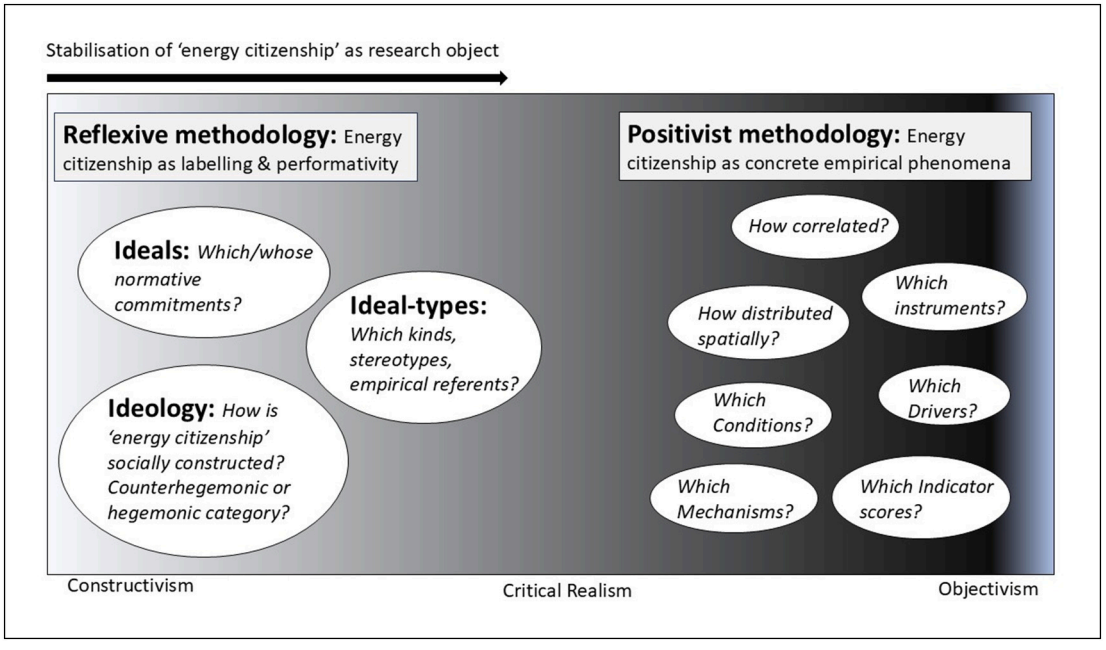

Fig. 2. Reflexive Methodology, 3 key clusters of energy citizenship questions.

can be taken to refer to. Compared to the statistics on energy poverty-affected or energy-saving households [58], energy citizenship lacks such direct referents. *How to classify and select relevant 'cases of energy citizenship'? How to avoid reproducing stereotyped representations of energy citizens? Which ideal-types can be distinguished? Which kinds of energy citizenship can we discern across contexts? Which under-exposed kinds of energy citizenship can be distinguished? Which desirable/possible futures could emerge?*

These three reflexive-methodological approaches will be elaborated in the next sections.

3. Ideals: ENCI as crossroads of ethical-political commitments

Energy citizenship is a normatively rather complex discourse. Fig. 3 exemplifies the widespread imagery of green (sustainable), bright (innovative-progressive) and deliberated (democratic, inclusive) energy futures. Other potentially relevant visual elements are the white skin colour of the two individuals, and their rather comfortable, privileged position of overseeing matters from the bench. Although generally defined affirmatively as emancipatory concept [13,22,27], energy citizenship may have oppressive implications as well. This multiplicity of ideals has been investigated along a wide range of research questions. We discuss these along the approaches of literature and policy review **(section 3.1)**, normative analysis **(section 3.2)**, and transdisciplinarity and action research **(section 3.3)**.

3.1. Literature and policy review

What is energy citizenship? How to define it? As a neologism, energy citizenship invites etymological questions about its composition. Is it primarily an 'energy' suffix, alongside other new energy discourses on energy democracy, energy justice and energy literacy)? Or should we take it as a citizenship affix, marking a new phase in citizenship? Given its positive connotations and apparent institutional backing, it also has evoked questions on its traction as a policy concept, similar to those on 'social innovation' [59], 'circular economy' [60] or 'transition' [61].

There is a certain bewilderment over energy citizenship. Paraphrasing Latour [62]: *Do we dismiss it as a vague buzzword, or do we develop an affirmative critique that substantiates it as a scientifically and politically meaningful category?* Many researchers have therefore sought to untangle it through literature review. Within the already voluminous body of reviews there are marked differences in methodological strategy. First there are the attempts at conceptual stabilization, undertaken in the service of explanatory theory and research. Investigations of causal patterns require stable definitions, operationalised concepts, and comparison between harmonised data-sets. Considering energy citizenship as a factor in sustainability transitions, Röderer et al. [63] sought to identify underlying psychological factors and mechanisms, for example. DellaValle & Czako [64] similarly used literature review to take stock of empowerment mechanisms in the face of energy poverty. Charting the vagueness of energy citizenship in EU policy discourse, Held et al. [40] stress the urgent need for a psychological scale to make it measurable. Schlindwein & Montalvo [46] similarly dissect the state-of-the-art to take stock of drivers and factors. The frequency and co-occurrence analyses of Biresselioglu et al. [47] provide useful quantitative elaboration, situating energy citizenship in a broader conceptual web.

Other than these systematizing scoping reviews, several problematizing reviews [65] have focused more reflexively on the ethical-political ambiguity. These analyses tease out its subtle semantic contrasts with adjacent concepts such as energy prosumerism [20], energy democracy [3], or environmental and technological citizenship [47]. Considering both its newness as well as its familiarity, these studies usefully disclose the myriad of interpretations, origins, and conceptual linkages. Pointing out how energy citizenship scholarship develops through rather contradictory mixtures of 'realist' and 'constructivist' approaches, Silvast & Valkenburg [22] developed a particularly reflexive review of underlying assumptions: *Do we want to know about energy citizenship as it happens to take shape, or as a normative ideal to aspire to?*

The policy review, third, can be a worthwhile strategy as well. Given the promotion of energy citizenship in the Clean Energy Package (CEP) of the European Commission, a multitude of reflexive policy questions arises: *Whose ideals and ideas is energy citizenship representing? Who are its promoters? How is it adopted, institutionally anchored and operationalized? How does it relate to policies of energy poverty, energy security and clean energy?* Many researchers have enhanced their reviews of academic literature through analyses of legal frameworks, policies, and the abundant reports from think tanks, NGOs and consultancy bureaus. The grey literature reviews pose serious limitations qua reflexive depth, however. Even if refusing to take the energy citizenship slogans at face value, the reviewing easily gets stuck in generic commitments to sustainability, democracy, justice, inclusivity and social equality. More fine-grained policy analysis seems essential to untangle the mix of ethical-political commitments. Hess [66] analyzes for example how



Fig. 3. ENCI as a set of political ideals [Source: ULB Actu 2021].

concepts such as energy citizenship may act as 'pacifiers', as bridging narratives, within polarized energy transition contexts. Such analysis showcases the purchase of empirically concrete reflexive methodology: Energy citizenship is reconstructed as a diversified bundle of political ideals, attracting various individuals and organizations.

3.2. Normative analysis

Apart from the problematizing reviews, normative inquiries have also been pursued head-on through various forms of ethical reasoning and systems analysis: *Energy citizenship is an odd composite term, what does its etymology tell us? What are the ethical-political implications of the 'energy' suffix, and where does it sit in the longstanding debates on citizenship? What are the limits of the concept, and what could be considered 'false' energy citizenship?* And as Brown et al. [67] asked about renewable energy prosumerism: *What, precisely, is energy citizenship good for?*

These ethical-normative questions mark the rather philosophical strands of reflexive methodology. They help to disclose the considerable ethical complexity involved. A first key issue is the intricate coupling between 'energy' and 'citizenship'. However intuitive it may appear as a mirror image to the passive energy consumer [13], energy citizenship it is not that ethically coherent a notion. To begin with, citizenship is a politically complex concept. Different theoretical traditions have charged it with different normativities [68]. From a liberal perspective, citizenship emphasizes rights-bearing individuals, who are protected from collective interference and free to pursue their own life plans. From a republican perspective, citizenship revolves around active participation in collective self-government, and shared responsibilities for the common good. And where *environmental* citizenship has evolved primarily around duties towards the environment [69], energy citizenship appears to revolve more around entitlements to well-being, protection and means towards self-determination. These ethical inquiries clarify how energy citizenship may incorporate the entire 'clean, affordable and secure' energy trilemma, and how emphases on energy-related civic duties may amount to instrumentalizing reductions of it [26]. If citizenship becomes subservient to energy policy objectives, this may neglect the fundamental importance of *democracy*, and the associated rights of individuals to challenge energy-related decisions and power relations [70]. In summary, normative analysis shows energy citizenship as an incoherent unity. As discussed later under foresight methodologies **(section 5.3)**, energy citizenship may even be considered as a bifurcation between opposing 'energy' and 'citizenship' concerns.

Citizenship is known to be a layered concept. The energy aspects of energy citizenship have been scrutinized as well, however, through natural-scientific reflections: Halloy [71] has questioned its basic 'energy transition' teleology. *The need for sustainable energy transitions is the taken for granted normative horizon for energy citizenship research – but what does this mean precisely, and what would it entail?* Analyzed from a systemic perspective on the bio-geo-physical constraints to life on Earth, there is no structural planetary energy problem: Solar energy is abundant. Structural problems reside instead in the power (the energy per time unit) needed to produce key consumables and technologies such as houses, internet, telephones and cars. The 'energy transition' may thus be framed more accurately as a 'materials transition', a 'time scale transition', or a 'power transition'.

Misrepresenting our planetary predicament, the 'energy' add-on to the citizenship is thus far from innocent. Ecological-political analyses have similarly scrutinized selective 'energy' understandings. Batel [72] situates energy citizenship in an era of 'renewable energy colonialism', where 'green energy transition' processes deepen structural power asymmetries. This comprises global North-South as well as urban-rural divides. Post-growth scholarship zooms out similarly, to highlight broader power structures of coloniality [73]. *Given the mounting geopolitical tensions and the reality of finite resources, what energy systems and polities should 'energy citizenship' presuppose?*

Diffracting energy citizenship into a multitude of political-ethical commitments, these reflexive investigations unfold its internal contradictions and ambiguities: *'Shallow' or 'deep', 'transformative' or 'reformative', 'tokenistic' or 'authentic' – what is the real energy citizenship?*

3.3. Transdisciplinary approaches and action research

What is energy citizenship and what is it good for? Literature reviews and normative analyses are sharp reflexive-methodological tools, but they have their limitations: They are analyses about, not *with* citizens. This can be problematic – when experienced home energy injustices get misrepresented, for example [74]. Responsive, participative and transdisciplinary approaches are being applied already, but experiences of energy-related hardships are still often obscured by cold energy poverty statistics. This underscores the importance of methodological efforts towards more grounded and embodied energy citizenship understandings. These can be developed notably through transdisciplinary investigations with energy citizens, practitioner workshops, and (participative) action research.

In a series of workshops, we asked practitioners in Germany, Hungary, Belgium (Wallonia) and Spain (Galicia) what energy citizenship meant to them. *The Anglophone concept, is it at all transferable across European contexts? How is it translated, appropriated, and rephrased?* Attending to everyday language and to cultural-political contexts, our 'regional translation' workshops unfolded energy citizenship into a range of near-synonyms and adjacent concepts. The word clouds in Fig. 4 visualise how it is associated with democratization and justice, participatory decision-making, environmental awareness, consumer empowerment, energy security and energy market development. The workshops also disclosed its roots in more longstanding citizenship discourses. The incipient energy citizenship in Spain and Portugal builds on preexisting forms of collective agency, such as neighbourhood associations, social movements and cooperative economies [75]. In these contexts, it thus emerges less as a novel, imported governance ideal, and more as return to established repertoires of civic engagement. Apart from the wide endorsement, these situated discussions also brought out mistrusting attitudes towards the concept, however. In our Hungarian workshop, participants associated energy citizenship with privileged social strata, rather than with the general citizenry. This resonates with Zuk et al. [76], undertaking focus group interviews with energy prosumers in the Visegrád countries (Czech Republic, Poland, Slovakia and Hungary). In these European contexts, sluggish national transition, low social trust, centralized energy systems and weakly developed civic spheres have given rise to a noteworthy variation of energy citizenship: Energy prosumerism as civic 'self-defence' – against, parallel to, independent from, but in any case not *with* the state.

Such practitioner workshops exemplify the added value of transdisciplinary energy citizenship research. Highlighting its multi-faceted and potentially conflictual nature, these situated accounts challenge abstract endorsements of the concept. Rodhouse et al. [77] pursued a similarly 'grounded' approach through Q-methodology. Rather than investigating public participation in the Dutch heat transition along preconceived notions, they analyzed various governance actors' assumptions about the alleged energy citizens. This disclosed subtle but crucial assumptions about citizens' agency, passivity and collaborative intentions. Rather than asking what energy citizenship is, various participative action research projects and real-world experiments have explored how it is enacted [30]. Trenks & Bögel [78] asked the typical action research questions: *"Did the real-world experiment lead to an empowering role change among the involved citizens? Which processes and mechanisms are involved in supporting an empowering role-changing process?"* Importantly, action research approaches capture how energy citizenship takes shape across energy contexts and practices. An interesting approach is the 'energy walks' method, to 'walk and talk with ordinary citizens and explore how they connect and interact with current heating systems' [79]. Embracing 'the idea that energy citizenship is a reflexive process rather than an outcome', this methodology breaks



Fig. 4. Energy citizenship interpretations in Belgium, Spain, Germany and Hungary.

loose from the idealistic energy citizenship research that Silvast & Valkenburg [22] warned against.

Various recent transdisciplinary inquiries have examined energy citizenship through very practical questions. Comparing experiences in different European Positive Energy Districts (PED), van Wees et al. [48] investigated citizens' more active and passive engagements in them, evaluated their interest and willingness, and assessed the impacts of these engagements. As the authors indicate themselves however, the search for energy-related impacts did obscure some of the underlying active/passive energy citizenship behaviours. When overemphasizing practical relevance and impact, action research can lead into rather managerial modes of research, Alvesson & Sköldberg [35] warned. In contrast, Sahakian et al. [80] show a very compelling example of *reflexive* action research. Their Citizen Action Labs did not only help to hone the multiplicity of requisite skills, but they also supported social learning on collective forms of energy citizenship – which tend to be systematically overlooked [80]. The next section delves further into these ideological dimensions.

4. Ideology: Questioning an idealizing social construct

Energy citizenship is a rather idealizing concept. Appealing to enlightened, empowered civic agency, it raises reflexive-methodological questions about the societal conditions under which these ideals could be realized. A significant stream in energy citizenship research is probing its ideological representations. We discuss critical discourse analysis **(section 4.1)**, co-productionist methods and media analysis **(section 4.2)**, and inquiries into social representation **(section 4.3)**.

4.1. Critical discourse analysis

From the viewpoint of empirical concreteness, literature reviews and conceptual discussions may be unsatisfying due to their terminology focus. They do address a crucial aspect of the energy citizenship puzzle, however, namely *language*. Taking it as a label that refers rather loosely and selectively to states of affairs and social groups, critical discourse analysis focuses on the labelling process. *What is this neologism supposed to achieve? Why has it emerged in this particular societal context? What are its hegemonic or counterhegemonic implications, and which variations can be distinguished? What are its key implicit assumptions? Which social actors promote the discourse, and why?*

Critical discourse analysis approaches have enriched energy citizenship research by disclosing the subtle power effects of the concept. In line with Fairclough et al. [34] they have highlighted the ideological operation of 'energy citizenship': It is precisely its common-sensical, consensual appearance that naturalises energy citizenship into a taken-for-granted, norm-setting concept. **Fig. 5** shows one example of its normalizing, disciplining effects. The Dutch governmental publicity campaign 'turn the switch too' raised a question that circulated widely during the European energy crisis in 2021: *Have you, dear citizen, already turned down your thermostat?*

Critical discourse analysis is inclined towards the deconstructive lines of reflexive methodology. Similar to Swyngedouw's deconstruction of participative governance [25], various authors have revealed the implicit assumptions that tend to accompany energy citizenship discourse – and especially its appropriations in policy discourses. Following Foucault's historical analyses of governmentality and subjectification [9,81], much discourse-analytical attention goes out to the individualising tendencies of energy citizenship discourse. However intuitive, individualising narratives eclipse collective forms of energy citizenship that are rooted in diverse preexisting community relations and energy cultures (e.g. [82] for an example from Ireland). Lennon et al. [24] usefully indicate how individualising energy citizenship imaginaries can turn into disempowering imperatives. The narrative of empowered, self-organizing, responsible citizenship becomes constraining, the less means and capacities one has to live up to that ideal. Bouzarovski et al. [74] indicate instructively how the similarly individualizing notions of 'energy poverty', or 'energy vulnerable groups' 'place the burden of responsibility onto people experiencing energy-related hardships'. Energy *citizenship*, in contrast with energy



Fig. 5. 'Turn the switch too' publicity campaign. Source: https://zetookdeknopom.nl/

community, energy *democracy* or energy *justice* discourse, alludes quite strongly to individual rights and duties [17].

Critical discourse analysis is at its most productive when it elicits the semantic subtleties through which concepts evolve. It helps to retrace the political appropriation of energy citizenship discourse through programs of energy market integration, energy sovereignty, and the neoliberal insistence on consumer choice and entrepreneurial spirit [24,83,84]. Gathering evidence confirming 'neoliberal' tendencies, Anfinsson [83] exemplifies how interpretive inquiry can slide into objectivist judgement: *"What is labeled local citizen empowerment is actually the governance of citizens and the environment according to market imperatives."* As Fairclough et al. [34] argue, rigorous critical discourse analysis also discloses the *counter*hegemonic structures and actor coalitions that shape a discourse. Alongside the extensive accounts of 'capture' by energy consumerist ideology [13], various researchers have indeed explored emancipating manifestations of energy citizenship discourse. Analysing it as an emerging governmentality in a Portuguese Positive Energy District, Nguyen & Batel [23] do highlight its ideological assumptions of hedonistic, economically rational and materially independent citizens, inhabiting 'smart' but gentrified neighbourhoods. They also show its empowering sides, however, and especially Nguyen [85] calls attention to the great variety of energy citizenship identities, practices and narratives. In the same vein, Dunphy & Lennon [19] raise critical questions on its ideological operation as a 'late-Capitalocene chimera' – whilst also discussing its diversified appropriation by different groups of actors.

4.2. Co-production and media analysis

Policy reviews **(section 3.2)** have charted its political uptake, and critical discourse analyses **(section 4.1)** disclose the broader ideological shaping of energy citizenship identities. These language-focused analyses raise further questions on the actors, media and societal structures transmitting the concept. Energy citizenship is, as theorized by Jasanoff [32], Voß & Freeman [11] and others, a 'co-produced' category. Similar to concepts such as the circular economy [60], it simultaneously shapes understandings of the reality to be governed (understanding energy systems as social-institutional systems) and understandings of its governance (arguing for democratic deliberations and somehow active citizenship, rather than top-down catering to consumer demands). Co-productionist analyses typically decipher the shaping and implications of energy citizenship at the science-policy interface: *Through which actors and communication channels is it circulated and 'co-produced'? How are researchers, and research programs shaping energy politics, and* vice versa*? And how to position oneself as researcher in the confusing mixtures of energy citizenship recommendations, evidence, expectations, policies, narratives and future projections?*

It is puzzling how energy citizenship can be a policy slogan, a fascination of energy researchers, or a popular narrative all at once. Discussing the EU Clean Energy package, a planning bureau publication and the communications of the RESCOOP energy cooperatives platform, Anfinsson [83] shows how its neoliberal tendencies manifest across institutional domains. A next step along this co-productionist methodology is media analysis. In a highly instructive study on Finnish newspaper coverage of the energy crisis, Laakso et al. [86] reveal energy citizenship to be a strongly mediatised phenomenon. Broadcasted on a daily basis with persuasive storylines, energy citizenship narratives can lead our perceptions in wildly diverging ways: During the intensively mediatised period of volatile energy prizes and societal turmoil in 2021, citizens were sometimes cast as victims, and sometimes rather as agents of change. Media analysis usefully elicits the dynamics through which energy citizenship narratives are transmitted, appropriated, and connected to other narratives - the populist and far-Right appropriations of citizenship discourse, for example. Investigating newspaper media discourses in Portugal, Valquaresma et al. [87] considered how these media may use tropes on the renewable energy transition that converge with, and unintendedly support, far-Right populist discourses – notably through common juxtapositions between supposed elites and 'the people'. Reconstructing how this convergence between media frames and political framings may be intended or unintended, partial or complete, media analysis exemplifies the reflexive-methodological mode of inquiry: *Energy citizenship, how does it resonate through society?*

This discursive resonance poses very direct challenges for science communication. As we have experienced ourselves, energy citizenship researchers operate in an echo-chamber of communications. First, our research started out from a loosely pre-constructed research object: Featuring as a research priority in the recent EU H2020 program, energy citizenship forms part of mission-oriented innovation policies to meet 'grand societal challenges'. The corresponding call for projects asserted the existence of energy citizenship, its potential contributions to energy transitions, the need to identify barriers, and the challenge to strike balances between sustainability, inclusion and energy security concerns. Integrating the key findings of four projects, a concluding policy brief [88] summarised main conclusions on barriers, pathways, caveats, citizen opinions and challenges. Synthesizing findings to enhance practical relevance, the brief also provided a shorthand definition to bypass the divergent conceptualisations. Stated in such generic fashion, the research results inevitably echoed much of the call-for-proposals that they had started from. Such loops between science and policy framings have been investigated earlier for policy concepts such as 'transition management' [33] and 'social innovation' [89]. Following Voß [33], it will be worthwhile to follow how 'energy citizenship' gains traction through mutually reinforcing scientific and political credibility.

Looking beyond language, these co-productionist analyses also mind the material communication infrastructures that bring energy citizenship into being. Bouzarovski et al. [74] point out how 'energy-poor citizens' exist partly through energy poverty measurements and statistics. Another very relevant co-productionist approach is 'material participation' analysis. Ryghaug et al. [90] demonstrate through such 'device-centered' analysis how energy citizenship develops around electric vehicles, smart energy technologies, and rooftop photovoltaic solar cells. As these mundane artifacts are seldom associated with political matters of citizenship, these analyses provide a refreshing perspective. Retracing its co-production through various actors, objects and practices, they show energy citizenship as a particularly dispersed achievement. Co-productionist angles such as 'material participation' or

'ecologies of participation' [91] easily neglect an important aspect, however: Energy citizenship raises anthropological and political-scientific questions on *citizenship*.

4.3. Social representation analysis

Reflexive methodology typically delves into the ideological dimensions of the energy citizenship concept. A central concern is its universalising appeal to citizenship, and the associated suppression of difference. Fig. 3 emplifies how visual representations may silently reproduce stereotypical ideas about male, white and rather privileged energy citizens. They may obscure the existence of energy citizens outside the polity. Focusing on social representation, various researchers have taken this issue beyond general critiques: *Which perspectives and identities are marginalised in energy citizenship discourse? Which social groups and roles can it be taken to refer to?*

As observed earlier for community energy [92] and for political participation more generally, there is a certain gap between universalizing energy citizenship narratives and often rather less than inclusive practices. As the affluent, higher-educated, ecologically-aware, privileged citizens tend to be overrepresented, Sahakian et al. [80] sought to make their citizen labs attractive for 'hard to reach' social groups such as immigrants. This underscores the particular relevance of transdisciplinary approaches **(section 3.3)** for energy citizenship research. Sensitive to epistemic justice, they have developed dedicated repertoires to include underrepresented voices. Kluskens et al. [93] did similar efforts towards balanced representation, through an emphasis on inclusive respondent sampling.

Many studies have detailed how representation is not only a formal matter of presence and membership, but also more subtly and profoundly a matter of expectations, identities, trust, and persistent stereotypes. Jaradat et al. [21] discuss for example how the youth is often treated as *not yet* energy citizens, in need of education and energy literacy. Lindberg et al. [94] add how female marginalization often takes place through the gendered job profiles and stereotypes of professions in the energy sector. Laakso et al.'s [86] media analysis on Finnish energy citizenship shows how especially the elderly easily fall into stereotypes of the 'vulnerable victim', or the 'tough granny' braving the cold winter. These qualitative accounts of marginalization are increasingly systematised through quantitative analyses [38,92]. Typically starting from concerns of representativeness, surveys form integral parts of current European energy citizenship research [88].

Social representation and marginalization analyses have helped to relate energy citizenship to controversial societal phenomena such as 'green gentrification' [23]. Beyond the well-established lines of privilege and marginalization, this research has specified the crude notion of 'hard to reach' social groups. This also comprises not only the wealthy and disengaged upperclass [80], but also rather invisible energy citizens: In a qualitative study on Norwegian low-income households, Solbu et al. [95] brought out how their frugality practices somehow stay below the radar. The next section elaborates how these 'unsung heroes' of the Norwegian energy transition form part of a broader difficulty to disclose energy citizenship in its full empirical variety.

5. Ideal-types: Identifying empirical referents and categories

Energy citizenship research amounts to a 'ghost chase', Luque [55] expressed it well. Reflexive methodology sensitises us to the risk of reproducing stereotypes. This constructivist epistemological caution does not imply empirical disinterest, however. Neither does it imply hostile rejection of critical-realist epistemologies, with tentative explanations (Cf. **section 2**). In any case, our own research did start from such ambitions towards explanation and practical relevance, and this raised questions such as the following. *What can energy citizenship be taken to refer to empirically? Which ideal-types can be distinguished? Which desirable/possible energy citizenship futures could emerge?* We discuss approaches of critical innovation studies **(section 5.1)**, typology development **(section 5.2)** and foresight **(section 5.3)**.

5.1. Critical innovation studies

Energy citizenship research can silently reproduce ideological assumptions and stereotypes. A related challenge is the 'pro-innovation bias' that pervades contemporary innovation thinking. Innovation research, including research on social innovations such as energy citizenship, is inclined to focus on the best practices, the stereotypical pioneers and innovators, and the stock images of beneficial innovation. Critical innovation research, following Godin & Vinck [96], challenges this: *Which are the stereotypical and highly visible representations of energy citizenship? Which under-exposed kinds of energy citizenship can be distinguished, 'beneath the tip of the iceberg'?*

Energy citizenship investigations are vulnerable to the methodological bias towards the 'manifest' cases of radical innovation and strong upscaling ambitions. As Pel & Kemp [97] argued, the rather restorative and locally oriented initiatives stay underexposed. Well-known, manifest forms of energy citizenship could be considered the politically engaged citizens, the organised citizen summits, the environmentally conscious consumers, and the citizens collaborating and associating in energy communities. These are the typical hits one gets through a 'Google images' search **(Cf.** Fig. 3**)**. Committed to analytical symmetry and resisting narrow typologies, critical innovation analysis yields a range of relatively underexposed energy citizenship. Methodologically, these counterparts to stereotypical forms are advances towards what Doty & Glick [98] called 'expanded typologies':

Commonly defined as active, engaged, empowered forms of citizenship [13], *passive* energy citizenship appears to be an oxymoron. *But is it?* To begin with, active energy citizenship does presuppose certain preceding activation processes and incentives, such as the threat of electricity blackouts [99]. Moreover, Dobson's [68] foundational citizenship studies have distinguished various shades of active/passive and top-down/bottom-up citizenship. In fact, 'passive energy citizenship' corresponds roughly with Ekman & Amnå's [100] categories of relatively 'latent' political participation, such as blank voting, non-voting, and various apparently semi-political or non-political behaviours. One could similarly situate 'passive' energy citizenship at the bottom of Arnstein's [101] famous participation ladder. Meanwhile, the Yellow vest and Extinction Rebellion movements are notorious borderline cases: Even if far from passive, their civil disobedience transgresses conventional forms of citizenship [102].

Reflexive-methodologically, passive energy citizenship cannot be ruled out so easily. Exploring the energy citizenship exerted by collectives such as families, neighbours, communities, and companies, other studies have explored the area beyond the notoriously overrepresented individualised, private-sphere focused forms [19,74,80]. In contrast, longstanding liberal and republican citizenship traditions actually consider the private sphere rather as *external* to citizen life. Looking beyond the private sphere, energy citizenship could thus be sought for in schools, companies, universities, churches and sports clubs. Adopting a material participation perspective, van Veelen [103] argues that it just cannot be confined to the private sphere: the very boundaries between public and private spheres are becoming increasingly porous. Collective energy citizenship has also been investigated through relational modes of inquiry, highlighting its enactment through distributed agency [93] and institutional hybridization. Since Devine-Wright [13] promoted energy citizenship as politicised and state-oriented counterpart to the passive consumer, others have nuanced the citizen-consumer dichotomy. Studies on institutional innovation [18] and renewable energy prosumerism [67] have highlighted how energy citizenship initiatives develop through *mixed* motivations and *multiple* institutional logics [104].

Seeking ways out of 'pro-innovation bias', critical innovation methodology also shifts analytical attention towards the underexposed

parts of Rogers' [105] classic innovation diffusion model, the so-called 'late adopters' and 'laggards'. Postulating psychological features of innovation adopters, the model distinguishes venturesome 'innovators' (the first 2.5%), 'early adopters' (the next 13%) that serve as peers for others, the 'early majority' (less venturesome than earlier adopters), the rather sceptical 'late majority' (34%), and finally the 'laggards' (16%) who are typically traditional and tend to exert little opinion leadership. As described in various social representation analyses **(section 4.3)**, these categories have become stereotypes. They are descriptors that easily victimize, marginalize and dismiss certain groups of energy citizens – who, as Hacking [106] investigated, may start to self-identify and behave differently, which in turn may 'loop back' into new understandings of 'energy citizenship'. Taking a similarly reflexive perspective on these innovation categories, critical innovation research highlights the systematic over-exposure and disproportional celebration of the 'innovators' and 'early adopters' [96]. In sustainability transitions research, these 'frontrunners' catch much attention as trailblazers of transformative change [107]. In energy citizenship research, this corresponds with the obsession for the pioneering Positive Energy District projects, the trailblazing citizens in living labs, and the leading EU member states and their efforts to 'leave nobody behind'. This critical innovation studies reflexivity is gaining ground: Markard [108] describes how energy transition processes in various contexts have surpassed the pioneering stages, and Geels [109] calls for closer attention to 'followership' rather than leadership.

5.2. Typology development

Looking beneath the tip of the iceberg, critical innovation studies help to find energy citizenship beyond the obvious places. Typology development is a way to systematize this. Establishing theoretically coherent sets of empirically grounded ideal-types, it is a stepping stone from critical reflection towards systematic and possibly explanatory empirical research. Typical research questions are the following: *Which kinds of energy citizenship can we discern empirically? Which ideal-types can be distinguished conceptually? Which kinds of energy citizenship can we discern across contexts?*

Intensifying scholarship has attempted to classify, order, and circumscribe energy citizenship, and to separate it from the many partially overlapping concepts. Kanger [110] explains the challenge well: The defining characteristics of the ideal-types need to be mutually exclusive, and the overall typology needs to be logically exhaustive. If not, typologies provide partial views of phenomena. Indeed, from our reflexive-methodological angle, typologies could easily introduce energy citizenship stereotypes. To condense the many relevant distinctions into a crisp set of relevant key characteristics is therefore very challenging. It involves ever-debatable assumptions about categorisations. For energy citizenship, Kanger's aforementioned requirement of logical exhaustiveness seems quite impossible to meet. Many defininings characteristics are inherently open-ended; it is difficult to demarcate what or who would lie *outside* energy citizenship. In summary, typology development marks the frontline between complexity-embracing reflexive methodology, and the explanation-oriented, complexity-reducing and practically relevant methodologies that Geels [36] advocated.

As detailed in Debourdeau et al. [111], we ourselves have attempted to articulate energy citizenship through an empirically validated conceptual typology. Following the critical innovation studies logic of looking beyond the prominent examples, we disclosed energy citizenship along 7 distinctions. These distinctions raised questions of delimitation, logical coherence and exhaustiveness, but also of observability: *Can 'passive' forms of energy citizenship be acknowledged without overstretching the concept? How do the seven key distinctions overlap with each other? How can they be operationalised into empirically observable distinctions? Which distinctions are conceptually the most fundamental?*

These considerations led us to a conceptual typology along the two dimensions of 1) agency (disclosing a fivefold spectrum from individual to collective) and 2) outcome orientations (distinguishing between reformative and transformation-seeking energy citizenship). Condensing our theorizing, these two dimensions capture much of the broader debates. The spectrum between individual and collective forms proved quite easy to operationalise. It responded not only to the critiques on the individualizing assumptions, but also to the considerations on institutional hybridity and the blurring between public and private spheres. Identifying six citizen roles, Lennon & Dunphy [112] similarly distinguished more and less 'reformative' and 'transformative' forms, but less systematically along the actor dimension. Our typology also coincided roughly with Stern's [113] 'shallow'/'deep' environmental citizenship distinction, and with Smith et al.'s [114] "incumbent actors'/'grassroots innovation' antagonism. Less pronounced but still relevant is the conceptual convergence with Jansma et al."s [115] distinction between 'material'/'cultural' participation, and with Stirling's [12] juxtaposition of 'technocratic'/ 'democratization-oriented' approaches to sustainable energy transitions. Accommodating various reflexive-methodological insights, the reformative/transformative distinction was fundamental to our overall energy citizenship understanding. Empirical distinctiveness remained a challenge in subsequent research, though: How to draw the line for the specific case? Similar operational challenges arise for otherwise very incisive distinctions such as Wittmayer et al.'s [116] cooperating, exchanging and competing modes of social innovation, or even the empirically quite concrete categories of 'diverse economies' scholarship [117].

Typology development depends considerably on empirical testing and iterative refinement. Here we encountered a persistent methodological challenge: The theorized under- and overexposition of energy citizenship variations also makes itself felt through differences in access. Well-organised 'frontrunners' tend to seek exposure and scaling, but 'passive energy citizens' are difficult to identify and recruit. Few people are inclined to set up websites on their 'passive energy citizenship' practices, or on their lives as 'laggards' in the energy transition.

5.3. Foresight

Typologies help to order and consolidate the reflexive-methodological energy citizenship insights. In turn, the systematically defined ideal-types invite investigation of the societal conditions under which they develop. As Schmid et al. [51] elaborated in a Qualitative Comparative Analysis, typologies help to fine-tune the heterogeneity and homogeneity between cases that make systematic comparison possible. Analysing the conditions for energy citizenship initiatives to contribute to energy system democratization, they singled out 14 collective initiatives as a sub-set from a broader $N = 40$ study. Serving as stepping stones towards energy citizenship patterns, typologies also help to construct future pathways. This development of foresight and actionable knowledge is a widely shared research aim **(Cf. section 1)**: *Which desirable/possible energy citizenship futures could emerge? Which could be the driving forces?*

The exploration of energy citizenship futures typically involves complexity reduction. The reflexive methodology approaches are still relevant however, especially for the selection of salient structuring variables. Exploring future configurations of decentralized energy systems, Wieczorek et al. [42] structured the possibility space through the key uncertainties of 'value orientation' (what/whose values are promoted) and 'steering direction' (the steering by different actors and how this plays out). A particularly reflexive foresight methodology is to deconstruct energy citizenship. Focusing on its internal contradictions and trade-offs, it can be explored along four bifurcating scenarios. Comparable to Stirling's [12] disjunction between technocratic and democratizing energy transitions, the scenarios show positive and negative 'energy' and 'citizenship' developments in different combinations. The associated tradeoffs can be elaborated further through earlier-discussed distinctions such as passive/active, individual/collective, or reformative/transformative energy citizenship. The 'Futures Wheel'

methodology by Defila et al. [118] could help to develop these bifurcations through personal experiences. Another reflexive-methodological approach would be to ground the foresight analysis in normative critiques **(section 3.2)**. Following Pansera et al. [119], energy citizenship could be situated provocatively in post-growth futures. It could thus be conceived as a driver towards a 'planned democratic control' future pathway, with gradual phase-out of pressures for economic growth - or alternatively, as being driven by the turbulence of a 'chaotic collapse' future pathway.

Reflexive methodology approaches share a good sense for critical junctures, but they tend to require additional structuring. A further step towards systematic foresight is the analysis of conditioning factors. In our own project we have examined energy citizenship through a PESTEL methodology, analyzing political, economic, social, technological, economic and legal factors [53]. Apart from yielding important comparative insight across different EU member states, this analysis also served as a basis for scenario development: Hajdinjak et al. [120] describe the findings of an expert workshop, elaborating optimistic and pessimistic variations of social-economic (SE), political-legal (PL), and environmental-technological (ET) scenarios.

Whilst the expert workshop was the suitable methodology towards synthesis into actionable (policy) insights, this scenario development exercise also showed the wide scope for further elaboration. The analysis of conditioning factors could be refined through more integrative analyses of energy cultures [6,115,121]. This could help identify the 'distal' and 'proximate', micro, *meso* and macro, factors conducive to active energy citizenship. Our PESTEL analysis also confirmed the importance of advances in system dynamics modelling. Alkemade et al. [43] indicate their methodological strength to synthesise conditions and effects, and to formalise energy citizenship dynamics into reinforcing and dampening feedback loops. One could analyse for example how digitalisation could unleash a series of energy citizenship-empowering effects, and how these desirable, sustainability-enhancing effects could trump various negative effects and rebounds. Such formalisation opens up a wide range of quali-quantitative methodologies. Along the lines of Campfens et al. [122] this could ultimately yield quantifying approximations of 'social tipping dynamics'.

For energy citizenship research, modelling exercises evoke hopes of identifying 'drivers' and pathways. As Kunnas & Trutnevyte [46] indicated however, energy citizenship may just remain one of these elusive factors that does not make it into the models. *Should it be expressed as driver, system component, stock or flow?* On the other hand, the modelling methodologies are not necessarily confined to positivist epistemologies. Rather than providing certainty and exactitude, they also underscore the incompleteness and selectivity of any model. Proceeding through transparency about assumptions, they indicate how reflexive methodology approaches could be consolidated through careful, stepwise formalizations. These ventures beyond reflexive-methodological home turf lead into the concluding discussion.

6. Conclusion and discussion: Ways forward for energy citizenship research

The 'energy citizenship' concept has evoked intensive conceptual discussions **(section 1)**. Particularly striking however is its elusiveness as a research object: It is both an empirical phenomenon as well as a label **(section 2)**. Energy citizenship research is thus at risk of landing into an epistemological chaos of normative calls, empirical observations, supposed 'drivers' and policy instruments – on each occasion designating different individuals, categories, social phenomena. Paraphrasing Ragin & Becker [123]: *What would be proper 'cases of energy citizenship'?* Still it indicates crucial social innovation aspects of energy transitions [1]. Its complexities need to be faced. *How to investigate it in a way that does justice to its complexities?*

Taking a reflexive methodology approach, we have focused on three key aspects: 1) the multiplicity of associated normative *ideals*; 2) the *ideological* assumptions about it and 3) the empirical phenomena, actors and *ideal-types* that it can be taken to refer to. Table 1 provides an overview:

The overview informs three main findings. First, there is the striking diversity of research questions. Next to the explanatory and practice-oriented questions about 'drivers' and empowerment mechanisms, energy citizenship has also been explored through reflexive-methodological lines of questioning. This addresses a pressing problem in energy studies, namely the prevalence of what Sovacool et al. [124] characterised as 'uninteresting (or poorly written) research questions'. Qua reflexive methodology, the discussed research questions comprise a mix of deconstruction and reconstruction, problematisation and what Alvesson & Sköldberg [35] called 'mystery construction'. Importantly, Table 1 encourages towards thoughtful *sets* of research questions. Research can start for example from critical interrogation and proceed with more open exploration - or the other way around.

A second important result is the abundance of reflexive methodology approaches in energy citizenship research. Even without comprehensive review of the full methodological diversity, this is an encouraging development in - indeed dearly needed [124] -methodological creativity. Table 1 guides energy citizenship researchers towards a wide range of tested methodological options. Discussing nine sets of options, our analysis has also facilitated interdisciplinary research. Following Sovacool [28], we have substantiated how policy sciences, political philosophy, Science & Technology Studies, innovation studies and other core social science subjects (e.g. human geography, sociology and anthropology) offer complementary methodological resources for reflexive energy citizenship research. The interdisciplinary discussion has highlighted different strategies of inquiry, each appreciating the ambiguities in their own ways [125].

The interdisciplinary convergence also hints, third, at methodological synergies. Whilst it is useful to classify and cluster methodologies, many studies actually rely on *combinations* of them. One can consider for example how problematizing literature reviews **(section 3.1)** often involve elements of critical discourse analysis **(section 4.1)**, how system dynamics modelling **(section 5.3)** presupposes normative analysis **(section 3.2)**, or how critical modes of participatory action research **(section 3.3)** may redress some of the marginalization issues articulated in social representation analyses **(section 4.3)** and critical innovation studies **(section 5.1)**. It is worth reading Table 1 as a cross-table between methodological approaches. This goes all the more for collective research efforts: Our analysis builds on experiences with a broad research consortium, which posed high demands for methodological synergy and consistency across data gathering activities.

A central issue with broader implications for energy studies is the combination of reflexive methodology with more explanation-oriented research activities. As discussed, both have their merits. When neglecting the former, energy citizenship research easily drifts into uncritical empiricism and simplistic beliefs in 'silver bullet' solutions [22]. Without insisting on any particular methodological approach: Energy citizenship research needs to deploy at least *some* of these reflexive methodology approaches to do justice to its research object. On the other hand, researchers would be ill-advised to drop the explanatory aims altogether. Energy citizenship research could remain stuck in abstract critiques, and in what Geels [36] dismissed as practically irrelevant stories of complexity and particularity. In our project, typology development **(section 5.2)** was an important stepping stone. It crucially connected our reflective critical innovation studies analysis with explanation-oriented activities of empirical mapping [75], context analysis [53,126], and Qualitative Comparative Analysis [51]. Fig. 6 visualizes this as integration between methodologies with more and less stabilized understandings of the research object.

The figure indicates various methodological approaches on an epistemological spectrum. The methodologies at the left-hand side typically raise constructivist questions about perceptions, underlying assumptions, and societal shaping. Premised on critical-realist or objectivist

Table 1
Reflexive methodology approaches to energy citizenship research.

Aspect	Research questions	Methodologies
Ideals	• What is energy citizenship? How to define it? Is it primarily an 'energy' suffix, alongside other new energy discourses on energy democracy, energy justice and energy literacy? Or should we take it as a citizenship affix, marking a new phase in citizenship? • Do we dismiss it as a vague buzzword, or do we develop an affirmative critique that substantiates it as a scientifically and politically meaningful category? • Do we want to know about energy citizenship as it happens to take shape, or as a normative ideal to aspire to? • Whose ideals and ideas is energy citizenship representing? Who are its promoters? • How is it adopted, institutionally anchored and operationalized? How does it relate to policies of energy poverty, energy security and clean energy? • Energy citizenship is an odd composite term, what does its etymology tell us? What are the ethical-political implications of the 'energy' suffix, and where does it sit in the longstanding debates on citizenship? • What are the limits of the concept, and what could be considered 'false' energy citizenship? What, precisely, is energy citizenship good for? • The need for sustainable energy transitions is the taken for granted normative horizon for energy citizenship research – but what does this mean precisely, and what would it entail? • Given the mounting geopolitical tensions and the reality of finite resources, what energy systems and polities should 'energy citizenship' presuppose? The Anglophone concept, is it at all transferable across European contexts? How is it translated, appropriated, and rephrased? • 'Shallow' or 'deep', 'transformative' or 'reformative', 'tokenistic' or 'authentic' – what is the real energy citizenship? • Did the real-world experiment lead to an empowering role change among the involved citizens? Which processes and mechanisms are involved in supporting an empowering role-changing process?	• Literature review • Policy analysis • Normative analysis • Philosophical reasoning • Stakeholder workshops • Q methodology • Participatory action research • Real-world experiments
Ideology	• What is this neologism supposed to achieve? Why has it emerged in this particular societal context? • What are its hegemonic or counterhegemonic implications, and which variations can be distinguished? • What are its key implicit assumptions? Which social actors promote the discourse, and why? • Through which actors and communication channels is it circulated and 'co-produced'? • How are researchers, and research programs shaping energy politics, and vice versa? • And how to position oneself as researcher in the confusing mixtures of energy citizenship recommendations, evidence, expectations, policies, narratives and future projections? • Energy citizenship, how does it resonate through society? • Which perspectives and identities are marginalised in energy citizenship discourse? Which social groups and roles can it be taken to refer to?	• Critical discourse analysis • Co-production analysis • Media analysis • Material participation • Social representation analysis
Ideal-types	• What can energy citizenship be taken to refer to empirically? • Which ideal-types can be distinguished? • Which desirable/possible energy citizenship futures could emerge? • Which are the stereotypical and highly visible representations of energy citizenship? Which under-exposed kinds of energy citizenship can be distinguished, 'beneath the tip of the iceberg'? • Which kinds of energy citizenship can we discern empirically? • Which ideal-types can be distinguished conceptually? Which kinds of energy citizenship can we discern across contexts? • Can 'passive' forms of energy citizenship be acknowledged without overstretching the concept? How do the seven key distinctions overlap with each other? How can they be operationalised into empirically observable distinctions? • Which distinctions are conceptually the most fundamental? • Which desirable/possible energy citizenship futures could emerge? • Which could be the driving forces? • Should it be expressed as driver, system component, stock or flow?	• Critical innovation studies • Empirical mapping • Typology development • PESTEL analysis • Foresight studies and scenario development • Systems dynamics modelling • Survey analysis

epistemologies, right-hand side methodologies work with more stabilized assumptions about energy citizenship. Examining the stabilization processes, reflexive methodology approaches can thus enlighten explanation-oriented approaches through clarified assumptions, key distinctions, caveats regarding reliability and validity, and reflexively developed typologies. Energy citizenship complexity could be reduced stepwise, through thoughtful mixes of methods. Admittedly, this continuous representation of methodological integration is a bit optimistic: Apart from downplaying issues of ontological commensurability – *are we really studying the same energy citizenship?* -, it also leaves aside practical considerations. As Johnson & Onwuegbuzie [127] remind, multi-method research requires well-funded projects and collaboration-minded research teams.

To conclude, energy citizenship is a rather murky area of energy research. This murkiness needs to be engaged with however, especially considering the abundance of similarly elusive but pressing topics: 'Energy poverty' [74] and 'energy literacy' [21] are just two other striking examples. Following Sovacool et al. [124], this study provides methodological guidance for reflexive social studies of energy. This guidance helps energy researchers to reach beyond clinical critiques, politically naive instrumentalism, or empirical reports with stereotypical assumptions about energy issues.

CRediT authorship contribution statement

B. Pel: Writing – review & editing, Writing – original draft, Visualization, Validation, Methodology, Investigation, Conceptualization. **A. Debourdeau:** Writing – review & editing, Writing – original draft,

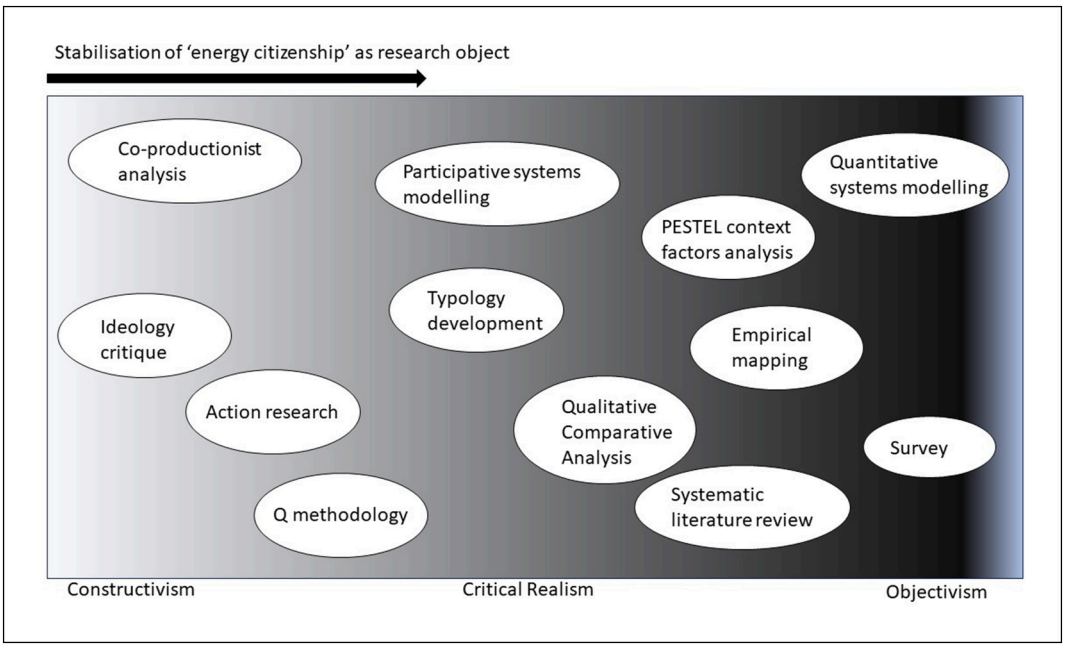

Fig. 6. Reflexive and explanatory energy citizenships methodologies.

Validation, Methodology, Investigation, Conceptualization. **R. Kemp:** Writing – review & editing, Writing – original draft, Validation, Methodology, Investigation, Conceptualization. **B. Schmid:** Writing – review & editing, Writing – original draft, Validation, Methodology, Conceptualization. **E. Vadovics:** Writing – review & editing, Writing – original draft, Validation, Methodology, Investigation. **M. Markantoni:** Writing – review & editing, Writing – original draft, Validation, Methodology, Investigation. **A. Dumitru:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Conceptualization. **B. Bornemann:** Writing – review & editing, Writing – original draft, Methodology, Conceptualization. **M. Schäfer:** Writing – review & editing, Writing – original draft, Methodology, Conceptualization. **H. Rau:** Writing – review & editing, Writing – original draft, Methodology, Conceptualization. **F. Fahy:** Writing – review & editing, Writing – original draft, Funding acquisition, Conceptualization. **A. Fransolet:** Writing – review & editing, Writing – original draft, Methodology, Investigation. **L. Losada Puente:** Writing – review & editing, Writing – original draft, Methodology, Investigation. **A. Stirling:** Writing – review & editing, Writing – original draft, Methodology, Conceptualization. **M. Pansera:** Writing – review & editing, Writing – original draft, Conceptualization. **S. Batel:** Writing – review & editing, Writing – original draft, Conceptualization. **G. Goggins:** Writing – review & editing, Writing – original draft, Conceptualization. **E. Raufflet:** Writing – review & editing, Writing – original draft, Conceptualization. **J. Halloy:** Writing – review & editing, Writing – original draft, Conceptualization.

Declaration of competing interest

The authors have no competing interests.

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Data availability

Data will be made available on request.

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