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Revealing social values in the context of peer-to-peer energy sharing: A methodological approach

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ABSTRACT

Peer-to-peer (P2P) energy sharing models fundamentally thrive on the social interconnectedness among end-users, but the literature fails to provide fit-for-purpose methodologies that uncover their Social Sciences & Humanities aspects. Therefore, this paper devised the first overarching social values-based assessment framework that allows the identification of underlying social values associated with these models. Thence, this paper looks at whether social values emerge from the ground up due to P2P energy sharing, or whether existent social values are reinforced/modified by P2P energy sharing. The impact of the framework on 123 end-users from 3 real-life pilots is analysed. The social values enacted in this paper were mainly categorised as existing social values that were reinforced by peer-to-peer energy sharing. This framework is scalable, provided that result interpretations undergo a cohesive validity check on a case-by-case basis. In conclusion, this paper expects to create a new social values-based language that is explicitly associated with P2P energy sharing.

1. Introduction

The disruptive reconfiguration occurring in the energy sector is largely influenced by the ongoing co-evolution of the techno-economic, socio-cultural, socio-environmental, and political-institutional agendas across the globe in the face of a desirable carbon-constrained future [1]. As a result of this growing global ethos, novel user-centric energy market models have started emerging with the potential to deliver new value streams in the form of energy and non-energy outcomes and services [3]. At the core of these user-centric energy market models lies the peer-to-peer (P2P) energy sharing concept [2], which refers to flexible, decentralised, synergistic, and direct exchanges of (often the case) decentralised renewable electricity between active grid-connected end-users [4]. P2P energy sharing models can be organised under different not-for-profit governance schemes that combine non-commercial economic aims with environmental and social objectives [5,6]. Under this new perspective, end-users become more empowered to transact their energy assets in their own terms and explore the benefits of their local embeddedness in energy markets, threatening the well-established hegemonic role of traditional players in energy markets [4,7]. Although this vision does not necessarily imply the complete upheaval of the energy sector[5] [8], it nonetheless highlights opportunities to address dysfunctional arrangements of the current energy market, including the shortcomings of the existing power dynamics.

1.1. A social values-based perspective on peer-to-peer energy sharing models

Based on the above, this paper defends the idea that P2P energy sharing models are far more accessible, distributed, democratised, collaborative and socially-just than traditional energy market models. That is because P2P energy sharing models fundamentally represent complex

[5] Ruotsalainen et al. [8] explains that this relates to the concept of societal experimentation, where change is progressively experienced in waves of innovation rather than in one go, due to the fact that some incumbent actors try to hold on as much as possible to the status quo while others try to foster innovation as fast as possible.

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social networks that thrive on the social interconnectedness among end-users, rather than on competing economic self-interests. This challenges the traditional approach of energy markets, which is usually characterised by a rigid top-down hierarchical structure that leads to individualistic and antagonistic behaviours at the consumers' level [4].

Though competition and its pervasive features[6] seems to be the predominant approach of traditional energy markets, Favini [10] has shown that competition is not an inherently dominant human behaviour trait - not more so than collaboration. Competition is only present in the collective ethos due to political manoeuvre that promotes the ruling industrial, for-profit economic model. On the other hand, P2P energy sharing represents an alternative not-for-profit economic model that is operationalised though the synergistic collaboration between multiple peers.

The P2P energy sharing concept is also particularly pertinent in the face of the COVID-19 pandemic crisis. The fast pace of this global emergency is forcing societies to create more agile, resourceful and collective responses that often transcends geopolitical borders, inflexible financial systems, existent supply chain structures and power dynamics. Uren [11] argues that the shared responses that are coming forth indicate a systemic change in mental models, namely by signifying social norms and societal behaviours for collective actions. Potentially, the COVID-19 pandemic crisis could be a catalyst for systemic reforms, providing societies with a renewed approach towards energy distribution and other critical global challenges [11].

By investigating the intricate social wiring and local embeddedness that characterises P2P energy sharing models, this paper looks at whether P2P energy sharing models influence the social values systems of those directly involved with it. This hypothesis finds support in the energy-related Social Sciences & Humanities (SSH) literature that states that the radical change currently observed in energy systems is likely driving the transformation of societal systems and vice-versa [8,12]. Yet, when looking back at academia, most research efforts on P2P energy sharing are limited to a reductionist techno-economic ethos that rules out any element that is neither easily quantifiable nor profit-oriented.

In the current literature, there are few studies looking at the less tangible SSH facets of P2P energy sharing models. In summary, Giotitsas et al. [13] proposed a theoretical framing for P2P energy sharing based on the decommodification of energy and production of common value. Jogunola et al. [14] highlighted that the donation of surplus decentralised generation can fulfil non-economic goals. Moret and Pinson [15] demonstrated fairness among end-users in distributed negotiation mechanisms. Biggs [16] uncovered that the main social drivers for end-user engagement in prosumerism are greater control, autonomy and independence. Van der Schoor and Scholtens [17] concluded that greater social cohesion is a main motivation for end-user engagement in local energy communities. Roberts et al. [5] explained that the main social objectives of an energy community are openness, democratic participation and governance, effective ownership and control, and the provision of benefits for its members.

Even more sparse is the literature on the social values-based perspective of P2P energy sharing models. The most informative conceptual work is the essay written by Ruotsalainen et al. [8], which offered a hope-filled vision of a decentralised, renewable-based P2P society by 2050 – a future society that embraces culture and values as key forces driving and deriving from the energy transition. These authors argue that, if their desirable 2050 vision comes to reality, it will imply the emergence of more complex social structures with broader consequences for society (e.g., culture, values, lifestyles, and power structures). Therefore, Ruotsalainen et al. [8] innovated by proposing the incorporation of the social values-based dimension into the conceptualisation of P2P energy sharing models. Still, their vision remained mostly at the abstract level of theoretical conceptualisation, analogy and aspiration, failing to provide any concrete approach to reach this vision - e.g. in the forms of an analytical framework, a specific methodology or empirical data.

This paper aims to address this knowledge gap by providing the first systematic investigation of the social values-based dimension of P2P energy sharing models. Specifically, this paper devised an overarching social values-based assessment framework that allows the identification of underlying social values associated with P2P energy sharing interactions, highlighting the importance of the valuation[7] process.

1.2. An actionable understanding of the concept of social values

This paper emphasises the need to consider social values paramount not just in relation to core energy service outcomes, but also from the way that these energy services are designed and delivered to society. Hence, it is fundamental to provide a clear definition of what "social values" means in this paper.

Firstly, there is not a single authoritative definition of social values mainly due to multiple theoretical underpinnings across different SSH disciplines that defined this term from their own disciplinary orientations.[8] Secondly, this theoretical debate usually diverges from present-day practice, which usually offers more actionable understandings of this term. Nonetheless, it is still difficult to find a clear taxonomy of social values, thus highlighting how multifaceted this term is. Hence, this paper coined its own actionable interpretation of this term (see below), which was adapted from different definitions provided by ESDinds [21]:

"Social values are enduring beliefs defined by groups, organisations, or individuals, in their own particular cultural and social contexts, that define which specific modes of conduct (i.e., behaviours) or end states (i.e., outputs) are personally or socially preferable to their opposite - thus providing the basic rules that govern human interactions, indicating what is good or bad, desirable or undesirable, and eventually driving meaningful cultural and social changes."

Illustratively, ESDinds [21] provided a few examples of what social values might represent in practical terms: individual or collective goals (e.g., prosperity, wellbeing, happiness or satisfaction); principles of social ethics (e.g., justice, solidarity or altruism); material versus spiritual priorities (e.g., moderation, contentment, detachment or frugality); community values (e.g., unity in diversity, tolerance or participation); or individual qualities of character (e.g., independent thinking, courage, confidence, trustworthiness, honesty, resilience, adaptability or creativity). These examples are not intended to represent a comprehensive listing of social values, but merely expose some ideas to spur further thought and discussion on its meaning.

By coining its own actionable interpretation of social values, this paper attempted to move this abstract concept from vague normative statements to its operationalisation for research purposes. That is, this interpretation of social values was passed on to the end-users to help them transform this complex concept into their specific language/cultural assumptions.

1.3. Case study description

The case study under scrutiny is the Community S demonstration project.[9] As detailed by Klein et al. [22,23], this was the first P2P en-

[6] E.g., competitive self-interests, consumerism, environmental degradation, inequality, market concentration and political capture that inhibit regulations that counteract these trends [9].

[7] According to Kenter et al. [18], valuation refers to formal research related to analysis or decision-making processes that explicitly express or deduce values (of various types). In this sense, it is important to distinguish valuation from valuing, as the latter refers to "informal and largely implicit processes that are not bound to any particular setting" [18].

[8] Illustratively, Harder et al. [19] explained how diverse the interpretations of the broader term "value" are, citing the work of Horáková [20] that identified 180 distinct definitions within the SSH literature.

[9] The Community S project (also known as *NetEffiCity - Virtual Power Networks Efficient Management,* project no. 18015 under call no. 31/SI/2015 SI I&DT) was

ergy sharing initiative to be trialled in Portugal under real-life settings and real market conditions in 3 different pilots (Alfândega da Fé, Penela and Lordelo/Vila Real). Hence, it played a fundamental role in consolidating insights and fomenting discussions around this concept in the Portuguese energy landscape, pushing forward the deregulation of these activities in the country. This project was already scrutinised through a novel business model perspective [22] and an end-user engagement perspective [23]. On top of that, this paper explores the social values-based dimension of the Community S project.

Each pilot in the Community S project represented a low-voltage renewable energy community composed of 4 public buildings equipped with photovoltaic (PV) panels (i.e., prosumers) and on average 41 participating resident citizens[10] (i.e., consumers) that were selected by convenience sampling [23]. The core idea behind the proposed business model was the equitable distribution of surplus renewable generation from public buildings among the participating citizens (instead of injecting it in the distribution grid as per business as usual), in addition to facilitating energy efficiency measures [22]. Nonetheless, given that this demonstration project was conducted between 2016 – 2018,[11] the P2P energy sharing interactions had to be demonstrated through financial simulations rather than through physical electricity trading per se [22]. In this sense, participating citizens benefited from the advantages of P2P energy sharing by receiving monthly discounts in their energy bills that were equivalent to the costs savings that they would have gotten from the purchase of surplus renewable generation in a desirable deregulated scenario [22].

The benefits from participating in the Community S project were only realised due to the real-time monitoring and control of energy consumption and renewable generation in each participating building (i.e., public buildings and households). Each participant received a smart energy management system to optimise their energy consumption based on the availability of distributed surplus generation within their low-voltage renewable energy community. Hence, in practical terms, participants were asked to keep their smart energy management equipment fully operational during the trial period as to provide consistent data for the simulations of the proposed P2P energy sharing activities.

In terms of broad social goals, the underlying expectations of the Community S project stem back to raising awareness of the next generation of smart energy citizens and incentivise collective participation and cooperation, thus promoting long-lasting community-wide benefits that go beyond the qualitative realms of energy efficiency gains.

2. Methodology

To date, there is no fit-for-purpose methodology that can transfer the inherently qualitative nature of social values into quantitative measures for data analysis purposes. This is because social values are still often perceived as intangible and unmeasurable due their inherently qualitative nature [19,26,27,28]. Therefore, to achieve the objectives set by this paper, it became critical to understand whether it was necessary to develop a scientifically sound social values-based framework from the ground up or repurpose any existing framework that is known for the valuation of P2P energy sharing models.

Harder et al. [19] critically analysed the most influential values-based frameworks within academia,[12] highlighting in detail their most common drawbacks. Firstly, these frameworks were built based on the context of previous decades, with outdated notions of values and value structures, thus not being completely fit to contemporary days [19]. Secondly, they represent closed, prescribed models, given that they were all constructed as external, top-down frameworks that precluded co-design and participatory approaches with the respondents [19]. Finally, they proposed predefined and rigid lists of values to respond to that are not contextually relevant and that do not capitalise on local interpretations [19]. In response to these limitations, Harder et al. [19] co-created from the ground up a modern-day, empirically based, scientifically sound, grassroot framework for valuation processes entitled the WeValue toolkit.[13]

The WeValue toolkit made possible to operationalise and measure social values by transforming subjective interpretation into objective assessment. To do so, the toolkit contains a reference list of 166 generic Values-Based Indicators (VBIs)[14] that can be directly linked to values.[15] By measuring these VBIs that are objective in nature, their correlated underlying social values that are subjective in nature are implicitly measured by extension [21].

The WeValue toolkit introduces two distinct methodological approaches to operationalise and measure social values: (i) the Indicator pathway and (ii) the Value pathway [19,26,28,29]. A synopsis detailing the 8 exploratory phases involved in each methodological approach is presented in Fig. 1.

The Indicator Pathway is recommended when the purpose of the valuation process is to identify underlying social values that are not known *a priori*. Alternatively, the Value Pathway is recommended when predefined social values are known beforehand and the valuation serves to understand whether these social values translate into real action – i.e., whether they are "active" in a specific context [30].

This toolkit was purposefully built to have a polycentric approach.[16] [30]. Because of that, it has been applied in a wide range of different settings over the years, including secondary schools, universities, health services, religious groups, companies, indigenous communities, etc. [19,26]. Despite that, the WeValue toolkit is yet to be applied in the context of P2P energy sharing models.

Based on that, this paper reviewed, repurposed and redesigned the Indicator Pathway aiming to create the first operational social values-based assessment framework that is able to uncover underlying social values associated with P2P energy sharing models. By doing so, this paper was able to scrutinise the following 4 main hypotheses for each uncovered social value:

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[10] The target citizens were defined following the same premises of the European Values Study [24]: citizens aged 18 or older (without upper age limit) that have address of residence in one of the 3 defined pilots within private households at the date of the kick-off of the Community S project.

[11] This period predates the deregulation of P2P energy sharing activities in the Portuguese legal landscape, which only happened in 2020 [25].

[12] Allport-Vernon-Lindzey Study of Values; Rokeach Values Survey; Values and Lifestyle Segmentation; Schwartz Values Survey; Portrait Values Questionnaire; Schlater's framework; Competing Values Framework; and Organizational Values Questionnaire, apud [19].

[13] The WeValue toolkit was originally devised to provide Civil Society Organisations (CSOs) with a methodology that allowed them to uncover the unique underlying social values deriving from their educational work on sustainable development [29]. This means that face validity was the core guiding principle of the WeValue toolkit – i.e., the underlying social values deriving from the measurements had to be considered representative from the CSOs' perspectives to be validated [29].

[14] VBIs are objective in nature since they represent an "expression of values in commonly understood units" or the "measure of the importance of something" [18].

[15] Social values have multiple nuances that can be subjectively interpreted in different ways by different people – e.g., one's interpretation of a given social value might differ from another's, and even overlap with the someone else's interpretation of a different social value [21].

[16] The WeValue toolkit holds transferability validity, which allows it to be systematically applied in different contexts [30]

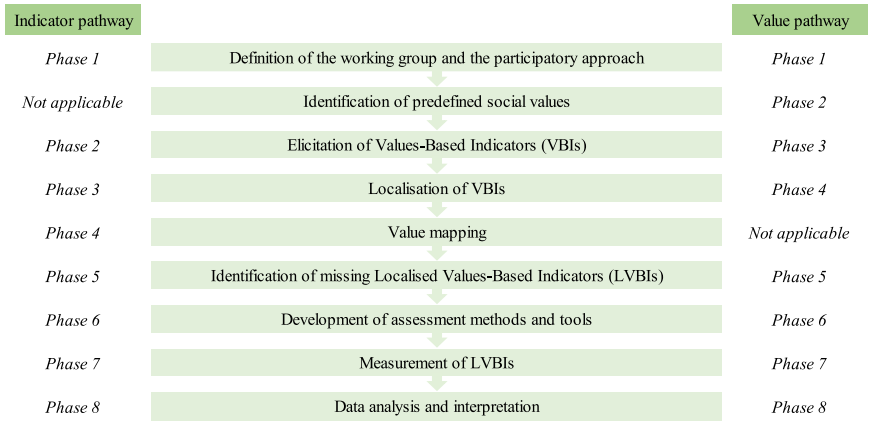

Fig. 1. Schematic representation of the Indicator and Value pathways as proposed by the WeValue toolkit. Source: Adapted from ESDinds [30].

- If the uncovered social value is created from the ground up as a result of P2P energy sharing;
- If the uncovered social value already exists and is reinforced by P2P energy sharing;
- If an antagonistic version of the uncovered social value already exists but is modified by P2P energy sharing;
- If the uncovered social value does not apply to P2P energy sharing.

In the following section, this paper describes the step-by-step implementation of the proposed social values-based assessment framework in the 3 pilots devised in the Community S project.

3. Implementation

3.1. Phase 1: definition of the working group and the participatory approach

Phase 1 refers to convening an appropriate working group to carry out the valuation process [21]. To do so, stakeholders that could play a role in the valuation process were mapped out and grouped in two distinct categories: the core and the wider working groups. The latter included participating end-users (i.e., energy consumers and prosumers) and municipal representatives from the 3 pilots in the Community S project that were were selected by convenience sampling. The former was composed of a qualified group of academic experts and project managers that was heterogeneous in terms of academic/professional competencies and gender[17] to enrich the discussions and widen the reach of the valuation process.

Furthermore, phase 1 also refers to defining the level of participation of those stakeholders in the valuation process [21]. Naylor et al. [31, apud 21] proposed four distinct levels of participation in project valuation using VBIs: (i) consultation; (ii) cooperation; (iii) participation; and (iv) full control. Based on the particular configuration of the study conducted in this paper (i.e., organisational structure, timeframe, budget, human resources, etc.), the participatory approach was viewed here as cooperation[18] since the valuation process was mainly structured by the core working group, but guided by inputs, responses and feedback-loops from the wider stakeholder group.

3.2. Phase 1.1: identification of gatekeeper(s)

The working group was attentive about the key role of gatekeepers[19] in effective message delivery and knowledge sharing with the wider stakeholder group. In this sense, given the dual role played by Evaluator A as both head researcher of the valuation process and head project manager of the Community S project, the working group acknowledged him as the main gatekeeper bridging information exchange between internal and external stakeholders. On that note, a supplementary assessment layer was integrated into this methodology (entitled Phase 1.1) to evaluate Evaluator A's potential bias and/or limitation as gatekeeper. Specifically, a pre- and post-survey[20] were designed by Evaluator B (i.e., the external academic expert) to the Evaluator A (i.e., the main gatekeeper) as to determine changes in the latter's self-reported behaviour, expectations, knowledge, awareness, attitude and priorities towards the valuation process, thus reducing expectation bias.[21] Hence, this supplementary assessment layer was essential to infer whether the message delivery and knowledge sharing associated with the valuation process was to some extent limited or impaired by the gatekeeper's potential bias and/or limitation.

3.3. Phase 2: elicitation of VBIs

In phase 2, the appointed working group should review the original list of 166 draft VBIs developed by the WeValue toolkit extract the most contextually relevant for measurement [21]. The output of this phase should be a new list of VBIs that only includes those selected by the working group.

[17] (i) Evaluator A (male) played a dual role of head researcher of the study conducted in this paper and head project manager of the Community S project. Therefore, Evaluator A was a stakeholder with high expertise on the social values-based dimension of P2P energy sharing models and high influence over the development of the Community S project; (ii) Evaluator B (male) played the role of an external academic expert with high expertise on the main concept under scrutiny in this paper but limited influence over the development of the Community S project; (iii) Evaluators C and D (females) played the roles of associate project managers of the Community S project. Hence, Evaluators C and D were stakeholders with limited expertise on the main concept under scrutiny in this paper but high influence over the development of the Community S project.

[18] In this level of participation, although the wider stakeholder group provides advice and input to decision making processes, the main responsibility still lies with project leaders [21].

[19] In qualitative research, gatekeepers are essentially effective communicators that are responsible to analyse, filter, translate and control which and when information is passed on to others [32, apud 23].

[20] The pre- and post-survey sought to analyse the gatekeeper against his two distinct roles: as head researcher of this paper and as head project manager of the Community S project. Given that both this study and the demonstration project were developed concomitantly, it was possible that the two roles played by Evaluator A overlapped at some point, potentially compelling him to make decisions that favoured one role over the other.

[21] Expectation bias stands for the tendency to "believe, certify, and publish data that agree with (the gatekeeper's) expectations for the outcome of an experiment, and to disbelieve, discard, or downgrade the corresponding weightings for data that appear to conflict with those expectations" [33].

In this paper, each evaluator from the core working group was firstly asked to elicit individually those VBIs that they found the most relevant to avoid conformity bias. The elicitation process used the weighting criteria: *1 - not applicable; 2 - not so relevant; 3 - relevant; 4 - very relevant*. An in-depth deliberation followed to gauge whether each evaluator found the exercise relevant, easy and educative. In general lines, this short-listing exercise was perceived as burdensome due to the amount of draft VBIs to be analysed. Also, it was unanimously agreed that the selected VBIs were perceived as expressive of social values-content (i.e., they were understood in terms of social values) and were strongly connected to the context of this paper.

Whenever there were differences between evaluators about a specific VBI and at least one evaluator had a very strong feeling about it, the consensus of two/three out of four was taken as valid. A few VIBs referred to the same core question, hence they were jointly revised and merged through proper rewording (namely VBIs 30-33; 36-37-38; 40-41; 73-81; 103-104; and 107-108). The outcome of this phase was the collective selection of a total of 31 VBIs (see Table 3 in Appendix A) that moved forward to phase 3.

3.4. Phase 3: localisation of VBIs

The 166 draft VBIs of the WeValue toolkit were designed to be concise and generic trigger statements that can be customised to become locally comprehensible and contextually relevant [30]. This "localisation" exercise is precisely what gives the WeValue toolkit its polycentric approach [30].

In this paper, the draft VBIs selected from phase 2 were customised by the core working group to clearly articulate the social values-based dimension of P2P energy sharing models, whilst still being understandable to the wider working group. As explained by ESDinds [21], it is fundamental to consider the varying levels of literacy among respondents and the potentially different interpretations of the underlying meaning of the VBIs for each of them. Hence, the working group translated the selected VBIs to European Portuguese using a more informal language to address their specific sociodemographic characteristics. This approach was based on Marinho [34, apud 23], who argued that informal communication represents a crucial factor to further incentivise knowledge sharing, since it reinforces social structures in ways that surpass formal boundaries of organisational communication.

The localisation exercise was first carried out individually by each evaluator within the core working group to avoid conformity bias. Then, an in-depth deliberation session aimed to attune their different perspectives and reach a consensus about the meaning of each Localised VBI (henceforward LVBI), making them as objective as possible to avoid double meanings, and meet the criteria of measurability, reliability and usability. Also, following ESDinds [21] suggestions, the localisation exercise aimed to present some degree of generality to be relevant across other P2P energy sharing initiatives, and to allow external evaluators to compare their local results. Table 4 in Appendix B presents the deliberation around the "localisation" process, and the final list of LVBIs for measurement that was sent to the wider working group for their validation (i.e., "face validity"). This is further scrutinised in phase 7.

3.5. Phase 4: value mapping

Phase 4 relates to an exercise entitled value mapping – i.e., the association of each LVBI with at least one social value that is expressive of this indicator, and the preferred combination of several LVBIs to measure each individual social value [29,21]. ESDinds [21] indicates that this is a subjective exercise, and that there is no one-to-one, universally valid link between a specific LVBI and an individual social value. Hence, these associations can be multiple and mutually inclusive, representing an interpretative decision rather than an inherent property of each individual LVBI per se [21].

In this paper, this exercise was firstly carried out separately by each evaluator of the core working group and then discussed collectively for validation, before proposing it to the wider working group. According to the ESDinds [29], this interactive dialogue promotes "transformational learning", which stands for the ability to clearly articulate personal social values-related perceptions in a shared vocabulary that is understood by all.

The core working group agreed that asking the wider working group to elicit a set of social values individually for each LVBI would be a strenuous exercise due to the limited social values-related vocabulary that society typically upholds, often struggling to articulate in words their particular social value systems. Because of this value-discourse gap [32], the core working group predicted the unfolding of two potential scenarios: (i) the wider stakeholder group would either oversimplify the task of eliciting social values due to the Dunning-Kruger Effect;[22] or (ii) they would drop the task out by believing it is overly cumbersome and abstract.

To address this issue, the core working group proposed an alternative methodological approach for phase 4. Specifically, Evaluator A (i.e., the main gatekeeper) compiled from scratch the first overarching reference list of 166 individual social values that is explicitly associated with P2P energy sharing interactions, and that could be used as point of reference for respondents in the mapping of LVBIs to social values (see Table 5 in Appendix C). This reference list was compiled based on different institutional core statements and international SSH sustainable development reports that cut across different understandings of social values [22,29,36,37]. These 166 social values were clustered into 30 different macro themes based on similar meanings, espousing one discrete social value that is representative of each macro theme to name this macro theme (e.g., belonging stood for belonging, identification, inclusiveness, integrativeness, etc.).

Borrowing from Ribeiro et al. [38], "*values are cultural, context specific, evolving with time and affected by previous learning*". Hence, this reference list of P2P energy sharing-related Social Value Themes (henceforth P2P-SVTs) was intended to represent a reasonably representative list of the main social values associated with P2P energy sharing models, rather than a universal, rigid and complete list of all existing social values.

The P2P-SVT reference list directly addresses what ESDinds [29] calls the Häagen–Dazs effect.[23] That is, this reference list was created to allow the wider working group to match social values more easily and assertively to those LVBIs that they perceive as relevant, consequently making social values more tangible and understandable. By the end of this transformational process respondents should have a clearer idea of the social values that are representative of what is important to them [29].

3.6. Phase 5: identification of missing LVBIs

In phase 5, the core working group should clarify whether any fundamental social value is still not being addressed by the compilation of LVBIs [21]. If that is the case, they should define whether to proceed with the valuation process without addressing this gap or to design additional LVBIs from scratch to reflect the missing social value(s) in question [21]. If additional LVBIs are to be designed, ESDinds [29] proposes

[22] A bias that leads someone to assume that a concept is overly simple due to the lack of depth of knowledge on it [35].

[23] When people are asked to enact social values by themselves (as originally proposed in the Indicator pathway), they tend to either use a vocabulary that is often poor or limited to their own particular socio-cultural context, or even not be able to express them whatsoever. However, by coming across the P2P-SVT reference list, they are exposed to a much broader social values-related vocabulary, allowing them to potentially enrich their discourse, make connections that were lying below conscious level and go through a self-realisation process that were previously not possible - i.e., the "Häagen-Dazs effect" [31].

Table 6
Identification of a missing LVBI and its correlated social values.

No.	LVBI description	Identified social value(s) that can be linked to the referred LVBI	Other social value(s) that can be linked to the referred LVBI
167	Did you feel somehow coerced/forced to participate in any of the project activities?	Authoritarianism, control, coercion	Discipline, obedience, power, order, rigor

Table 7
Identification of the assessment methods and tools promoted in this paper.

Type of collected evidence	Assessment methods	Assessment tools
Evidence based on what participants think, feel and understand	Questionnaires	Social values-based questionnaire
		Ex-ante assessment questionnaire
		Ex-post assessment questionnaire
		Gatekeeper's pre- and post-surveys
	Creative research methods	Storytelling
Evidence based on what participants do and say in their daily activities	Observation-based methods	Unstructured observation
Evidence based on what is said or what is written about the project	Document analysis	Project website
		Associated scientific publication
Evidence based on what can be directly seen, counted or measured	Indirect measures	Numerical data analysis of the end-user involvement with the project
		Numerical data analysis of the responses to the social values-based questionnaire

to validate them through "face validity,"[24] so that the operationalisation and measurement of social values can occur with a plausible level of scientific rigour.

In this paper, the core working group concluded that none of the draft VBIs from the WeValue reference list addressed aspects of hierarchical pressure/stimulus, which represented a relevant social value theme to be scrutinised under the context of the Community S project. As discussed by Klein et al. [23], that was because the municipal authority in one of the pilots was determined to get people to participate in the project, which could have be seen from a negative perspective (as hierarchical pressure) or positive perspective (as hierarchical stimulus). In view of that, after proper deliberation, the core working group created an additional LVBI description to address this gap, linking it to its correlated social values, as detailed in Table 6.

3.7. Phase 6: development of assessment methods and tools

Phase 6 relates to the design of context-appropriate assessment methods and tools, following the criteria defined by Podger et al. [26]: (i) methodological rigour, richness and reliability of results; (ii) adaptability to the target respondents and project specificities; (iii) ease of use resources for replicability.

ESDinds [21] described several assessment methods and tools that were previously used by other organisations working with the WeValue toolkit, noting that the combination of different assessment methods to measure each LVBI heightens the chances to uncover its nuances, thus increasing the validity and meaningfulness of the collected evidence. Furthermore, it recommends encompassing at least one assessment method that is not based on self-reported data to avoid sampling errors and social desirability bias among respondents [21]. Based on that, this paper devised different assessment methods and tools as summarised in Table 7.

Due to the focus of this paper, the discussions present here are limited to the social values-based questionnaire, while the supplementary assessment methods and tools are briefly described in Appendix D and fully scrutinised in the doctoral thesis from which this paper derived [39].

The proposed social values-based questionnaire was defined as the core assessment instrument of the valuation process. This questionnaire was specifically designed for the respondents' self-valuation of their participation in the Community S project, and was sent in an online, customised, and dynamic format via SurveyGizmo [40].

The main functions enabled by the SurveyGizmo's Professional License were: (i) survey logic; (ii) question repeating/piping; (iii) question options randomisation; (iv) report data filters; (v) instruction elements; (vi) progress bar removal; and (vii) survey diagnosis. These functions prevented several different types of biases from manifesting — e.g., anonymity option that mitigated conformity bias; the built-in questions/answer options randomisation that prevented bias introduced by question order (e.g., default effect) and/or survey fatigue; and the removal of the progress bar that further avoided bias introduced by survey fatigue.

A generic, static and translated[25] template of this questionnaire is given in Appendix E.

3.8. Phase 7: measurement of LVBIs

Phase 7 focuses on the measurement of LVBIs using the social values-based questionnaire sent via SurveyGizmo. Since the participatory approach was defined as cooperation, the measurement of LVBIs worked as follows: firstly, respondents were asked to validate the localisation exercise from phase 3 by rating each LVBI as individual Likert-type items. Secondly, they were asked to validate the value mapping exercise from phase 4, using for that end the reference list of P2P energy sharing-related Social Value Themes (P2P-SVT). Thirdly, they were asked to reflect about the nature of each enacted P2P-SVT, allowing the core working group to draw final conclusions about the social values-based dimension of the Community S project.

[24] Respondents should determine if they recognise the LVBI subsets as coming from them [29].

[25] This questionnaire was originally sent out to respondents in European Portuguese but was translated to English in Appendix E for illustration purposes.

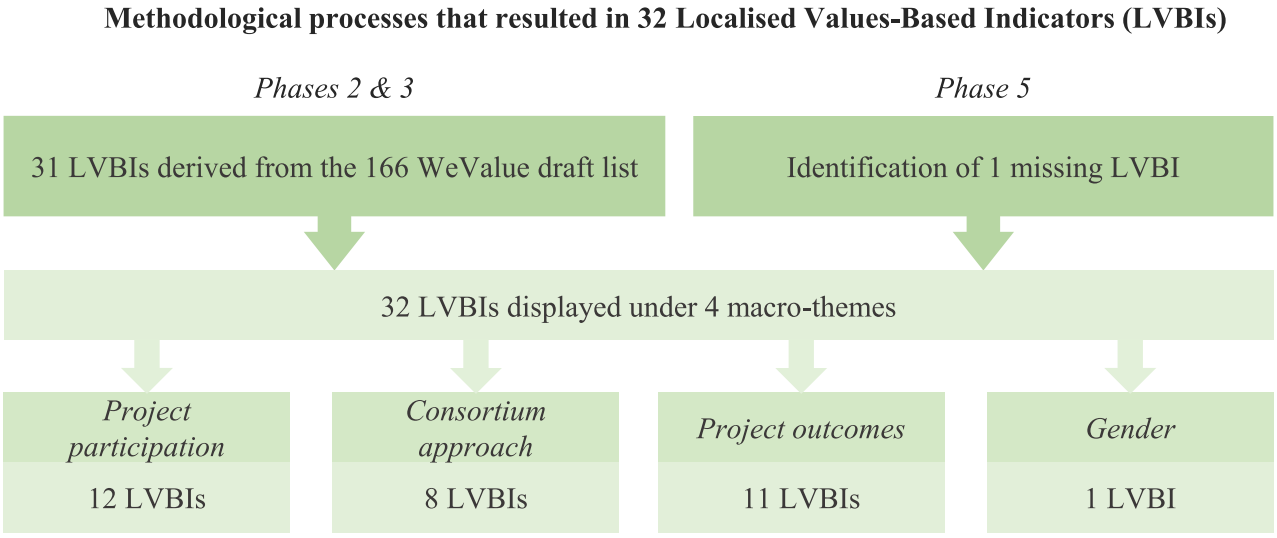

Fig. 2. Schematic representation of the methodological processes that resulted in 32 LVBIs displayed under 4 macro-themes.

Step 1: Validation of Localised Values-Based Indicators (LVBIs)

In the first step of the SurveyGizmo questionnaire, respondents were asked to rate the 32 elicited LVBIs (see Fig 2) as 5-point Likert-type items[26]: <Strongly Agree (SA) — Agree (A) — N/A — Disagree (D) — Strongly Disagree (SD)>. These 32 LVBIs were displayed online to respondents under 4 different macro-themes to break this exercise into different substeps and consequently avoid survey fatigue (as detailed in Appendix E).

The frequency distribution of answers for each LVBI is visually represented in a diverging stacked bar chart[27] (Fig. 3) and further detailed in Table 9 (Appendix F).

An item-by-item analysis of the diverging stacked bar chart (Fig. 3) allows to conclude that responses for all LVBIs were highly concentrated in the <Strongly Agree> and <Agree> categories. LVBI no. 167 was the only outliner item, having most responses concentrated in the <Disagree> category. This is of importance for this paper, since LVBI no. 167 was purposefully tailored as a negatively expressed statement to test out the reliability of respondents. That is, due to its inherently negative undertone, responses for this item should be reversely anchored/oriented in contrast to the responses for all other items with more neutral or positive undertones.

Step 2: Validation of the value mapping exercise

In the second step of the SurveyGizmo questionnaire, respondents were asked to validate the default value mapping proposed by the core working group in phase 4. The default value mapping was done to avoid survey fatigue among respondents. They could nonetheless propose alternative associations between LVBIs and P2P-SVTs at their own discretion or suggest new social values other than those encompassed by the P2P-SVT reference list.

Table 10 (Appendix G) presents the overall results from this task. The general trend observed is the overall agreement about the default associations (86.7% - 100%), allowing to conclude that the default value mapping was fully accepted by respondents.

Furthermore, respondents suggested 6 new individual social value terms, including: *interesse* (interest); *valorização* (appreciation); *controlo* (control); *futuro* (long-sightedness); *alternativas* (resourcefulness); and *pressão no governo* (advocacy).[28] From these suggestions, only resourcefulness and advocacy were not yet encompassed by the P2P-SVT reference list. After some refinement by the core working group, two new P2P-SVTs were devised (see Table 11). This is a clear manifestation of the "Häagen-Dazs effect", thus reinforcing the validity of the proposed methodology.

Step 3: Classification of the enacted P2P energy sharing-related Social Value Themes (P2P-SVTs)

In the third step of the SurveyGizmo questionnaire, respondents were asked to reflect about the nature of each P2P energy sharing-related Social Value Themes (P2P-SVTs) they enacted in the previous step. That is, they were asked to categorise each enacted P2P-SVT in one of the 4 initial hypotheses set by this paper about their origin:

- If the enacted P2P-SVT arose from the ground up as a result of the P2P energy sharing activities;
- If the enacted P2P-SVT already existed and was reinforced by the P2P energy sharing activities;
- If an antagonistic version of the enacted P2P-SVT existed but was modified by the P2P energy sharing activities;
- If the enacted P2P-SVT did not apply to P2P energy sharing activities.

Fig. 4 presents the overall results from this task. This data further detailed in Table 12 (Appendix H).

The analysis of Fig. 4 allows to conclude that respondents tended to agree that all P2P-SVTs already existed and were reinforced by the P2P energy sharing activities. However, this is not the case for <coercion>, which was the only P2P-SVT considered not to be applied to the P2P energy sharing activities.

Further remarks are revealed when the individual frequency distributions of responses are visualised per hypothesis, as described in Tables 13–16:

Table 13 reveals that <dialogue> and <personal development> were the best representatives of existent P2P-SVTs that already existed and were reinforced by the P2P energy sharing activities.

[26] Likert-type items represent popular psychometric item scoring schemes that usually refers to a series of unique, stand-alone questions, each of which measures a specific construct (e.g., a personality trait or attitude) on its own [41]. Because of that, the performance of each item should be assessed individually and any formal inferences about them as a group should be avoided [42,43]. In this study, given that each LVBI represented a tailored, stand-alone declarative statement related to target P2P-SVTs, they were treated as Likert-type items.

[27] Since Likert-type items belong to the ordinal measurement scale, non-parametric statistics are the most appropriate procedures to draw valid statistical conclusions from them, including: (i) modes or medians for central tendency and (ii) frequencies for variability [44]. Also, diverging stacked bar charts can be equally effective to visually represent the responses at the item level [45].

[28] Evaluator A spoke by phone with the respective respondents to understand the underlying meaning of those suggestions for social values before translating them from European Portuguese to English.

Fig. 3. Frequency distribution for all Likert-type LVBIs.

Table 11
List of new P2P-SVTs and their associated individual social values derived from the respondents' suggestions.

No.	P2P Social Value Themes (P2P-SVTs)	Value(s) that can be linked to this P2P-SVT
31	advocacy/ activism/ militancy	advocacy; activism; militancy; influence peddling; backing; championing; endorsement
32	long-sightedness/ aspiration/ contemplation	long-sightedness; aspiration; contemplation; intention; expectancy; anticipation; prospect; foresight; forethought; outlook; prescience; projection; desire; wish; hope

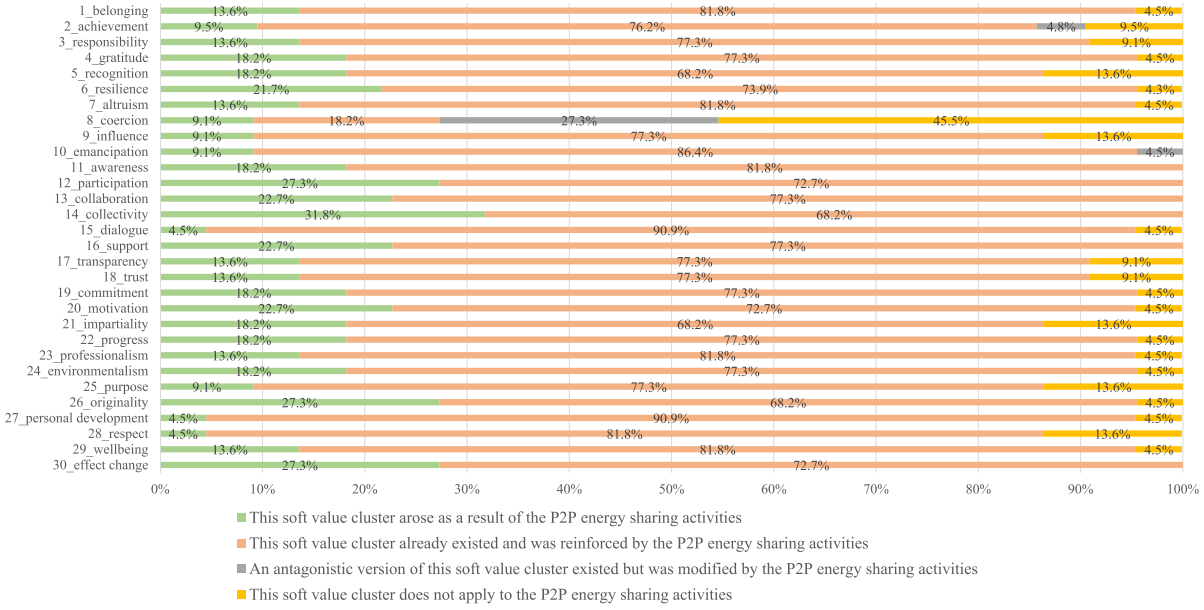

Fig. 4. Frequency distribution for all Likert-type P2P-SVTs.

Table 13
Frequency distribution for answers measuring existent P2P-SVTs that already existed and were reinforced by the P2P energy sharing activities.

Existent P2P-SVTs that already existed and were reinforced by the P2P energy sharing activities	Frequency (%)
15_dialogue; 27_personal development	90.9%
10_emancipation	86.4%
1_belonging; 7_altruism; 11_awareness; 23_professionalism; 28_respect; 29_wellbeing	81.8%
3_responsibility; 4_gratitude; 9_status; 13_collaboration; 16_support; 17_transparency; 18_trust; 19_commitment; 22_progress; 24_environmentalism; 25_purpose	77.3%
2_achievement	76.2%
6_resilience	73.9%
12_participation; 20_motivation; 30_effect change	72.7%
5_recognition; 14_collectivity; 21_impartiality; 26_originality	68.2%
8_coercion	18.2%

Table 14 illustrates that <collectivity> was the best representative of a P2P-SVTs that arose from the ground up as a result of the P2P energy sharing activities.

As can be seen in Table 15, <coercion> was the best representative of an antagonistic P2P-SVTs that was changed by the P2P energy sharing activities, with 27.3% of agreement among respondents. This individual response distribution is approximately 6 times higher than the other two other P2P-SVTs encompassed in this hypothesis, showcasing that <coercion> is a clear outlier in the data.

Finally, Table 16 reveals that <coercion> was also the greatest representative of a P2P-SVT that did not apply to the P2P energy sharing activities, with 45.5% of agreement among respondents (approximately 3 times higher than the second highest rated P2P-SVT).

3.9. Phase 8: data analysis and interpretation

A summary of the results obtained from the data collection using each assessment method and tool devised in phase 6 are presented in Table 25 (Appendix I). This table was created so that the final conclusions can be visualised for each of the 33 P2P-SVT that was identified during the valuation process (see Fig. 5), including any potential value-behaviour gap.

Table 14
Frequency distribution for answers measuring new P2P-SVTs that arose from the P2P energy sharing activities.

New P2P-SVTs that arose from the P2P energy sharing activities	Frequency (%)
14_collectivity	31.8%
12_participation; 26_originality; 30_effect change	27.3%
13_collaboration; 16_support; 20_motivation	22.7%
6_resilience	21.7%
4_gratitude; 5_recognition; 11_awareness; 19_commitment; 21_impartiality; 22_progress; 24_environmentalism	18.2%
1_belonging; 3_responsibility; 7_altruism; 17_transparency; 18_trust; 23_professionalism; 29_wellbeing	13.6%
2_achievement	9.5%
8_coercion; 9_influence; 10_emancipation; 25_purpose	9.1%
15_dialogue; 27_personal development; 28_respect	4.5%

Table 15
Frequency distribution for answers measuring antagonistic P2P-SVTs that were changed by the P2P energy sharing activities.

Antagonistic P2P-SVTs that were changed by the P2P energy sharing activities	Frequency (%)
8_coercion	27.3%
2_achievement	4.8%
10_emancipation	4.5%

Table 16
Frequency distribution for answers measuring P2P-SVTs that did not apply to the P2P energy sharing activities.

P2P-SVTs that do not apply to the P2P energy sharing activities	Frequency (%)
8_coercion	45.5%
5_recognition; 9_influence; 21_impartiality; 25_purpose; 28_respect	13.6%
2_achievement	9.5%
3_responsibility; 17_transparency; 18_trust	9.1%
1_belonging; 4_gratitude; 7_altruism; 15_dialogue; 19_commitment; 20_motivation; 22_progress; 23_professionalism; 24_environmentalism; 26_originality; 27_personal development; 29_wellbeing	4.5%
6_resilience	4.3%

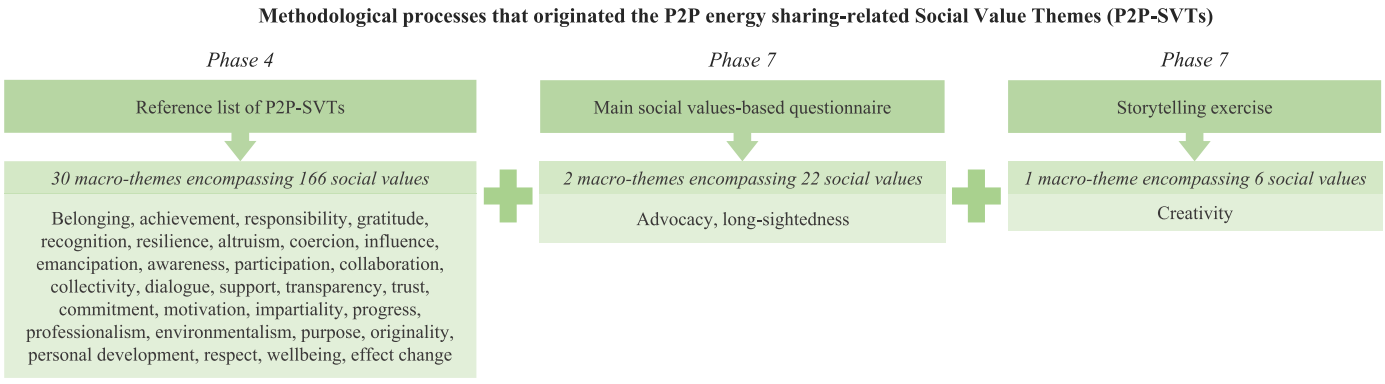

Fig. 5. Schematic representation of the methodological processes that originated the 33 P2P energy sharing-related Social Value Themes (P2P-SVTs).

The validity of phase 8 relied on unbiased data analysis, which was performed by different scholars to avoid expectation bias, the illusion of validity[29] the framing effect.[30]

The analysis of Table 25 (Appendix I) allowed to conclude that the results for 27 out of the 33 P2P-SVTs enacted in the valuation process were reinforced by at least two assessment methods and tools envisioned in this paper. Illustratively, <participation> was identified by 7 out of the 9 assessment methods and tools, followed by <emancipation> and <awareness> that were identified by 6 of them and so on. This means that those 27 P2P energy sharing-related Social Value Themes (P2P-SVTs) were validly "active" in the context of the Community S project.

Nonetheless, the same conclusion cannot be reached for <gratitude>, <recognition>, <transparency>, <trust>, and <respect>, since they were uncovered by the main social values-based questionnaire but were not further identified by any other supplementary assessment method and tool. Similarly, <curiosity> was uncovered by the storytelling exercise as a P2P-SVT that arose from the ground up in the Community S project but was also not further validated by other assessment means. Therefore, the potential value-behaviour gap for those 6 P2P-SVTs was not dismissed, and so they could not be considered "active" P2P-SVTs in the context of the Community S project.

Finally, in terms of the nature of the "active" P2P-SVTs, respondents tended to agree that they were existent P2P-SVTs that were reinforced by the P2P energy sharing activities. Coercion, however, was the only framed as a P2P-SVT that does not apply to the P2P energy sharing activities.

4. Conclusions

This methodology-focused paper argued that there must be a fundamental shift in the way that social values are accounted for in the transition towards a desirable carbon-neutral future. Since only part of the overall value created by society can be assimilated into market relations, this paper highlighted the need to demonstrate the real impact of what can be truly achieved instead of just what is easily quantifiable. For that, social values should be considered core outcomes of energy services provision and commissioning, rather than just an incremental externality. This means moving from a strict profit-oriented perspective focused on economic outcomes towards a wider perspective that also encompasses non-market outcomes, such as the case of social values. However, up to now there were no fit-for-purpose methodologies in the literature able to transfer the inherently qualitative nature of social values into quantitative measures in the context of peer-to-peer energy sharing. Based on that, this paper devised the first overarching social values-based assessment framework that allows the identification of underlying social values associated with peer-to-peer energy sharing models.

The design of this framework was inspired by the WeValue toolkit, which was revised, repurposed, trialled and validated in 3 pilots in Portugal. These pilots were developed under the Community S project — the first to have trialled and validated the concept of peer-to-peer energy sharing in Portugal in real market condition and real-life scenarios.

As discussed, the framework was highly effective in drawing conclusions for 27 of the 33 social values themes enacted in this paper.[31] In other words, they were considered validly "active" in the context of the Community S project. <Coercion> was mainly categorised as a social value that does not apply to the peer-to-peer energy sharing activities, while the other 26 social value themes were mainly categorised as existing social values that were reinforced by the peer-to-peer energy sharing activities.

Furthermore, if these social values are scrutinised under the 4 initial hypotheses set by this paper, <dialogue> and <personal development> become the best representative of existent social value themes that were reinforced by the P2P energy sharing activities; <collectivity> becomes the best representative of a new social value theme that emerged as a result of the P2P energy sharing activities; and <coercion> becomes the best representative of an antagonistic social value theme that existed and was modified by the P2P energy sharing activities, and a social value theme that did not apply to P2P energy sharing activities.

In terms of scalability, this paper recommends applying the proposed methodological approach in different P2P energy sharing initiatives,[32] provided that the result interpretations drawn here are put in perspective and validated through a cohesive validity check on a case-by-case basis. This can be done by following and adapting the validity check performed by and described throughout this paper.

Additionally, this paper coined its own actionable understanding of social values to help end-users transform this abstract concept into their specific language and cultural assumptions. Data analysis indicates that end-users were able to make sense of this concept that laid beneath consciousness, suggesting knowledge transfer, sensemaking, strong commitment and interest in the project, and a (possible) shared social dimension among them.

In conclusion, this paper expects to open new pathways to better comprehend the nuances of the social values-based dimension of peer-to-peer energy sharing systems, as well as create a new social values-based language that is explicitly associated with P2P energy sharing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

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[29] The "illusion of validity" stands for the illusion that "one's judgments is accurate, especially when available information is consistent or inter-correlated" [46].

[30] The framing effect refers to reaching different conclusions from the analysis of the same data based on how this data is presented [47].

[31] Belonging, achievement, responsibility, resilience, altruism, coercion, influence, emancipation, awareness, participation, collaboration, collectivity, dialogue, support, commitment, motivation, impartiality, progress, professionalism, environmentalism, purpose, originality, personal development, wellbeing, effect change, advocacy, long-sightedness.

[32] That is, different P2P energy sharing business models; ownership, stewardship or governance models; pilot sizes and scales; legal frameworks; geographic locations; a more diverse target group, etc.

Appendix A

Table 3

Table 3
Elicitation of relevant draft VBIs as proposed in phase 2 of the methodological pathway.

No.	Draft VBI description	Evaluators A	B	C	D	Deliberation
1	Everyone has their place in the team	4	3	1	1	YES (2nd round)
2	Everyone knows what their responsibilities are within the team	4	1	1	1	NO
3	Everyone feels responsibility for their part of the work	4	4	3	1	YES (2nd round)
4	Everyone knows what the final goal of his/her work is, as well as the work of the whole entity	4	4	3	4	YES
5	People feel that they are encouraged to fulfil their responsibilities	4	1	1	1	YES
6	People feel that they are given autonomy and trust to fulfil their responsibilities	4	3	1	1	YES
7	People feel that they are supported to fulfil their responsibilities	4	4	1	1	NO
8	Work environment is supportive of people being able to fulfil their responsibilities in their families or personal relationships	1	1	1	1	NO
9	Work environment is supportive of people being able to act with care in their families or personal relationships	1	1	1	1	NO
10	People follow through on their commitments	4	4	4	1	YES
11	Partners are trusted to follow through on their commitments without the need for formal agreements	4	2	1	1	NO (2nd round)
12	People feel that they are trusted to follow through on their commitments	2	1	1	1	NO
13	Goals are reviewed between committed parties to determine what has and has not been achieved	2	2	1	3	NO
14	Decision-making processes are ethical	2	1	1	1	NO
15	Decision-making processes are democratic	2	4	1	4	YES
16	Decision-making processes provide for equal representation	1	3	1	4	NO
17	Decision-making takes into account the social, economic and environmental needs of future generations	2	3	1	4	NO
18	People participate actively in reaching the entity's goals	4	1	1	4	NO
19	People participate actively in making decisions about issues that affect their lives	4	2	1	4	YES
20	People participate actively in developing the entity's code of ethics	1	1	1	1	NO
21	People participate actively in developing procedures to deal with unethical conduct	1	3	1	1	NO (2nd round)
22	People feel that there is transparent communication	2	1	2	4	NO
23	Entity is transparent about the processes of decision-making	2	4	1	4	NO
24	Entity is transparent about the outcomes of decision-making	2	3	1	4	NO
25	People feel that there is the right information flow	3	1	2	4	NO
26	Entity shares information openly with people	3	1	3	3	YES (2nd round)
27	Regular monitoring of how people are treated	1	4	1	1	NO
28	Action is consciously taken to improve the ways that people are treated	1	4	1	4	YES
29	Teams include members with different characteristics (e.g. gender, culture, age and other aspects of individual differences such as personality)	1	2	1	1	NO
30	Different points of view are heard and incorporated	2	4	1	4	YES (2nd round) (31 – 33 merged)
31	People feel that different approaches are valued	2	1	2	2	NO
32	Trusted partners are given flexibility to do things differently within prescribed structure	1	2	1	1	NO

(*continued on next page*)

Table 3 (*continued*)

No.	Draft VBI description	Evaluators A	B	C	D	Deliberation
33	Learning processes accommodate different learning styles	1	4	1	1	YES (2nd round) (31 – 33 merged)
34	People feel that their own individual identity and approach is respected	2	1	1	1	NO
35	People feel that their worth is acknowledged	4	4	1	4	YES
36	Women feel that they are valued	1	3	1	1	YES (2nd round) (36 – 37 – 38 merged)
37	Women feel that they have equal access to information	1	1	1	1	
38	Women feel that they are given equal opportunities to participate in decision-making processes	1	3	1	1	
39	People have self-respect	1	2	1	1	NO
40	People are inclusive (talk to everyone and no one is left out)	1	3	1	1	YES (2nd round) (40 – 41 merged)
41	People respect the differences in others	1	4	1	1	
42	People appreciate the differences in others	1	1	1	1	NO
43	People find ways to understand the differences in others	1	4	1	1	NO
44	Entity acts in a manner that is impartial and non-discriminatory (not discriminating on the basis of nationality, ethnic origin, colour, gender, sexual orientation, creed or religion)	1	4	1	1	YES
45	People learn freely together, regardless of nationality, ethnic origin, skin colour, gender, sexual orientation, creed or religion	1	1	1	1	NO
46	People share information freely, regardless of nationality, ethnic origin, skin colour, gender, sexual orientation, creed or religion	1	1	1	1	NO
47	People share their skills and abilities freely with one another, regardless of nationality, ethnic origin, skin colour, gender, sexual orientation, creed or religion	1	2	1	1	NO
48	Differences of opinion are acknowledged and valued through dialogue	3	3	1	1	YES
49	Conflicts are resolved through dialogue	1	4	1	1	NO
50	Open dialogue exists between project partners	3	1	1	1	NO
51	People are able to suspend their own standpoints during dialogue and listen to those of others	1	1	1	1	NO
52	Conflict resolution leads to learning and growth	3	3	1	1	YES
53	Individuals express their own opinions	3	3	1	1	NO
54	People feel that they have an equal opportunity to express their opinions	3	2	1	1	NO
55	Action is consciously taken to give everyone an equal opportunity to express their opinions	1	1	1	1	NO
56	People feel encouraged to express their opinions	3	3	1	1	NO
57	Action is consciously taken to encourage people to express their opinions	1	1	1	1	NO
58	People feel that their opinions are respected	3	1	1	1	NO
59	People feel that everyone's opinions are respected	3	4	1	1	NO
60	People become aware of how their existing knowledge, skills, resources and/or traditions can contribute to a project or the whole entity	4	4	1	4	NO
61	People feel that they are encouraged to contribute their existing knowledge, skills, networks, resources and/or traditions to a project or the whole entity	4	1	3	4	NO
62	Action is consciously taken to encourage people to contribute their existing knowledge, skills, networks, resources and/or traditions to a project or the whole entity	3	1	1	4	NO
63	People feel that their own knowledge, skills, networks, resources and/or traditions have already contributed to the outcomes of the project or entity	4	2	1	4	YES
64	People feel that their contributions to the entity are acknowledged	4	1	1	3	NO
65	Entity respects and acknowledges the contributions of others to its work, and gives credit for the outcomes to those who contributed	4	3	1	3	NO
66	People feel that they are encouraged to explore their own ideas and/or reflect on their own individuality	1	1	1	1	NO

(*continued on next page*)

Table 3 (*continued*)

No.	Draft VBI description	Evaluators A	B	C	D	Deliberation
67	People are taking the opportunity to explore their own ideas and/or reflect on their own individuality	1	1	1	1	NO
68	People feel that they have been given the opportunity to explore the wisdoms, traditions and values that they already hold, rather than having something imposed upon them	1	2	1	1	NO
69	People feel that they are encouraged to develop their own visions and goals for projects, and/or for the whole entity	1	2	1	1	NO
70	People are taking the opportunity to develop their own visions and goals for projects, and/or for the whole entity	1	1	1	1	NO
71	People feel that they are encouraged to develop programs, identify problems and deliver solutions on their own	1	2	2	1	YES
72	People are taking the opportunity to develop programs, identify problems and deliver solutions on their own	1	1	2	1	NO
73	People investigate what is right and good by themselves, rather than adopting other people's opinions	4	3	1	1	YES (2^{nd} round) (73 – 81 merged)
74	Entity's activities or events have a motivating effect on participants	4	1	1	1	NO (2^{nd} round)
1	Entity's activities or events connect participants emotionally to the community of life	4	3	1	1	NO (2^{nd} round)
76	People feel that they are encouraged to reach their potential	4	3	1	4	NO
77	People feel that their personal needs for development in the workplace are met	1	1	1	1	NO
78	People feel that they are provided with opportunities for personal growth	3	4	1	4	NO (2^{nd} round)
79	Entity has a culture of learning	4	3	1	1	NO
80	People have an attitude of learning towards their development	2	1	1	1	NO
81	People reflect critically on what is necessary to learn	4	2	3	1	YES (2^{nd} round) (73 – 81 merged)
82	People are not afraid to make mistakes	1	3	1	1	NO
83	Mistakes are understood as opportunities to learn and improve	1	4	1	1	NO (2^{nd} round)
84	People feel that the work environment is pleasant and harmonious	1	1	1	1	NO
85	People are perceived to be respectful in their interactions with others	1	3	1	1	NO
86	People treat each other with kindness	1	1	1	1	NO
87	People speak courteously to each other	1	1	1	1	NO
88	People introduce ideas to others with respect, humility and patience	1	2	1	1	NO
89	People are perceived to be trustworthy	2	1	1	1	NO
90	People are perceived to be truthful	2	1	1	1	NO
91	People are perceived to be honest	2	4	1	1	NO (2^{nd} round)
92	People are perceived to be transparent	2	3	1	1	NO
93	People are perceived to practice integrity in their interactions with others	2	1	1	1	NO
94	People do not back-bite about others within the entity	1	1	1	1	NO
95	People feel that they create something better or greater as a group than on their own	4	4	4	4	YES
96	People feel that they can participate in the vision and activities of the entity or project without compromising their personal beliefs or values	1	1	1	1	NO
97	Group norms exist	4	4	1	1	YES
98	People follow the group norms	4	3	1	4	NO (2^{nd} round)
99	People's behaviour is consistent with their words	4	1	4	1	YES
100	People strive to become conscious of their value system	4	1	1	1	YES (2^{nd} round)
101	People can identify applicable ethical values in a given context	4	1	1	1	NO
102	People strive to put their personal values into practice	3	1	1	1	NO (2^{nd} round)

(*continued on next page*)

Table 3 (*continued*)

No.	Draft VBI description	Evaluators A	B	C	D	Deliberation
103	Actions of individuals are consistent and in harmony with the core principles promoted by the entity	4	4	1	1	YES (103 – 104 merged)
104	People strive to bring their lives into accordance with the entity's values	4	1	1	3	
105	Leaders act as living representatives of the principles they espouse	1	1	1	1	NO
106	People feel inspired by the way that leaders live their principles	4	1	3	1	NO
107	As a result of the entity's messages or activities, people start their own personal initiatives with similar goals	4	1	4	3	YES (107 – 108 merged)
108	As a result of the entity's messages or activities, people's personal lifestyles include more conscious pro-environmental behaviours	4	4	1	4	
109	As a result of the entity's messages or activities, people establish new organisations or groups	4	4	1	1	YES
110	People have demonstrated the ability to replicate a project or approach in other communities or organisations	4	1	1	3	YES
111	People invest their own time and resources in activities that benefit the environment or society	4	1	4	4	YES
112	Entity aims to provide people with educational opportunities that empower them to contribute actively to sustainable development	4	3	4	1	NO
113	People have a sense of power that they can effect change	4	4	1	4	YES
114	Entity allows local groups who have an interest in their work to contribute their ideas or become partners on a project	1	3	1	4	NO
115	Partners trust that each shares a commitment and willingness to collaborate for a similar vision	4	1	1	4	NO (2nd round)
116	Entities are willing to work with each other because they respect each other	1	1	1	4	NO
117	People are productive	2	1	1	4	NO
118	People are creative	1	2	1	1	NO
119	Decisions made in the entity are supported	3	1	1	1	NO
120	People feel that they are treated equitably and with fairness	2	3	3	1	NO
121	Recruitment processes are conducted in a way that is perceived as fair to all applicants	2	2	4	1	NO
122	Remuneration/payment policies are perceived as fair by all involved	1	2	1	1	NO
123	Human resource management policies are perceived as fair by all involved	1	1	1	1	NO
124	People treat each other with equity and fairness	1	3	1	1	NO
125	Truth-seeking, non-judgmental, confidential channels are in place for individuals/teams seeking guidance on the application of ethics, reporting violations and examining violations of ethics	1	2	1	1	NO
126	People trust the channels that are in place for individuals/teams seeking guidance on the application of ethics, reporting violations and examining violations of ethics	1	1	1	1	NO
127	Performance goals are measured	1	3	4	1	NO
128	Performance goals are communicated internally or externally	1	3	4	1	NO
129	Financial integrity is assessed	1	1	1	1	NO
130	Financial integrity is communicated internally or externally	1	1	1	1	NO
131	Resource use efficiency is measured	1	1	1	1	NO
132	Resource use efficiency is communicated internally or externally	1	4	1	1	NO
133	People have respect for nature	1	1	3	4	NO
134	Action is consciously taken to contribute to a greater respect for nature	3	4	4	4	NO (2nd round)
135	People understand the complexity of natural systems	1	1	1	4	NO
136	Action is consciously taken to contribute to a greater understanding of the way nature is organised in systems and cycles	1	3	1	2	NO
137	Action is consciously taken to contribute to a greater understanding of the natural world as a source of personal fulfilment	1	3	1	3	NO

(*continued on next page*)

Table 3 (*continued*)

No.	Draft VBI description	Evaluators A	B	C	D	Deliberation
138	The environment and community of life is celebrated	4	1	1	1	NO
139	Entity is aware of the interconnectedness between the environment and their sphere of activity	2	1	3	4	NO
140	People are aware of the connectedness between their religion and the environment	1	1	1	1	NO
141	Entity acts to reduce its environmental impact or remedy its contribution to environmental problems	2	3	4	4	NO
142	Entity is aware of its environmental impact or its contribution to environmental problems	2	1	4	4	NO
143	Entity has successfully reduced its environmental impact or remedied its contribution to environmental problems	2	2	3	4	NO
144	Entity strives to have a positive effect on the natural environment	3	1	1	4	NO
145	Entity recognises its role as a protector of the natural environment	3	2	1	4	NO
146	Entity acts to protect the environment, without waiting for governments or others to act first	4	3	4	4	YES
147	Entity is open to dialogue about alternative means of production that have less negative impact, no impact, or a positive impact on the environment	2	4	1	1	NO
148	Entity implements a policy of purchasing environmentally sustainable products, e.g. recycled paper, even if cheaper alternatives exist	1	4	1	4	NO
149	Entity implements a policy of procuring some or all of its energy from renewable sources	1	4	4	4	NO
150	Entity implements a policy of reducing carbon emissions	1	1	4	4	NO
151	Entity implements a policy of sustainable waste management, e.g. recycling or reducing waste	1	2	1	4	NO
152	Number of activities/projects towards the goal of environmental sustainability	1	4	2	4	NO
153	Number of activities/projects for raising awareness of environmental sustainability	1	1	1	4	NO
154	Quality of process of activities or projects aiming to achieve or promote environmental sustainability	1	1	1	1	NO
155	Action is consciously taken to share with others how to protect and restore the natural environment	1	1	1	3	NO
156	Education is undertaken to raise awareness and capabilities for the organisation to act according to principles of environmental sustainability	4	4	1	1	NO
157	Entity actively seeks to work with others who will increase their ability to improve the environment	1	3	1	4	NO
158	Long term commitments to protect the environment are created	2	1	4	1	NO
159	Long term commitments to protect the environment are adhered to	3	2	1	1	NO (2^{nd} round)
160	Entity contributes positively to society by working to address social problems or global issues	3	1	1	3	NO
161	Entity implements a policy of ethical investment	1	2	1	1	NO
162	Number of activities/projects towards the goal of addressing the social aspects of sustainability	1	4	1	1	NO
163	Number of activities/projects for raising awareness of the social aspects of sustainability	1	1	1	1	NO
164	Quality of process of activities or projects aiming to achieve or promote social aspects of sustainability	1	4	1	1	NO
165	Entity's activities or events create a safe environment for people	1	1	3	1	NO
166	Work is viewed as a form of service	4	3	2	1	YES

Appendix B

Table 4

Table 4
"Localisation" of selected draft VBIs as proposed in phase 3 of the methodological pathway.

No.	Draft VBI	Final localisation (in European Portuguese)	Final localisation (in English)
1	Everyone has their place in the team	Sentiu que teve o seu espaço dentro do projeto?	Did you feel that you had your own place in the project?
3	Everyone feels responsibility for their part of the work	Sentiu-se responsável pela sua respetiva contribuição no projeto?	Did you feel responsible for your own contribution to the project?
4	Everyone knows what the final goal of his/her work is, as well as the work of the whole entity	Sabia qual era o propósito de sua contribuição no projeto, bem como qual era a contribuição do projeto para a sua comunidade e país?	Did you know what the purpose of your contribution to the project was, as well as what was the project's contribution to your community and country?
5	People feel that they are encouraged to fulfil their responsibilities	Sentiu-se encorajado(a) a cumprir com as suas responsabilidades no projeto?	Did you think that the events and activities promoted by the project motivated you to fulfil your responsibilities in the project?
6	People feel that they are given autonomy and trust to fulfil their responsibilities	Sentiu que a equipa deu-lhe autonomia para cumprir com suas respetivas responsabilidades no projeto?	Did you feel the project consortium gave you autonomy and trusted you to fulfil your project responsibilities on your own?
10	People follow through on their commitments	Acha que cumpriu com os seus compromissos no projeto?	Did you think you fulfilled your commitments with the project?
15	Decision-making processes are democratic	Acha que os processos de tomada de decisão no projeto foram democráticos?	Did you think the decision-making processes in the project were democratic?
19	People participate actively in making decisions about issues that affect their lives	Passou a sentir-se mais apto(a) a tomar decisões sobre outras questões que afetam a sua vida?	Did you become more able to make better decisions on other issues affecting your life?
26	Entity shares information openly with people	Sentiu que a equipa partilhou informações abertamente com todos os participantes?	Did you feel that the project consortium shared information openly with all participants?
28	Action is consciously taken to improve the ways that people are treated	Sentiu que a equipa tomou iniciativa para melhorar a experiência dos participantes no projeto?	Did you feel that the project consortium took the initiative to improve the participants' experiences in the project?
30	Different points of view are heard and incorporated	Sentiu que houve diferentes meios de comunicação para atender os diferentes pontos de vista dos participantes?	Did you feel that there were different communication channels so that each participant could learn about the project in their own way?
33	Learning processes accommodate different learning styles		
35	People feel that their worth is acknowledged	Sentiu que o valor da sua participação no projeto foi reconhecido?	Did you feel that the value of your participation in the project was recognised?
36	Women feel that they are valued	Sendo mulher, sentiu que a partilha de energia pode de alguma forma contribuir para uma maior igualdade de género	... did you feel that P2P energy sharing initiatives can somehow contribute to greater gender equality?
37	Women feel that they have equal access to information		
38	Women feel that they are given equal opportunities to participate in decision-making processes		
40	People are inclusive (talk to everyone and no one is left out)	Sentiu que a partilha de energia representa uma alavanca para construir relações mais solidárias e inclusivas entre os participantes (em comparação com as relações que já existiam antes)?	Did you feel that P2P energy sharing is a lever to build more solidary and inclusive relationships between participants (compared to the relationships that already existed before)?
41	People respect the differences in others		
44	Entity acts in a manner that is impartial and non-discriminatory (not discriminating on the basis of nationality, ethnic origin, colour, gender, sexual orientation, creed or religion)	Sentiu que todos atuaram de uma maneira não-discriminatória com relação às diferenças dos participantes ou da equipa do projeto (nacionalidade, género, cor de pele, etc)?	Did you feel that everyone acted in a non-discriminatory manner with respect to the differences of the participants or the project team (e.g., on the basis of nationality, gender, skin colour, etc.)?
48	Differences of opinion are acknowledged and valued through dialogue	Acredita que o diálogo entre os participantes e a equipa foi capaz de reconhecer e valorizar diferentes opiniões?	Did you believe that different opinions were acknowledged and valued through dialogue between participants and the project consortium?

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Table 4 (*continued*)

No.	Draft VBI	Final localisation (in European Portuguese)	Final localisation (in English)
52	Conflict resolution leads to learning and growth	Sentiu que a resolução de conflitos no desenvolvimento do projeto resultou em novas aprendizagens?	Did you feel that conflict resolution during the project development resulted in learning and growth?
63	People feel that their own knowledge, skills, networks, resources and/or traditions have already contributed to the outcomes of the project or entity	Acredita que as seus próprios conhecimentos ou competências contribuíram para o desenvolvimento do projeto?	Did you believe that your own knowledge or skills contributed to the development of the project?
71	People feel that they are encouraged to develop programs, identify problems and deliver solutions on their own	Sentiu-se mais capacitado(a) para refletir criticamente e procurar soluções para problemas por conta própria, ao invés de adotar opiniões preestabelecidas?	Did you feel more empowered to critically reflect and seek solutions to problems on your own, rather than adopting preestablished opinions?
73	People investigate what is right and good by themselves, rather than adopting other people's opinions		
95	People feel that they create something better or greater as a group than on their own	Sentiu que estava a criar algo em comunidade que era maior e melhor do que algo que conseguiria caso estivesse sozinho(a)?	Did you feel that you were creating something collectively that was bigger and better than something you could ever create if you were on your own?
97	Group norms exist	Considera que existiram regras de grupo a ser respeitadas dentro do projeto?	Do you consider that there were group norms to be respected in the project?
99	People's behaviour is consistent with their words	Acredita que seu comportamento no projeto era congruente com aquilo que dizia fazer?	Do you believe your behaviour in the project was consistent with what you said you were doing?
100	People strive to become conscious of their value system	Acha que se esforçou para se conscientializar sobre o sistema de valores sociais que fundamentou o projeto?	Do you think you worked hard to raise awareness about the social values system that underpinned the project?
103	Actions of individuals are consistent and in harmony with the core principles promoted by the entity	Passou a se esforçar para adotar um estilo de vida mais alinhado aos valores promovidos pelo projeto?	Did you strive to adopt a new lifestyle more aligned with the social values promoted by the project?
104	People strive to bring their lives into accordance with the entity's values		
107	As a result of the entity's messages or activities, people start their own personal initiatives with similar goals	Passou a ter um estilo de vida com hábitos mais coletivos e altruístas?	Did you feel that you adopted a new lifestyle with more collective and altruistic habits?
108	As a result of the entity's messages or activities, people's personal lifestyles include more conscious pro-environmental behaviours		
109	As a result of the entity's messages or activities, people establish new organisations or groups	Acha que o projeto estimulou o desenvolvimento de um senso de comunidade entre os participantes?	Do you think the project stimulated the development of a community identity among participants?
110	People have demonstrated the ability to replicate a project or approach in other communities or organisations	Sentiu que ganhou novas competências para replicar os princípios do projeto noutros contextos de sua vida?	Did you feel that you gained new skills to replicate the principles of the project in other contexts of your life?
111	People invest their own time and resources in activities that benefit the environment or society	Passou a investir mais tempo e recursos em atividades que beneficiam a natureza ou a comunidade?	Did you start investing more time and resources in activities that benefit the environment or your community due to your participation in the project?
113	People have a sense of power that they can effect change	A participação no projeto deu-lhe a sensação de que pode causar mudanças no meio em que vive?	Did your participation in the project give you the feeling that you can effect changes in the environment in which you live?
146	Entity acts to protect the environment, without waiting for governments or others to act first	Acredita que o projeto estabeleceu objetivos inovadores voltados para a sustentabilidade, indo além da legislação atual e das propostas de governo?	Do you believe the project has set novel sustainability goals that goes beyond current legislation and governmental action?
166	Work is viewed as a form of service	Viu a sua participação no projeto como uma forma de serviço comunitário (ao invés de um benefício meramente individual)?	Did you see your participation in the project as a form of community service (rather than a purely individual benefit)?

Appendix C

Table 5

Table 5
List of P2P-SVTs and its associated individual social values.

No.	P2P-SVT	Social value(s) that can be linked to this P2P-SVT (English/European Portuguese)
1	belonging	accessibility (acessibilidade); belonging (sentimento de pertença/ inserção); identification (identificação); inclusiveness (inclusividade); integrativeness (integratividade)
2	achievement	accomplishment (conquista); achievement (realização)
3	responsibility	accountability (responsabilidade); duty (dever); responsibility (responsabilidade)
4	gratitude	appreciation (apreciação/valorização); contentment (contentamento); gratitude (agradecimento); happiness (felicidade)
5	recognition	acknowledgement (reconhecimento); recognition (reconhecimento)
6	resilience	adaptability (adaptabilidade); dynamism (dinamismo); flexibility (flexibilidade); resilience (resiliência)
7	altruism	altruism (altruísmo); assistance (assistencialismo); caring (zelo); compassion (compaixão); concern for others (preocupação com outros); generosity (generosidade); helpfulness (solicitude); goodwill (bondade); selflessness (abnegação); solidarity (solidariedade); volunteering (voluntarismo/colocar-se à disposição); willingness (boa vontade)
8	coercion	authoritarianism (autoritarismo); coercion (coerção); control (controlo); discipline (disciplina); obedience (obediência); power (poder); order (ordem); rigour (rigor)
9	influence	influence (influência); leadership (liderança); power (poder); status (estatuto)
10	emancipation	autonomy (autonomia); capacity building (desenvolvimento de competências); capability (capacitação); confidence (confiança), critical thinking (pensamento crítico); emancipation (emancipação); empowerment (capacitação/emancipação); free will (livre arbítrio); freedom (liberdade); independence (independência); independent thinking (pensamento próprio)
11	awareness	awareness (consciencialização); concern (preocupação); consciousness (maior discernimento); knowledge (conhecimento); education (educação); learning (aprendizagem); understanding (maior entendimento)
12	participation	compliance (conformidade); contribution (contribuição); participation (participação)
13	collaboration	collaboration (colaboração); cooperation (cooperação); interactivity (interatividade); reciprocity (reciprocidade); sharing (partilha); synergy (sinergia); teamwork (trabalho de equipa)
14	collectivity	commonality (comunalidade); common sense (senso comum); community/ collectivity/ sense of group (sentimento de coletividade/ grupo/ identidade comunitária); connection (conexão); locality (localidade); oneness (sentimento de unidade); shared prosperity (prosperidade partilhada); togetherness (união); unity (sentimento de unidade)
15	dialogue	communication (comunicação); dialogue (diálogo)
16	support	coordination (coordenação); guidance (orientação); service (assistência/serviço); support (suporte); backing (suporte)
17	transparency	clearness (clareza); comprehensibility (compreensibilidade); directness (objetividade); intelligibility (inteligibilidade); openness (transparência); palpability (palpabilidade); perceptibility (perceptibilidade); tangibility (tangibilidade); transparency (transparência)
18	trust	credibility (credibilidade); honesty (honestidade); loyalty (lealdade); reliability (confiabilidade); trust (confiança); trustworthiness (fidedignidade)
19	commitment	commitment (comprometimento); dedication (dedicação); determination (determinação); diligence (diligência); effort (empenho); engagement (envolvimento); involvement (envolvimento)
20	motivation	active citizenship (cidadania ativa); drive (motivação); encouragement (encorajamento); initiative (iniciativa); inspiration (inspiração); interest (interesse); motivation (motivação); optimism (otimismo); proactivity (proatividade); wilfulness (força de vontade/ obstinação); zeal (ardor, entusiasmo)
21	impartiality	democracy (democracia); social equality (igualdade social); equity (equidade); ethics (ética); fairness (imparcialidade); gender equality (igualdade de gênero); impartiality (imparcialidade); integrity (integridade); social justice (justiça social)
22	progress	development (desenvolvimento); growth (crescimento); improvement (melhoria); progress (progresso); success (sucesso); prosperity (prosperidade)
23	professionalism	formalism (formalismo); professionalism (profissionalismo)
24	environmentalism	environmentalism/ care for nature (consciência ambiental); sustainability (sustentabilidade)
25	purpose	focus (foco); meaning (significado); purpose (propósito); vision (visão)
26	originality	authenticity (autenticidade); creativity (criatividade); innovativeness (inovatividade); insightfulness (perspicácia); originality (originalidade); pioneering spirit (pioneirismo); resourcefulness (desenvoltura/criatividade); uniqueness (singularidade)
27	personal development	personal development (desenvolvimento pessoal); personal growth (desenvolvimento pessoal); self-expression (auto-expressão)
28	respect	respect for others (respeito pelos outros); tolerance (tolerância)
29	wellbeing	satisfaction (satisfação); wellbeing (bem estar)
30	effect change	impact (impacto); make a difference (fazer a diferença); effect change (promover mudanças); significance (relevância); usefulness (utilidade); utility (vantagem/benefício); value creation (geração de valor)

Appendix D

This appendix briefly describes all supplementary assessment methods and tools devised in this paper, as well as their practical implementation. Nonetheless, due to word count constraints, the result analysis is not presented in this paper.

Ex-ante assessment questionnaire

Description: the ex-ante assessment questionnaire sought to capture end-users' self-reported feedback on their main motivation for participating in the Community S project. This questionnaire, composed of a single open-ended question, was presented to end-users at the kick-off of the Community S project in each pilot as part of the work plan that structured the project development. The survey data was coded and analysed manually by the core working group.

Practical implementation: the open-ended, unstructured answers represented a fruitful textual source of evidence about how end-users felt, understood and thought about the Community S project in the very early stage of the project implementation. To uncover such evidence, this paper performed rigorous text classification on these unstructured texts, using a method entitled topic detection (also known as topic modelling or topic analysis). Through this method, it was possible to break down, extract and categorise the most relevant parts-of-speech tags or key phrases from textual data into topics that summarise its core ideas, giving a complete picture of the topics discussed in a text corpus [48].

Ex-post assessment questionnaire

Description: the ex-post assessment questionnaire sought to capture end-users' self-reported feedback on their perceptions, expectations, knowledge, awareness, attitude and priorities towards the Community S project after it ended. This online questionnaire was created using Google Forms and was composed of 7 structuring multiple-choice questions. The survey data was coded and analysed manually by the core working group.

Practical implementation: all active participants were also asked to answer an ex-post online questionnaire once the Community S project ended, representing a valuable textual source of evidence about how end-users felt, understood and thought about the Community S project in its final stage of deployment. The online survey was created using Google Forms and was composed of 7 structuring multiple-choice questions. It was sent to all active end-users right before the end of the project, remaining open for new entries for 2 weeks after it was sent.

Storytelling

Description: the WeValue toolkit incentives the creation of creative methods to uncover the reaction and values judgment of participants through indirect means. Against this backdrop, this paper tailored a storytelling exercise, which represents a specific narrative method for sensemaking that allows delving into deeper realities through the exploration of the symbolisms conveyed by stories [49].

This exercise was purposefully designed as both a primary method for sensemaking and a translation mechanism between theory and practice, since it allowed the working group to better understand how end-users perceived, interpreted, and incorporated the concepts of *social values* and *P2P energy sharing* into their daily lives.

The assessment of the storytelling exercise was interpretative and adopted a social constructionist perspective. This approach is in line with a primary aspect of storytelling explained by Rotmann et al. [50], that its lessons cannot be final nor definitive because storytelling copes with uncertainty, multiple perspectives and the absence of a single solution to tackle problems – hence, they should be open to multiple rounds of reinterpretation.

The storytelling exercise design followed the top-down structural textual approach proposed by Bamberg[33] [51]. Specifically, it drew inspiration from the work from Rotmann et al. [50], who structured storytelling in a "fairy tale story spine" format. This format is typically framed by specific trigger sentences that clearly mark the beginning, middle and end of the story, following a sequential structure composed of: (i) an optional abstract, (ii) the setting/exposition, (iii) the problem/crisis/complication, (iv) the action geared towards a resolution, (v) the resolution or failure, and (vi) the closure. Rotmann et al. [50] also explained that this storytelling format is extremely useful since it 'pre-digests' facts and the morale of the story in a way that resembles the well-known structure of childhood stories.

In this paper, the proposed sequential structured was: (i) once upon a time (…); (ii) every day, I (…); (iii) however, by participating in the project, I (…); (iv) because of that, I (…); (v) nonetheless (…); (vi) until, finally (…); (vii) and, ever since then, (…); (viii) the end. Note that the sequential composition of the storytelling exercise was segmented by tailor-made linguistic markers (resembling paragraphs or episodes of the story) that temporally followed each other and were stringed together by a causal contingency. Altogether, the episodic sequential arrangement that emerged ultimately composed the full story and what it is all about.

Practical implementation: the implementation of the storytelling exercise involved 10 different storytellers, who were selected based on their availability to create a story after the end of the final public sessions that took place in each pilot upon the end of the project. Storytellers were asked to narrate their first-hand, personal experiences (i.e., their feelings, reactions and value judgments) about their participation in the P2P energy sharing activities that took place in the project. The trigger sentences devised in the "fairy tale story spine" format led storytellers to narrate their experiences with strong logic and plausibility, but also with a high degree of customisation and freedom of expression. The benefit of such method is that it supported the transformation complex concepts (such as the cases of *social values* and *P2P energy sharing*) into the language and cultural assumptions from the storytellers' unique worldviews. This allowed the core working group to cut through different points-of-view of a heterogeneous group of end-users to make sense and derive meaning of the collected data from the other assessment methods promoted in this paper. Additionally, it allowed the core working group to identify central issues that were transversal to all those involved in this exercise.

Unstructured observation

Description: an assigned expert closely observes how participants interact with each other and what they do and say in a given situation. To avoid biased assessments, this method should be carried out by at least two independent observers, who discuss their observations afterwards to

[33] This approach focuses on the overall conceptual structure of the story - i.e., the story's overall sequential composition in episodes that in turn belongs to a wider plot structure [48].

reach a valid conclusion. In this paper, Evaluators A, C and D carried out unstructured observation[34] exercises during the awareness-raising sessions in each pilot.

Practical implementation: evaluators A, C and D carried out unstructured observation exercises during the awareness-raising sessions in each pilot and jointly agreed that the City Council of Alfândega da Fé might have exerted some form of social/hierarchical pressure or stimulus on public employees to participate in the project – potentially in the form of <coercion>. Given that this was not so evident in the other two pilots, this particular behaviour was scrutinised in the work done by Klein et al. [23].

Document analysis

Description: systematic analysis of documents generated by or related to the project under scrutiny in an attempt to find evidence about specific VBIs. In this paper, the working group performed a comprehensive analysis of all documentation associated with the Community S project to uncover any evidence about underlying VBIs associated with it. Namely, the assessed documentation included: mission, targets and goals statements as well as strategic and action plans stated in the *Community S* official website (http://community-s.vps.energy/); and the techno-scientific project reports or any associated scientific publication (namely the work carried out by Klein et al. [22,23]).

Practical implementation: the *Community S* official website presented a trustworthy overview of the project's main objectives and outcomes. The analysis of the website content involved seeking out for word tags that could be directly correlated with some of the P2P-SVTs from Appendix C.

Additionally, the work carried out by Klein et al. [23] assessed the impact of a novel end-user engagement framework on the same Portuguese pilots trialled in this paper. Because of this, the results uncovered in this document revealed many insightful behavioural patterns that corroborated the findings and interrelationships derived from the implementation of the main social values-based questionnaire.

Indirect measures

Description: in the case of indirect measures, evidence was collected without the need to observe nor interact with participants. The WeValue toolkit reinforces that the working group must clearly define that the indirect measures that are under assessment are related to well-defined VBIs.

Practical implementation: numerical data analysis of the main social values-based questionnaire's responses represents a fruitful source of indirect measures, covering for instance: (i) percentage of end-users that answered it; (ii) number of female respondents; (iii) willingness to further collaborate with the valuation process; (iv) participation in the awareness-raising sessions promoted throughout the project implementation; (v) technical support received (either via telephone or *in situ* visits paid by the project consortium).

Additionally, numerical data analyses of end-user involvement in the project represented another valuable source of indirect measures, namely in the forms of number of "Early Adopters", and "Indifferent End-users" that were successfully converted to other end-user segments.

[34] When the observation flows organically to detect behaviours that were not defined a priori.

Appendix E

Community S questionnaire

- Page 1 -

1) How did you see your participation in the project?

Localised Values-Based Indicators	SA	A	N/A	D	SD
Did you feel that you had your own place in the project?	()	()	()	()	()
Did you feel responsible for your own contribution to the project?	()	()	()	()	()
Did you know what the purpose of your contribution to the project was, as well as what was the project's contribution to your community and country?	()	()	()	()	()
Did you think that the events and activities promoted by the project motivated you to fulfil your responsibilities in the project?	()	()	()	()	()
Did you think you fulfilled your commitments with the project?	()	()	()	()	()
Did you feel that the value of your participation in the project was recognised?	()	()	()	()	()
Did you feel that everyone acted in a non-discriminatory manner with respect to the differences of the participants or the project team (e.g., on the basis of nationality, gender, skin colour, etc.)?	()	()	()	()	()
Did you believe that your own knowledge or skills contributed to the development of the project?	()	()	()	()	()
Do you consider that there were group norms to be respected in the project?	()	()	()	()	()
Do you believe your behaviour in the project was consistent with what you said you were doing?	()	()	()	()	()
Do you think you worked hard to raise awareness about the social values system that underpinned the project?	()	()	()	()	()
Did you see your participation in the project as a form of community service (rather than a purely individual benefit)?	()	()	()	()	()

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2) How did you see the project consortium's approach?

Localised Values-Based Indicators	SA	A	N/A	D	SD
Did you feel the project consortium gave you autonomy and trusted you to fulfil your project responsibilities on your own?	()	()	()	()	()
Did you think the decision-making processes in the project were democratic?	()	()	()	()	()
Did you feel that the project consortium shared information openly with all participants?	()	()	()	()	()
Did you feel that the project consortium took the initiative to improve the participants' experiences in the project?	()	()	()	()	()
Did you feel that there were different communication channels so that each participant could learn about the project in their own way?	()	()	()	()	()
Did you believe that different opinions were acknowledged and valued through dialogue between participants and the project consortium?	()	()	()	()	()
Did you feel that conflict resolution during the project development resulted in learning and growth?	()	()	()	()	()
Did you feel somehow coerced/forced to participate in any of the project activities?	()	()	()	()	()

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3) As a result of your participation in the project and what you learned about P2P energy sharing…

Localised Values-Based Indicators	SA	A	N/A	D	SD
Did you become more able to make better decisions on other issues affecting your life?	()	()	()	()	()
Did you feel that P2P energy sharing is a lever to build more solidary and inclusive relationships between participants (compared to the relationships that already existed before)?	()	()	()	()	()
Did you feel more empowered to critically reflect and seek solutions to problems on your own, rather than adopting preestablished opinions?	()	()	()	()	()
Did you feel that you were creating something collectively that was bigger and better than something you could ever create if you were on your own?	()	()	()	()	()
Did you strive to adopt a new lifestyle more aligned with the social values promoted by the project?	()	()	()	()	()
Did you feel that you adopted a new lifestyle with more collective and altruistic habits?	()	()	()	()	()
Did you feel that you gained new skills to replicate the principles of the project in other contexts of your life?	()	()	()	()	()
Did you start investing more time and resources in activities that benefit the environment or your community due to your participation in the project?	()	()	()	()	()
Did your participation in the project give you the feeling that you can effect changes in the environment in which you live?	()	()	()	()	()
Do you think the project stimulated the development of a community identity among participants?	()	()	()	()	()
Do you believe the project has set novel sustainability goals that goes beyond current legislation and governmental action?	()	()	()	()	()

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4) Gender?

() Male

() Female

() Other

5) As a woman...[35]

Localised Values-Based Indicators	SA	A	N/A	D	SD
... did you feel that P2P energy sharing initiatives can somehow contribute to greater gender equality?	()	()	()	()	()

[35] Question 5 only appeared for those who marked “female” as an answer in the online SurveyGizmo’s questionnaire.

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6) Now, please reflect on the social values associated with each indicator with which you agreed or strongly agreed in the previous sections.

Localised Values-Based Indicators	Associated social value(s)	Do you agree with this association?(YES OR NO)	OPTIONAL:Which other social value(s) would you associate with this indicator?	OPTIONAL: Which social value(s) would you remove from this association?
Did you feel that you had your own place in the project?	Inclusion; recognition			
Did you feel responsible for your own contribution to the project?	Responsibility; contribution; involvement			
Did you know what the purpose of your contribution to the project was, as well as what was the project's contribution to your community and country?	Purpose; contribution; involvement; recognition; effect change			
Did you think that the events and activities promoted by the project motivated you to fulfil your responsibilities in the project?	Motivation; responsibility; involvement			
Did you feel the project consortium gave you autonomy and trusted you to fulfil your project responsibilities on your own?	Emancipation; trust; responsibility			
Did you think you fulfilled your commitments with the project?	Accomplishment; responsibility; contribution; dedication			
Did you think the decision-making processes in the project were democratic?	Impartiality; inclusion; recognition; credibility			
Did you become more able to make better decisions on other issues affecting your life?	Capacity building; learning; personal development; satisfaction; achievement; effect change			
Did you feel that the project consortium shared information openly with all participants?	Transparency; credibility; commitment; impartiality; dialogue; responsibility; support; professionalism			
Did you feel that the project consortium took the initiative to improve the participants' experiences in the project?	Support; commitment; responsibility; professionalism			
Did you feel that there were different communication channels so that each participant could learn about the project in their own way?	Inclusion; impartiality; responsibility; support; adaptability; professionalism; involvement; respect			
Did you feel that the value of your participation in the project was recognised?	Recognition; inclusion; satisfaction; motivation; appreciation			
... did you feel that P2P energy sharing initiatives can somehow contribute to greater gender equality?	Gender equality; inclusion; inspiration; effect change; recognition; respect; satisfaction			
Did you feel that P2P energy sharing is a lever to build more solidary and inclusive relationships between participants (compared to the relationships that already existed before)?	Solidarity; inclusion; cooperation; sense of community; make a difference			
Did you feel that everyone acted in a non-discriminatory manner with respect to the differences of the participants or the project team (e.g., on the basis of nationality, gender, skin colour, etc.)?	Respect; impartiality; inclusion; concern for others; unity			
Did you believe that different opinions were acknowledged and valued through dialogue between participants and the project consortium?	Dialogue; impartiality; inclusion; transparency; involvement; credibility; participation; support; engagement; collaboration; professionalism; appreciation; recognition; concern for others			

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(*continued*)

Localised Values-Based Indicators	Associated social value(s)	Do you agree with this association?(YES OR NO)	OPTIONAL:Which other social value(s) would you associate with this indicator?	OPTIONAL: Which social value(s) would you remove from this association?
Did you feel that conflict resolution during the project development resulted in learning and growth?	Learning; personal development; accomplishment; recognition; value creation			
Did you believe that your own knowledge or skills contributed to the development of the project? Did you feel more empowered to critically reflect and seek solutions to problems on your own, rather than adopting preestablished opinions?	Contribution; inclusion; recognition; dedication; improvement; influence; collaboration; satisfaction Emancipation; learning; personal development; value creation; satisfaction; achievement			
Did you feel that you were creating something collectively that was bigger and better than something you could ever create if you were on your own?	Collectivity; integration; contribution; motivation; value creation; support; satisfaction; recognition; resilience; altruism; collaboration; involvement; development; purpose			
Do you consider that there were group norms to be respected in the project?	Control; teamwork; coordination; duty			
Do you believe your behaviour in the project was consistent with what you said you were doing?	Honesty; accountability; impartiality; acknowledgement; credibility			
Do you think you worked hard to raise awareness about the social values system that underpinned the project?	Awareness; responsibility; acknowledgement; critical thinking; involvement; motivation; significance			
Did you strive to adopt a new lifestyle more aligned with the social values promoted by the project?	Adaptation; capacity building; awareness; achievement; personal development; focus; motivation; impact; satisfaction			
Did you feel that you adopted a new lifestyle with more collective and altruistic habits?	Concern for others; adaptability; community; proactivity; value creation; personal development; vision; satisfaction			
Did you feel that you gained new skills to replicate the principles of the project in other contexts of your life?	Personal development; emancipation; consciousness; utility; satisfaction; purpose; drive; initiative; influence; achievement; appreciation; acknowledgement; adaptability			
Did you start investing more time and resources in activities that benefit the environment or your community due to your participation in the project?	Environmentalism; collectivity; empowerment; selflessness; belonging; awareness; contribution; inspiration; make a difference; purpose; personal development; respect; satisfaction; acknowledgement; resilience; influence; sharing; prosperity; fairness; dedication; long-sightedness			
Did your participation in the project give you the feeling that you can effect changes in the environment in which you live?	Empowerment; contribution; wilfulness; make a difference; purpose; personal development; satisfaction; recognition; resilience; influence			
Do you think the project stimulated the development of a community identity among participants?	Collectivity; concern for others; inclusion; cooperation; contribution; consciousness; capability; responsibility; recognition; resilience; drive; impact; backing; wellbeing; commitment; social justice; prosperity			
Do you believe the project has set novel sustainability goals that goes beyond current legislation and governmental action?	Innovativeness; development; purpose; value creation; environmentalism; contribution; status; achievement; advocacy			
Did you see your participation in the project as a form of community service (rather than a purely individual benefit)?	Collectivity; concern for others; inclusion; cooperation; contribution; consciousness; capability; responsibility; recognition; resilience; drive; impact; organization; wellbeing; purpose; commitment; social justice; prosperity			
Did you feel somehow coerced/forced to participate in any of the project activities?	Authoritarianism; influence			

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7) Reflect on the origin of the following social values

Social value theme	They emerged as a result of the project	They already existed and were reinforced by the project	Their antagonistic versions already existed but were modified by the project	They do not apply to the project
Belonging	()	()	()	()
Achievement	()	()	()	()
Responsibility	()	()	()	()
Gratitude	()	()	()	()
Recognition	()	()	()	()
Resilience	()	()	()	()
Altruism	()	()	()	()
Coercion	()	()	()	()
Influence	()	()	()	()
Emancipation	()	()	()	()
Awareness	()	()	()	()
Participation	()	()	()	()
Collaboration	()	()	()	()
Collectivity	()	()	()	()
Dialogue	()	()	()	()
Support	()	()	()	()
Transparency	()	()	()	()
Trust	()	()	()	()
Commitment	()	()	()	()
Motivation	()	()	()	()
Impartiality	()	()	()	()
Progress	()	()	()	()
Professionalism	()	()	()	()
Environmentalism	()	()	()	()
Purpose	()	()	()	()
Originality	()	()	()	()
Personal Development	()	()	()	()
Respect	()	()	()	()
Wellbeing	()	()	()	()
Effect Change	()	()	()	()

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Personal data

8) Do you accept being contacted for further discussion about the topics addressed by this questionnaire?

() Yes

() No

9) What is your name? (please fill in this field if you agree to be contacted later)

Data privacy: your responses will be reviewed confidentially and in an aggregated way

10) What is your email? (please fill in this field if you agree to be contacted later)

Data privacy: your responses will be reviewed confidentially and in an aggregated way

11) To which renewable energy community did you belong to?

() Alfândega da Fé

() Penela

() Lordelo/Vila Real

12) Did you Participate in the public sessions held at the City Council to learn more about the project?

() Yes (in all session)

() Partially (only in some of the sessions)

() No

13) Did you received any technical support from the project consortium (via calls or in situ support) to solve any pending issue with your smart home energy management system?

() No (I never had any technical problem)

() Yes (I received technical support and my pending problem was solved)

() Yes (I received technical support however the problem could not be solved)

() No (I had technical problems however I never received technical support)

() Other option (please describe):

Appendix F

Table 9

Table 9
Analysis of the Likert-type LVBIs and interpretation of results.

No.	"Localised" VBI description	Response categories					No. of responses	Central tendency	
		SA (5)	A (4)	N/A (3)	D (2)	SD (1)		Median	Mode
1	Did you feel that you had your own place in the project?	15.4%	65.4%	11.5%	7.7%	0%	26	4	4
3	Did you feel responsible for your own contribution to the project?	26.9%	61.5%	7.7%	3.8%	0%	26	4	4
4	Did you know what the purpose of your contribution to the project was, as well as what was the project's contribution to your community and country?	42.3%	46.2%	11.5%	0%	0%	26	4	4
5	Did you think that the events and activities promoted by the project motivated you to fulfil your responsibilities in the project?	26.9%	53.8%	15.4%	3.8%	0%	26	4	4
6	Did you feel the project consortium gave you autonomy and trusted you to fulfil your project responsibilities on your own?	37.0%	44.4%	11.1%	7.4%	0%	27	4	4
10	Did you think you fulfilled your commitments with the project?	23.1%	53.8%	11.5%	7.7%	3.8%	26	4	4
15	Did you think the decision-making processes in the project were democratic?	25.9%	59.3%	14.8%	0%	0%	27	4	4
19	Did you become more able to make better decisions on other issues affecting your life?	25.9%	40.7%	25.9%	7.4%	0%	27	4	4
26	Did you feel that the project consortium shared information openly with all participants?	55.6%	29.6%	14.8%	0%	0%	27	5	5
28	Did you feel that the project consortium took the initiative to improve the participants' experiences in the project?	40.7%	51.9%	3.7%	3.7%	0%	27	4	4
33	Did you feel that there were different communication channels so that each participant could learn about the project in their own way?	37.0%	40.7%	14.8%	7.4%	0%	27	4	4
35	Did you feel that the value of your participation in the project was recognised?	26.9%	46.2%	26.9%	0%	0%	26	4	4
36 – 37 – 38	... did you feel that P2P energy sharing initiatives can somehow contribute to greater gender equality?	16.7%	33.3%	41.7%	8.3%	0%	12	4	3
40 - 41	Did you feel that P2P energy sharing is a lever to build more solidary and inclusive relationships between participants (compared to the relationships that already existed before)?	37.0%	48.1%	14.8%	0%	0%	27	4	4
44	Did you feel that everyone acted in a non-discriminatory manner with respect to the differences of the participants or the project team (e.g., on the basis of nationality, gender, skin colour, etc.)?	50.0%	38.5%	11.5%	0%	0%	26	5	5
48	Did you believe that different opinions were acknowledged and valued through dialogue between participants and the project consortium?	29.6%	51.9%	14.8%	3.7%	0%	27	4	4

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Table 9 (*continued*)

No.	"Localised" VBI description	Response categories					No. of responses	Central tendency	
		SA (5)	A (4)	N/A (3)	D (2)	SD (1)		Median	Mode
52	Did you feel that conflict resolution during the project development resulted in learning and growth?	29.6%	29.6%	40.7%	0%	0%	27	4	3
63	Did you believe that your own knowledge or skills contributed to the development of the project?	15.4%	57.7%	19.2%	7.7%	0%	26	4	4
73	Did you feel more empowered to critically reflect and seek solutions to problems on your own, rather than adopting preestablished opinions?	15.4%	57.7%	23.1%	3.8%	0%	26	4	4
95	Did you feel that you were creating something collectively that was bigger and better than something you could ever create if you were on your own?	44.4%	44.4%	11.1%	0%	0%	27	4	5
97	Do you consider that there were group norms to be respected in the project?	26.9%	53.8%	19.2%	0%	0%	26	4	4
99	Do you believe your behaviour in the project was consistent with what you said you were doing?	15.4%	65.4%	15.4%	3.8%	0%	26	4	4
100	Do you think you worked hard to raise awareness about the social values system that underpinned the project?	30.8%	53.8%	11.5%	3.8%	0%	26	4	4
104	Did you strive to adopt a new lifestyle more aligned with the social values promoted by the project?	29.6%	48.1%	11.1%	11.1%	0%	27	4	4
108	Did you feel that you adopted a new lifestyle with more collective and altruistic habits?	18.5%	44.4%	14.8%	22.2%	0%	27	4	4
110	Did you feel that you gained new skills to replicate the principles of the project in other contexts of your life?	25.9%	59.3%	11.1%	3.7%	0%	27	4	4
111	Did you start investing more time and resources in activities that benefit the environment or your community due to your participation in the project?	22.2%	48.1%	25.9%	3.7%	0%	27	4	4
113	Did your participation in the project give you the feeling that you can effect changes in the environment in which you live?	37.0%	51.9%	11.1%	0%	0%	27	4	4
138	Do you think the project stimulated the development of a community identity among participants?	22.2%	51.9%	18.5%	7.4%	0%	27	4	4
146	Do you believe the project has set novel sustainability goals that goes beyond current legislation and governmental action?	40.7%	44.4%	14.8%	0%	0%	27	4	5
166	Did you see your participation in the project as a form of community service (rather than a purely individual benefit)?	33.3%	59.3%	7.4%	0%	0%	27	4	4
167	Did you feel somehow coerced/forced to participate in any of the project activities?	3.7%	7.4%	7.4%	48.1%	33.3%	27	2	2

Appendix G

Table 10

Table 10
Level of agreement of respondents towards the links between each LVBI and the respective P2P-SVTs associated by default by the working group.

No.	LVBI	Associated P2P-SVT(s)	Do you agree with the association with the P2P-SVTs indicator?		OPTIONAL: Which other P2P-SVT(s) would you correlate with this indicator?	OPTIONAL: Which associated P2P-SVT(s) would you eliminate from the default correlation?	No. of responses
			NO	YES			
1	Did you feel that you had your own place in the project?	**Inclusion;** recognition	*	Yes (100.0%)	*	*	17
3	Did you feel responsible for your own contribution to the project?	**Responsibility;** contribution; involvement	*	Yes (100.0%)	*	*	20
4	Did you know what the purpose of your contribution to the project was, as well as what was the project's contribution to your community and country?	**Purpose;** contribution; involvement; recognition; effect change	*	Yes (100.0%)	*	*	19
5	Did you think that the events and activities promoted by the project motivated you to fulfil your responsibilities in the project?	**Motivation;** responsibility; involvement	*	Yes (100.0%)	*	*	18
6	Did you feel the project consortium gave you autonomy and trusted you to fulfil your project responsibilities on your own?	**Emancipation;** trust; responsibility	*	Yes (100.0%)	*	*	20
10	Did you think you fulfilled your commitments with the project?	**Accomplishment;** responsibility; contribution; dedication	*	Yes (100.0%)	*	*	18
15	Did you think the decision-making processes in the project were democratic?	**Impartiality;** inclusion; recognition; credibility	*	Yes (100.0%)	*	*	19
19	Did you become more able to make better decisions on other issues affecting your life?	**Capacity building;** learning; personal development; satisfaction; achievement; effect change	*	Yes (100.0%)	*	*	16
26	Did you feel that the project consortium shared information openly with all participants?	**Transparency;** credibility; commitment; impartiality; dialogue; responsibility; support; professionalism	*	Yes (100.0%)	Appreciation (valorização, interesse) (5.0%)	*	20
28	Did you feel that the project consortium took the initiative to improve the participants' experiences in the project?	**Support;** commitment; responsibility; professionalism	No (5.3%)	Yes (94.7%)	*	*	19
30 – 33	Did you feel that there were different communication channels so that each participant could learn about the project in their own way?	**Inclusion**; impartiality; responsibility; support; adaptability; professionalism; involvement; respect	*	Yes (100.0%)	Control (controlo) (5.9%)	*	17

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Table 10 (*continued*)

No.	LVBI	Associated P2P-SVT(s)	Do you agree with the association with the of these P2P-SVTs indicator?		OPTIONAL: Which other P2P-SVT(s) would you correlate with this indicator?	OPTIONAL: Which associated P2P-SVT(s) would you eliminate from the default correlation?	No. of responses
			NO	YES			
35	Did you feel that the value of your participation in the project was recognised?	**Recognition;** inclusion; satisfaction; motivation; appreciation	*	Yes (100.0%)	*	*	16
36 – 37 – 38	... did you feel that P2P energy sharing initiatives can somehow contribute to greater gender equality?	**Gender equality**; inclusion; inspiration; effect change; recognition; respect; satisfaction	*	Yes (100.0%)	*	*	6
40 – 41	Did you feel that P2P energy sharing is a lever to build more solidary and inclusive relationships between participants (compared to the relationships that already existed before)?	**Solidarity;** inclusion; cooperation; sense of community; make a difference	*	Yes (100.0%)	*	*	19
44	Did you feel that everyone acted in a non-discriminatory manner with respect to the differences of the participants or the project team (e.g., on the basis of nationality, gender, skin colour, etc.)?	**Respect;** impartiality; inclusion; concern for others; unity	*	Yes (100.0%)	*	*	21
48	Did you believe that different opinions were acknowledged and valued through dialogue between participants and the project consortium?	**Dialogue;** impartiality; inclusion; transparency; involvement; credibility; participation; support; engagement; collaboration; professionalism; appreciation; recognition; concern for others	*	Yes (100.0%)	*	*	18
52	Did you feel that conflict resolution during the project development resulted in learning and growth?	**Learning;** personal development; accomplishment; recognition; value creation	No (6.7%)	Yes (93.3%)	*	*	15
63	Did you believe that your own knowledge or skills contributed to the development of the project?	**Contribution;** inclusion; recognition; dedication; improvement; influence; collaboration; satisfaction	No (6.7%)	Yes (93.3%)	*	*	15
73 –81	Did you feel more empowered to critically reflect and seek solutions to problems on your own, rather than adopting preestablished opinions?	**Emancipation;** learning; personal development; value creation; satisfaction; achievement	No (13.3%)	Yes (86.7%)	*	*	15
95	Did you feel that you were creating something collectively that was bigger and better than something you could ever create if you were on your own?	**Collectivity;** integration; contribution; motivation; value creation; support; satisfaction; recognition; resilience; altruism; collaboration; involvement; development; purpose	*	Yes (100.0%)	*	*	20

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Table 10 (*continued*)

No.	LVBI	Associated P2P-SVT(s)	Do you agree with the association of these P2P-SVTs with the indicator?		OPTIONAL: Which other P2P-SVT(s) would you correlate with this indicator?	OPTIONAL: Which associated P2P-SVT(s) would you eliminate from the default correlation?	No. of responses
			NO	YES			
97	Do you consider that there were group norms to be respected in the project?	**Control;** teamwork; coordination; duty	No (5.6%)	Yes (94.4%)	*	*	18
99	Do you believe your behaviour in the project was consistent with what you said you were doing?	**Honesty;** accountability; impartiality; acknowledgement; credibility	*	Yes (100.0%)	*	*	21
100	Do you think you worked hard to raise awareness about the social values system that underpinned the project?	**Awareness;** responsibility; acknowledgement; critical thinking; involvement; motivation; significance	*	Yes (100.0%)	*	*	20
103 – 104	Did you strive to adopt a new lifestyle more aligned with the social values promoted by the project?	**Adaptation;** capacity building; awareness; achievement; personal development; focus; motivation; impact; satisfaction	*	Yes (100.0%)	*	*	17
107 – 108	Did you feel that you adopted a new lifestyle with more collective and altruistic habits?	**Concern for others;** adaptability; community; proactivity; value creation; personal development; vision; satisfaction	*	Yes (100.0%)	*	*	13
110	Did you feel that you gained new skills to replicate the principles of the project in other contexts of your life?	**Personal development;** emancipation; consciousness; utility; satisfaction; purpose; drive; initiative; influence; achievement; appreciation; acknowledgement; adaptability	No (9.1%)	Yes (90.9%)	*	Emancipation (emancipação) (4.5%)	22
111	Did you start investing more time and resources in activities that benefit the environment or your community due to your participation in the project?	**Environmentalism; collectivity;** empowerment; selflessness; belonging; awareness; contribution; inspiration; make a difference; purpose; personal development; respect; satisfaction; acknowledgement; resilience; influence; sharing; prosperity; fairness; dedication; long-sightedness	No (5.6%)	Yes (94.4%)	Long-sightedness (olhar para o futuro) (5.5%)	*	18
113	Did your participation in the project give you the feeling that you can effect changes in the environment in which you live?	**Empowerment;** contribution; wilfulness; make a difference; purpose; personal development; satisfaction; recognition; resilience; influence	*	Yes (100.0%)	Resourcefulness (alternativas) (5.0%)	*	20

(*continued on next page*)

Table 10 (*continued*)

No.	LVBI	Associated P2P-SVT(s)	Do you agree with the association of these P2P-SVTs with the indicator?		OPTIONAL: Which other P2P-SVT(s) would you correlate with this indicator?	OPTIONAL: Which associated P2P-SVT(s) would you eliminate from the default correlation?	No. of responses
			NO	YES			
138	Do you think the project stimulated the development of a community identity among participants?	**Collectivity;** concern for others; inclusion; cooperation; contribution; consciousness; capability; responsibility; recognition; resilience; drive; impact; backing; wellbeing; commitment; social justice; prosperity	No (5.6%)	Yes (94.4%)	*	*	18
146	Do you believe the project has set novel sustainability goals that goes beyond current legislation and governmental action?	**Innovativeness;** development; purpose; value creation; environmentalism; contribution; status; achievement; advocacy	*	Yes (100.0%)	Advocacy (pressão no governo) (4.3%)	*	23
166	Did you see your participation in the project as a form of community service (rather than a purely individual benefit)?	**Collectivity;** concern for others; inclusion; cooperation; contribution; consciousness; capability; responsibility; recognition; resilience; drive; impact; organization; wellbeing; purpose; commitment; social justice; prosperity	*	Yes (100.0%)	*	*	21
167	Did you feel somehow coerced/forced to participate in any of the project activities?	**Authoritarianism;** influence	*	Yes (100.0%)	*	*	17

Appendix H

Table 12

Table 12
Respondents' inferences on the origin of each P2P-SVT.

No.	P2P-SVT	This P2P-SVT arose as a result of the P2P energy sharing activities	This P2P-SVT already existed and was reinforced by the P2P energy sharing activities	An antagonistic version of this P2P-SVT existed but was modified by the P2P energy sharing activities	This P2P-SVT does not apply to the P2P energy sharing activities	No. of responses
1	belonging	13.6%	81.8%	-	4.5%	22
2	achievement	9.5%	76.2%	4.8%	9.5%	21
3	responsibility	13.6%	77.3%	-	9.1%	22
4	gratitude	18.2%	77.3%	-	4.5%	22
5	recognition	18.2%	68.2%	-	13.6%	22
6	resilience	21.7%	73.9%	-	4.3%	23
7	altruism	13.6%	81.8%	-	4.5%	22
8	coercion	9.1%	18.2%	27.3%	45.5%	22
9	influence	9.1%	77.3%	-	13.6%	22
10	emancipation	9.1%	86.4%	4.5%	-	22
11	awareness	18.2%	81.8%	-	-	22
12	participation	27.3%	72.7%	-	-	22
13	collaboration	22.7%	77.3%	-	-	22
14	collectivity	31.8%	68.2%	-	-	22
15	dialogue	4.5%	90.9%	-	4.5%	22
16	support	22.7%	77.3%	-	-	22
17	transparency	13.6%	77.3%	-	9.1%	22
18	trust	13.6%	77.3%	-	9.1%	22
19	commitment	18.2%	77.3%	-	4.5%	22
20	motivation	22.7%	72.7%	-	4.5%	22
21	impartiality	18.2%	68.2%	-	13.6%	22
22	progress	18.2%	77.3%	-	4.5%	22
23	professionalism	13.6%	81.8%	-	4.5%	22
24	environmentalism	18.2%	77.3%	-	4.5%	22
25	purpose	9.1%	77.3%	-	13.6%	22
26	originality	27.3%	68.2%	-	4.5%	22
27	personal development	4.5%	90.9%	-	4.5%	22
28	respect	4.5%	81.8%	-	13.6%	22
29	wellbeing	13.6%	81.8%	-	4.5%	22
30	effect change	27.3%	72.7%	-	-	22

Appendix I

Table 25

Table 25
Drawing of conclusions for each P2P-SVT.

Hypotheses	*Hypothesis 1*	The uncovered social value was created from the ground up as a result of P2P energy sharing	**H1**
	Hypothesis 2	The uncovered social value already existed and was reinforced by P2P energy sharing	**H2**
	Hypothesis 2	An antagonistic version of the uncovered social value already existed but was modified by P2P energy sharing	**H3**
	Hypothesis 4	The uncovered social value did not apply to P2P energy sharing	**H4**

Assessment tools	*Questionnaires*	Social values-based questionnaire	**AT1**
		Ex-ante assessment questionnaire	**AT2**
		Ex-post assessment questionnaire	**AT3**
	Creative Research Methods	Storytelling	**AT4**
	Observation-based methods	Unstructured observation	**AT5**
	Document Analysis	Project website	**AT6**
		Associated scientific publication	**AT7**
	Indirect Measures	Numerical data analysis of the end-user involvement with the project	**AT8**
		Numerical data analysis of the responses to the social values-based questionnaire	**AT9**

P2P-SVT	**Social values terms linked to this P2P-SVT**	**Associated LVBIs**	**P2P-SVT identification using each assessment tool** (N/A – not identified; YES – identified; INC – inconclusive)								
			AT1	**A2**	**AT3**	**AT4**	**AT5**	**AT6**	**AT7**	**AT8**	**AT9**
1. belonging	accessibility; belonging; identification; inclusiveness; integrativeness	LVBIs: 1; 15; 33; 36-37-38; 40-41; 44; 48; 63; 95; 111; 138; 166	H2	N/A	N/A	N/A	N/A	YES	N/A	YES	N/A
2. achievement	accomplishment; achievement	LVBIs: 10; 19; 52; 73; 104; 110; 146	H2	YES	N/A	N/A	N/A	YES	YES	N/A	N/A
3. responsibility	accountability; duty; responsibility	LVBIs: 3; 5; 6; 10; 26; 28; 33; 97; 99; 100; 138; 166	H2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	YES
4. gratitude	appreciation; contentment; gratitude; happiness	LVBIs: 35; 48; 110	H2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5. recognition	acknowledgement; recognition	LVBIs: 1; 4; 15; 35; 36-37-38; 48; 52; 63; 95; 99; 100; 110; 111; 113; 138; 166	H2	N/A	INC	N/A	N/A	N/A	N/A	N/A	N/A
6. resilience	adaptability; dynamism; flexibility; resilience	LVBIs: 33; 95; 104; 108; 110; 111; 113; 138; 166	H2	N/A	N/A	N/A	N/A	N/A	N/A	YES	N/A
7. altruism	altruism; assistance; caring; compassion; concern for others; generosity; helpfulness; goodwill; selflessness; solidarity; volunteering; willingness	LVBIs: 40-41; 44; 48; 95; 108; 111; 138; 166	H2	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A
8. coercion	authoritarianism; coercion; control; discipline; obedience; power; order; rigour	LVBI: 97	H4	N/A	N/A	N/A	YES	N/A	YES	N/A	N/A
9. influence	influence; leadership; power; status	LVBIs: 63; 110; 111; 113; 146; 167	H2	N/A	N/A	N/A	N/A	YES	N/A	N/A	N/A
10. emancipation	autonomy; capacity building; capability; confidence; critical thinking; emancipation; empowerment; free will; freedom; independence; independent thinking	LVBIs: 6; 19; 73; 100; 104; 110; 111; 113; 138; 166	H2	YES	YES	YES	N/A	N/A	YES	YES	N/A
11. awareness	awareness; concern; consciousness; knowledge; education; learning; understanding	LVBIs: 19; 52; 73; 100; 104; 110; 111; 138; 166	H2	YES	YES	YES	N/A	N/A	YES	YES	N/A
12. participation	compliance; contribution; participation	LVBIs: 3; 4; 10; 48; 63; 95; 111; 113; 138; 146; 166	H2	YES	YES	YES	N/A	N/A	YES	YES	YES

(*continued on next page*)

Table 25 (*continued*)

13. collaboration	collaboration; cooperation; interactivity; reciprocity; sharing; synergy; teamwork	LVBIs: 40-41; 48; 63; 95; 97; 111; 138; 166	H2	N/A	N/A	YES	N/A	YES	N/A	YES	YES
14. collectivity	commonality; common sense; community / collectivity / sense of group; connection; locality; oneness; shared prosperity; togetherness; unity	LVBIs; 40-41; 44; 95; 108; 111; 138; 166	H2	YES	YES	YES	N/A	YES	N/A	N/A	N/A
15. dialogue	communication; dialogue	LVBIs: 26; 48	H2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	YES
16. support	coordination; guidance; service; support; backing	LVBIs: 26; 28; 33; 48; 95; 97; 138; 166	H2	N/A	YES	YES	N/A	N/A	YES	N/A	YES
17. transparency	clearness; comprehensibility; directness; intelligibility; openness; palpability; perceptibility; tangibility; transparency	LVBIs: 26; 48; 99	H2								
18. trust	credibility; honesty; loyalty; reliability; trust; trustworthiness	LVBIs: 6; 15; 26; 48; 99	H2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19. commitment	commitment; dedication; determination; diligence; effort; engagement; involvement	LVBIs: 3; 4; 5; 10; 26; 28; 33; 48; 63; 95; 100; 108; 110; 111; 113; 138; 166	H2	YES	N/A	YES	N/A	YES	YES	YES	YES
20. motivation	active citizenship; drive; encouragement; initiative; inspiration; interest; motivation; optimism; proactivity; wilfulness; zeal	LVBIs: 5; 35; 36-37-38; 95; 100; 104; 110; 111; 138; 166	H2	N/A	N/A	YES	N/A	N/A	N/A	YES	YES
21. impartiality	democracy; social equality; equity; ethics; fairness; gender equality; impartiality; integrity; social justice	LVBIs: 15; 26; 33; 36-37-38; 44; 48; 99; 111; 138; 166	H2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	YES
22. progress	development; growth; improvement; progress; success; prosperity	LVBIs: 63; 111; 138; 146; 166	H2	YES	N/A	YES	N/A	YES	N/A	N/A	N/A
23. professionalism	formalism; professionalism	LVBIs: 26; 28; 33; 48; 95	H2	N/A	N/A	YES	N/A	N/A	N/A	N/A	YES
24. environmentalism	environmentalism / care for nature; sustainability	LVBIs: 111; 146	H2	23x	N/A	YES	N/A	YES	N/A	N/A	N/A
25. purpose	focus; meaning; purpose; vision	LVBIs: 4; 95; 100; 104; 108; 110; 113; 146; 166	H2	N/A	N/A	N/A	N/A	YES	N/A	YES	N/A
26. originality	authenticity; creativity; innovativeness; insightfulness; originality; pioneering spirit; resourcefulness; uniqueness	LVBI: 146	H2	YES	N/A	YES	N/A	YES	N/A	N/A	N/A
27. personal development	personal development; personal growth; self-expression	LVBIs: 19; 52; 73; 104; 108; 110; 111; 113	H2	N/A	N/A	YES	N/A	N/A	N/A	YES	N/A
28. respect	respect for others; tolerance	LVBIs: 33; 36-37-38; 44; 111	H2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
29. wellbeing	satisfaction; wellbeing	LVBIs: 19; 35; 36-37-38; 63; 73; 95; 104; 108; 110; 111; 113; 138; 166	H2	N/A	YES	YES	N/A	N/A	N/A	N/A	N/A
30. effect change	impact; make a difference; effect change; significance; usefulness; utility; value creation	LVBIs: 4; 19; 36-37-38; 40-41; 52; 73; 95; 104; 108; 110; 111; 113; 138; 146; 166	H2	YES	YES	YES	N/A	YES	YES	N/A	N/A
31. advocacy	advocacy; activism; militancy; influence peddling; backing (a cause); championing; endorsement	LVBI: 146	H2	YES	N/A	YES	N/A	N/A	N/A	N/A	N/A
32. long-sightedness	long-sightedness; aspiration; contemplation; intention; expectancy; anticipation; prospect; foresight; forethought; outlook; prescience; projection; desire; wish; hope	LVBI: 111	H2	YES	YES	YES	N/A	N/A	N/A	N/A	N/A
33. curiosity	curiosity; expectation; eagerness; inquisitiveness; inquiringness; interestingness	N/A	N/A	N/A	N/A	YES	N/A	N/A	N/A	N/A	N/A

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