Borrowing, energy demand and Covid-19: a model for disruption

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Abstract

The sustainability of sharing economy business models, where less frequently-used items like power drills, carpet cleaners and jigsaws are borrowed rather than purchased, is often assumed. Multiple social and environmental benefits are associated with the more efficient use of resources that such models offer, focusing on the act of borrowing. However, little is known about the implications of borrowing models on energy demand. This paper examines a specific community-based model for borrowing, called Library of Things (LoT) in London, UK and the ways through which it is connected to energy demand. In examining the connection between energy demand and borrowing the paper pursues an ambitious agenda of contributing towards two important gaps in understanding energy demand and particularly its connections to borrowing: energy demand's "narrowness" and "invisibility". The connections between energy demand and the community-based model of borrowing is analysed through the lens of wellbeing, uncovering a powerful connection between the three but also pointing to an important gap in the current model for borrowing. The paper considers the disruptive changes to the LoT borrowing model which came with the global pandemic, revealing the deep-rooted invisibility of energy demand in borrowing and its powerful linkages with wellbeing. The paper puts forward important questions for understanding the relationship between borrowing and energy demand.

Based on observations, interviews and focus groups carried out in 2020 and 2021, the paper finds that energy intensive items like carpet cleaners constitute over 70 % of borrowing and are most frequently borrowed. However, associated energy demand is invisible in borrowing, while the borrowing model is driven by customer experience (good quality and durability of items), leading to environmental trades off. Only a small percentage of choices that users make over what is borrowed, how frequently and how it is used in the home are driven by the cost of energy and the energy intensity of the item. The global pandemic disrupted the LoT's model of operation, making visible the energy demand of items in the LoT and for customers, amplifying further the importance of energy intensive items. With the expansion of LoT operations within the UK even during the pandemic, this case study offers important lessons for the development and scaling up of borrowing models.

Introduction: sharing economy, borrowing and Library of Things

The global COVID pandemic which started in 2020 fundamentally changed many things, almost overnight. How we buy, where we buy, how we travel, where we travel and who we travel with. In some respects it fundamentally undermined the existence of carefully nurtured and encouraged practices and behaviour which support more sustainable way of living. Sharing spaces and items with others (be it strangers, friends of family) at times was strongly discouraged, disrupting established models of sharing, and in some cases stopping them altogether.

The sharing economy involves heterogeneous practices and sectors, ranging from for-profit to non-profit initiatives (Schor, 2014; Acquier et al, 2017), which enable sharing of access to goods and services, often facilitated by a community-based online platform" (Mi & Coffman, 2019). Borrowing is considered to be in the 'inner loops' of a circular economy (sharing, maintenance & reuse) which are at the core of preserving the value of an asset.

This paper examines a specific community-based model for borrowing, called Library of Things (LoT) in London, UK and the multiple ways through which it is connected to energy demand. In examining the connection between energy demand and borrowing the paper pursues an ambitious agenda of contributing towards two important gaps in understanding energy demand and particularly its connections to borrowing as a distinct part of the sharing economy: energy demand's "narrowness" and "invisibility". The connections between energy demand and the community-based model of borrowing of the LoT is analysed through the lens of wellbeing, uncovering a powerful connection between the three but also pointing to an important gap in the current models for borrowing. The paper considers the disruptive changes to the LoT borrowing model which came with the global pandemic, revealing the deep-rooted invisibility of energy demand in borrowing and its powerful linkages with wellbeing. The paper puts forward important questions for understanding the relationship between borrowing and energy demand and brings out to light/elaborates the connections and relationships between energy demand and models of borrowing.

At the time of writing this is one of the few attempts to closely examine the linkages between borrowing and energy demand, and to reflect on and learn from the emerging community-based model of borrowing (Library of Things) in the UK, which has been rolled out in several parts of London, and has inspired several spin offs in the making elsewhere. Although this paper does not seek to make claims about the alleged environmental impact of borrowing, in particular in terms of energy, it does aim to expose the implications of invisibility of energy in borrowing/sharing practices and make recommendations on how it can be addressed moving forward with the expansion of the sharing economy.

The borrowing model of Library of Things, like many other sharing economy services, is primarily promoted on the back of its environmental benefits: promoting a more sustainable use of resources by favouring access over ownership, less things going into landfill, and more recently, leading to less carbon emissions. It also promotes economic benefits (it is cheaper to rent than buy) and social benefits (community building). This particular model of borrowing falls neatly withing the broader framework of sharing economy's 'feel good' stories (Murillo et al., 2017). However, the nature of the sharing economy is contested and complex, and can aggregate different types of environmental, social and economic promises, framings and values (Acquier et al, 2017). The most borrowed items in the LoT before and during the pandemic are electrical items: pressure washer, carpet cleaners; hedge trimmer. Interest in and borrowing of these items during the pandemic intensified. Electrical waste is the fastest growing waste stream in the world, its environmental impact comparative to that of plastic.

This paper raises the questions: How does energy demand manifest in the way borrowing is organised? And to what extent have the interlinkages between energy demand and borrowing been disrupted by the global COVID pandemic?

Section 2 of this paper introduces the notions of sharing and borrowing and how these are characterised at the community level, and goes on to expand on the useful frameworks for thinking about energy demand and wellbeing. Section 3 presents the methodology for data collection and analysis, and introduces the Library of Things case study. Section 4 presents an analysis of the energy demand, borrowing and wellbeing, before and after the start of the pandemic. Section 5 offers conclusions and recommendations for bringing to light the connections between energy demand and borrowing.

Literature review and concepts: unpacking borrowing, community-based models, energy demand and wellbeing

SHARING ECONOMY AND BORROWING

Although many definitions of the sharing economy exist, in the context of borrowing Schor's (2014) definition provides a most suitable description: activities which deal with the "recirculation of goods, increased utilization of durable assets, exchange of services, and sharing of productive assets" (p. 2). Borrowing is about sharing underutilized assets in business models which can be for profit or not-for profit (Botsman, 2013). It often implies a sense of collective property or belonging to a community, often enabled by digital, profit-driven platforms (mobile application or website) that connect consumers to a service or commodity on-demand (Cockayne, 2016). In the context of borrowing, access (albeit temporary), rather than ownership, to consumption resources is provided for a fee or for free (Eckhardt and Bardhi, 2016). Often access is targeted at a community, cultivating a demand for the access services (Stephany, 2015).

Understanding the motivation for borrowing is the first step to beginning to understand the relationship between energy demand and borrowing. Motivations, in turn are part of understanding some of the paradoxes and tensions of the effects and logics of the sharing economy, and why some sharing economy business models reproduce wasteful consumer practices (Acquier et al, 2017). Acquier et al (2017) identify three foundational cores of the sharing economy: *access* economy, *platform* economy, and *community-based* economy, driven by different motivations and logic.

The access economy offers greater and cheaper access to services for customers, and more intensive use of products, thus promoting a more sustainable way of using resources 'trapped' in a given product (Firnkorn and Müller, 2011). However, as Acquier et al (2017) point out, tensions and paradoxes of this mode of sharing can limit their social and environmental impact. For example, since individuals are paying for a temporary service, they lack incentives to treat products with care (Bardhi and Eckhardt, 2012) which could in turn lead to higher need for repair and maintenance, and less intensive use or shorter use life. There are still gaps in understanding differences in environmental impact from products based on their robustness and the quality and number of repairs. While the access economy might tackle the underutilization of resources that

stand idle (environmental promise), they also make products more accessible and generate new uses (social and economic promise), ending up with additional resources being used by the community as a whole, the "Jevons Paradox". Depending on how products or services are consumed, and the way things are shared, sharing may push people to consume more energy (Jonas & Artho, 2019). Sharing economy initiatives can thus generate 'rebound effects' that are detrimental to environmental stewardship (Demailly and Novel, 2014), or stimulate unsustainable consumer behaviour such as indulgent consumption (Parguel et al, 2017). The social and economic promises of greater access to resources might thus run counter to the environmental promise of greater resource efficiency. Böcker and Meelen (2017) and Wilhelms et al (2017) suggest that users' environmental motivations are often of secondary importance to sharing economy business models, with leading role being taken by the social promise of the sharing economy, promoting cheaper access to services.

The sharing economy is believed to foster new models that enable innovative ways for the use of resources (Curtis & Mont, 2020; Laukkanen & Tura, 2020) and promote sustainable growth and energy efficiency (Kaushal, 2018; Munoz & Cohen, 2017). However, research on sharing economy and energy efficiency is subject to critical debate (Cherry & Pidgeon, 2018; Liu, Feng, Wang, & Guo, 2019). Various studies claim that the sharing economy helps to save energy, reduce waste, carbon footprints and emissions (Belk, 2014; Leismann, Schmitt, Rohn, & Baedeker, 2013; Plewnia & Guenther, 2018) while other researchers assert the opposite (Jonas & Artho,2019). It is believed that the sharing economy decreases the overall consumption and the associated level of resources usage (Ala-Mantila, Ottelin, Heinonen, & Junnila, 2016; de Leeuw & Gössling,2016) and that the overconsumption of natural resources is the main reason for environmental change (Piscicelli, Cooper, & Fisher, 2015; Surya et al., 2020). Yet, some scholars argue that there is not much empirical research to judge whether sharing reduces the environmental impacts in the long-term (Demailly &Novel, 2014; Ganapati & Reddick, 2018).

COMMUNITY-BASED CHARACTERISTICS

Since this paper analyses a community-based model for borrowing (LoT) it is important to consider the characteristics of community-based economy. Community-based economy usually refers to initiatives coordinating through non-contractual, non-hierarchical or non-monetized forms of interaction, the primary purpose of which is to contribute to a community project, to create social bonding, to promote values or to achieve a social mission through a collective project. Communities traditionally involve strong social ties among close members interacting at a local level (Bowles and Gintis, 2002; Marquis et al., 2011), which can be mobilised through digital technology (particularly during a global pandemic). Community is thus increasingly conceptualized as a type of organizing that involves meaningful and affective relationships based on shared experience or interests (Marquis et al., 2011: xiv). Community-based initiatives are meant to empower communities and serve as a vehicle for wider social change, emancipation and solidarity.

Acquier et al (2017) unpack initiatives, such as access platforms, which give access to underutilized resources, or services, through digital platforms. With technological advancements, digital platforms provide faster, less expensive, and innovative ways for delivery products and services to meet user needs. Access platforms optimize the usage of durable goods and allow greater access to expensive goods, and thus help to fulfil the environmental and social promise of the access economy (Eckhardt and Bardhi, 2016). In addition, they benefit from the advantages of the platform economy (Srineck, 2016) by leveraging the monitoring properties of digital platforms to providing advice for usage. Another initiative recognised by Acquier et al (2017) involves community-based platforms, which orient the purpose of the platform towards the community interest. Community-based access offers greater access to underutilized resources and services at the community level and thus aims to fulfil the economic, social, and environmental promises.

WIDENING UNDERSTANDING OF ENERGY DEMAND

The notion of energy demand captures all uses of energy: electricity, transport fuels and fuels for heating and industrial processes. Discussions of energy demand in the context of energy often focus on the energy necessary to produce an item vs the number of times this item is used. Less frequently used items in households such as power drills (power drills are one of the most frequently borrowed items in the LoT) will have higher associated energy demand over their lifetime. 90 % of all the energy used during the entire lifespan of a power drill is used in the first phase. Due to the shortage of usage, only 2 % are used during its use phase (WRAP, 2010). Were it used more often, the overall energy consumption would not change much, whereas buying a new one would have a great impact (Najine, 2017). Products which use a lot of energy during manufacture/production have a huge potential for resource and energy savings through borrowing, as they are used multiple times. However, this paper examines a less studied aspect of energy demand and borrowing, in the so-called use phase. For the purposes of this paper, energy demand here refers to the energy necessary to charge, use, clean and maintain items subject to borrowing, such as power drills, carpet cleaners and power washers.

The nature of borrowing, as discussed in the LoT case study straddles issues around behaviour at multiple levels: individual/household, community and organisational (LoT). Cass and Shove (2017) argue that one of the dominant ways of conceptualising energy demand is as an outcome of behaviour, (rational or non-rational/subjective) choices that people make having weighed up the costs and benefits of different options, given certain levels of information, time and money. Another key way of conceptualising energy demand is as an outcome of socio-technical change, an outcome of what people do as that is shaped and formed by established and novel socio-technical systems of transport, leisure, consumption etc. Change occurs as nascent systems involving different technologies and networks of actors appear, become embedded and eventually supplant previously dominant arrangements. Thus, energy demand is seen as a complex emergent property of people's involvement with multiple socio-technical regimes across different areas of everyday life (Cass and Shove, 2017).

Borrowing, in particular the borrowing journey and the model through which borrowing takes place plays a very important role in shaping energy demand. Ultimately the energy demand associated with borrowing depends on multiple, het-

erogenous aspects (social, technical, economic, natural), such as the user and their needs, wants and preferences; and the technical, built and/or living environment of users, which are defined by *where*, *by whom* and *for what purpose* are the borrowed items are being used. However, a focus on the borrowing journey and model allows us to adopt a wider view of the range of heterogenous aspects that shape and (re)produce the energy demand associated with borrowing beyond the specificity of personal circumstance, such as the way energy and energy demand are embedded/built into the borrowing journey and model, for example, how are they discussed through the borrowing journey online? As the borrowing model discussed in this paper is community-based, the analysis looks towards the specific relationships and drivers which shape borrowing and energy demand at the community level. With adopting a wider perspective of the drivers of the relationship between energy demand and borrowing, the paper also opens up to a greater complexity of the relationships under analysis, as through borrowing Things/items move from one specific environment/system of application (the kiosk) to another (someone's home) (Royston et al, 2018). The adopted wider perspective also aims to address the 'narrowness' of energy demand identified by Shove (2017b), reflecting a tendency to conceptualise energy as a quantifiable resource, the consumption of which is taken to indicate 'demand' (Shove, 2017b). Such approaches suppose that people need energy, that such needs should be met, and that these needs and demands are independent of mediating infrastructures, technologies, practices or policies. Thus, the paper aims to integrate and bring into the main stream energy demand discussion the role of such mediating infrastructures, technologies, practices and policies which shape associated energy demand.

While some may wonder why the focus of this paper is on the seemingly less important aspect of energy demand in the context of borrowing, this research was inspired by Royston et al's (2018) concept of 'invisible' energy demand. Royston et al (ibid) employ 'invisible' to refer to non-energy policies which have been unacknowledged, or insufficiently acknowledged, impacts on energy demand. The authors recognise that, in actuality, the boundaries between the 'visible' and 'invisible', and between 'energy' and 'non-energy', are always complicated and blurred. 'Visibility' is always a matter of degree and relative (a local energy manager will likely be more aware than her superiors of the potential repercussions of a new institutional strategy for energy demand). In this paper, rather than focusing on borrowing policies, we examine a borrowing model (LoT), as existing successful models codify the unspoken, official and common rules, principles and activities which shape borrowing. Widening understanding of energy demand and actively seeking to uncover and analyse the ways in which energy demand is invisible in the LoT model for borrowing is carried out through consideration of wellbeing.

WELLBEING

The World Health Organization (WHO) discussed mental health as: '… a state of wellbeing in which the individual realises his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community' (Herrman et al. 2005). Wellbeing is linked, among other things, to being able to cope with problems and crises in life; and being interested and involved in things in their lives (Donovan et al. 2003). There are multiple frameworks for conceptualising wellbeing, placing emphasis on physical and/or mental wellbeing, and emerging from clinical studies. For the purposes of this paper will utilise the so-called 'ABC' framework for wellbeing, which offers a practical understanding of the drivers of wellbeing, crossing over between the individual and community levels.

ABC stands for Act-Belong-Commit. The three verbs 'act', 'belong', and 'commit represent the three major domains of factors considered to contribute to good mental health (Donovan et al. 2003). Act refers to keeping mentally, socially, spiritually and physically active and engaged. Belong refers to developing a strong sense of identity and belonging by keeping up family relationships, friendships, joining groups, and participating in community activities. Commit captures the need to do things that provide meaning and purpose in life, such as taking up challenges, supporting causes and helping others. Overall, ABC encourages people to be physically, spiritually, socially, and mentally active, in ways that increase their sense of belonging to the communities in which they live, work, play, and recover, and that involve commitments to causes or challenges that provide meaning and purpose in their lives. These three behavioural domains contribute to increasing levels of positive mental health and wellbeing, as well as physical health (Patterson, 2009; Barry et al. 2005). They also present a hierarchy for increasing levels of involvement, and thus a deeper contribution to wellbeing. While Belong is about building and maintaining connections with others, including community and civic organisations and institutions, Commit involves doing things that provide meaning and purpose in life, including taking up causes and volunteering that helps society and other individuals (Donovan and Anwar-McHenry, 2015).

There are well established and analysed linkages between wellbeing and energy demand, particularly in the context of fuel poverty and vulnerability, energy efficiency and energy security (three big discourse topics in energy research). For example, there is multiple literature dedicated to how energy efficiency measures can support good physical and mental health, by creating healthy indoor living environments with healthy air temperatures, humidity levels, noise levels, and improved air quality. While failure to meet energy demand, leading to chronic thermal discomfort and fuel poverty also has negative mental health impacts (anxiety, stress, and depression). Thus, energy efficiency improvements can improve mental wellbeing, especially when combined with strong community engagement (IEA, 2019).

There is also emerging literature which examines the potential of sharing economy in the energy sector in the context of energy storage services, blockchain applications, mobility-as-a-service solutions, and the development of community solar or energy trading virtual marketplaces (Egana-del Sol and Nungsari, 2019), with poorly articulated linkages to wellbeing but emerging articulations of how these emerge at the community level. However, at the time of writing this paper, the authors were unable to find any discussions articulating the linkages between energy demand, borrowing and wellbeing, despite the existence of obvious logical linkages between energy demand and community building, nor borrowing as a conduit of maintenance, repair and upgrading of the built environment.

Methods and introduction to the case study of Library of Things

METHODOLOGY

The data informing this paper is qualitative and has been collected through a survey (with 156 responses) with LoT members, two focus groups (involving a total of 17 people) and 19 individual interviews with borrowers, LoT team and volunteers for the Things on Wheels trial, as well as 3 interviews with other LoT borrowing schemes in the UK in 2020 and 2021. Almost all data collected for the project was carried out entirely online, through Microsoft Teams. Slack and Zoom interactions. One socially distanced observation of cleaning and maintenance of borrowed items was observed in person at the Big Yellow Storage Units in use by the LoT at the time in July 2020.

The survey consisted of 10 questions and asked borrowers about what drives borrowing and what are the most important factors when they are considering borrowing an item from the LoT. The survey then asked questions specifically about whether participants purposely try to save energy/reduce your energy use within their household and the extent to which how much energy a Thing uses influence borrowers' decision on whether to borrow or not; and whether the amount of energy a borrowed item uses affects how and when it is used. Further questions went deeper into understanding whether energy used or the cost of energy were considerations in how often items are being borrowed. The survey was carried out in the first stage of the project and the responses informed the questions developed for the focus groups and interviews during the second stage of the project. The focus groups and interviews were used to i) engage more extensively with more vulnerable borrowers, who were harder to engage through the survey, and ii) prompt people to discuss in more details the relationships or *lack of* between the energy used by borrowed items in their home and drivers, likelihood and desire to continue to borrow through the LoT model. The different data collection methods used in the research were complementary and the focus groups were instrumental in providing relevant information pertaining to the invisibility of energy in borrowing. The collected qualitative data was coded and analysed using open coding (Blair, 2015) and the analysis was led by key themes identified through the data collection.

Although the overall project engages with LCA, it does so without attempting to carry out a full LCA on any items borrowed, and is not a method used in this paper. LCA is discussed in a follow-up paper focusing on the three most frequently borrowed items. This research was entirely conducted during the first year of the pandemic (between March 2020 and 2021). Although it was originally planned to examine how repair and maintenance were organised as part of borrowing, maintenance practices were significantly reduced and changed during the pandemic. For example, weekly volunteer repair workshops have stopped taking place since March 2020 and are yet to resume.

INTRODUCING THE LIBRARY OF THINGS CASE STUDY

Although there is a growing body of literature on the practices and drivers behind sharing, there is less available information, case studies and analysis on practices of borrowing, and more specifically on the connections between energy demand and borrowing. The latter relationships will depend on the specific model of borrowing, from the items that can be borrowed, the drivers for borrowing, the rules and values that guide the practices involved in borrowing, to the ways in which items are being used during borrowing, and items are repaired, maintained and put back into circulation. The purpose of this paper is to unpack and detail the broad borrowing journey of the LoT, and identify key points of this journey through which the connections between energy demand and borrowing are defined and (re)produced. This section outlines the community-based borrowing model of LoT in Crystal Palace, London.

A community-based borrowing model

The current model of LoT has emerged through several years or experimenting, starting in 2014 through grassroots community activism. The model went through several different stages, starting from civic mode of operation to finally emerge as a standalone business model for borrowing, which is financially sustainable. Although many commercial and civic borrowing models have emerged in the past decade (e.g. Edinburgh Tool Library, Share sheds, Fat Lama to name a few), many have failed only after a couple of years.

The LoT model is community-based as it depends on strong ties with the local community, which are carefully nurtured through local partnerships (such as the Norwood Library in Crystal Palace); direct and sustained engagement with local borrowers (with the LoT being responsive to borrowers' needs); and an empowerment and education agenda, focusing on the environmental benefits of borrowing vs buying and owning items which are less frequently used. The local community is engaged with the borrowing model through regular consultations on the items available for borrowing (for example, during the pandemic LoT added a second pressure washer and a Nintendo game to aid in home entertainment for local children). Another powerful way of engaging the local community is by getting them to "adopt" the items through naming them. For example, *Jazzy the Jigsaw* was a popular item for borrowing during the first lockdown in 2020. Rather that borrowing an item, the LoT create a borrowing journey using a constant stream of examples, photos and finding ways to celebrate the things that can be achieved through borrowing (such as little stories about the *before* and *after* borrowing, of painted doors, trimmed hedges and cleaned carpets). The LoT see borrowing as a pathway to customer experience leading to a permanent change in individuals' lifestyle.

But what distinguished the LoT model of borrowing from other borrowing schemes (such as in B&Q) are the customer service and the focus on building a local community of individuals who share the ideals of borrowing. To achieve this the LoT are introducing an explicit set of shared norms and expectations around ownership, usage and maintenance and repair, through the borrowing journey, social media posts and the set of supporting activities that they have in place locally, such as repair cafes. Developing and nurturing engagement with local communities is carried out through roles such as *Things Wizzards* (the people responsible for maintenance and cleaning of borrowed items) and *Community Energisers* (who work with community partners such as the Transitin Town network and play a key role in highlighting how the LoT serves local communities). A key claim made by the LoT is that for every £10

that local people spend borrowing with LoT, £8.50 stays local, helping to create jobs for people in the community. In addition, the LoT relies on a steady stream of users who volunteer to carry out repairs, maintenance, collections and deliveries of items for borrowing. Seventy percent of borrowers live within a mile of the borrowing kiosk (this distance doubled during the Covid Things on Wheels trial).

The LoT are not only building a community of local borrowers but also educating them to integrate borrowing into their daily lives to show them how and why borrowing matters (saving waste and looking after the environment). The LoT CP claims that each year, 170 million new electrical items are purchased in the UK, with less than a third recycled. Borrowing infrequently used items is a simple way to reduce the amount of items that end up in landfill. Since May 2018, the LoT has estimated that its members have borrowed items over 3,000 times and have diverted over 16 tonnes of waste from landfill.

LoT's focus on customer services is driven by the expectation that borrowers are not borrowing primarily out of environmental concern. A smooth and satisfactory customer experience drives all aspects of the borrowing journey, from item selection to how many times borrowers would need to click in order to complete the borrowing process. The quality of the experience in using an item and its durability are the two drivers of what items are purchased for borrowing. In practice this means that most electrical items, which are also the most frequently borrowed items, are industrial strength. Another important aspect of the borrowing journey is the ease of borrowing, which involves providing friendly guidelines for use and (in pre-COVID times) fully charged and ready to use items. The LoT website is specifically designed to follow certain steps in line with a *good* customer experience and are constantly reviewed and updated to improve performance. The LoT borrowing kiosks are easy to use and have user-friendly opening hours. The borrowing process does not include deposits or involve negative or technical language. The company constantly monitors and adjusts the service it provides to save borrowers money (for example, borrowing costs are set to be between 5 % and 10 % of the purchase price and 25 % less of the cost of borrowing through commercial models), effort and time, and to make borrowing enjoyable.

The LoT kiosk at Crystal Palace offers 50 items for borrowing at any given time, with an additional 20 items which were changed depending on the season. Before the start of the global pandemic, the most borrowed items through included the pressure washer, carpet cleaner, steam cleaner and hedge trimmer. Less frequently borrowed, but still utilised roughly around 50 % of the time were the waffle and ice-cream makers, sewing machine and drill. The LoT uses 4 criteria in deciding what to items to stick for borrowing: 1) what works for borrowing (can it be maintained, stored and cleaned?); 2) community demand; 3) ethical and environmental considerations (for example, no leaf blowers); and 4) is it available anywhere else.

Analysis

ENERGY DEMAND AND BORROWING

Although the majority of the borrowers try to save energy or reduce their energy use within their household through small changes, borrowing an item from the LoT is driven first and foremost by the cost saving (e.g. that it is cheaper to borrow than to buy); in second place by the need to carry out an activity (such as carpet cleaning); and lastly by concern for the environmental impact of buying an item which will not be used most of the time. How much energy an item uses or the cost of energy does not influence borrowers decision on whether to borrow or not. For a small percentage (20 %) of borrowers energy use matters but only when borrowing items that use a lot of energy or need to be charged. For most borrowers (70 %) how much energy an item uses does not impact on the frequency of borrowing. A smaller percentage of borrowers consider the energy use only for items which use a lot of energy, or limit themselves to borrow only when they absolutely need to. Only 10 % of the survey respondents were inclined to avoid borrowing items which need to have their batteries charged before being returned or used.

Energy demand is not at the forefront of borrowers minds or motivations, and is mostly invisible in the borrowing journey through the LoT. In fact, investigation of the LoT borrowing model revealed that energy is an invisible element of borrowing, both in the way borrowing is organised by LoT and in how and why items are used by borrowers within their homes. There are multiple reasons for this invisibility. Despite an engagement process which aims to cultivate a community of environmentally conscious borrowers, LoT's guidelines for use and engagement through their website, kiosk and aftercare include limited information on charging and battery usage at home, such as the model of the batteries and how to charge the batteries optimally. There is no information on the average energy used by the item or advice on how to reduce this. The LoT had put in considerable effort in translating manufacturing details to aid a smoother and more pleasant borrowing experience for customers, providing easy to use cleaning and care guides. However, most manufacturers do not provide any useful information with regards to the carbon footprint and energy performance of electrical items, and energy has not been considered an important aspect of the borrowing journey by the LoT.

Before the pandemic, electrical items not in use were plugged in to charge at the Library Kiosk. The process of charging was part of the borrowing 'display' and could be observed through the kiosk windows for each item. A special light indicated that items were in the process of charging, while the times were used to ensure that after receiving full charge the electricity supply will automatically switch off, retaining the integrity of the battery for longer and minimising the waste of energy. Thus most electrical items with batteries were charged at the kiosk and could normally be used without additional charging remaining an invisible part of borrowing at both the LoT and user ends. The invisibility of energy demand in borrowing can also be explained with the invisibility of energy cost and demand for the way the LoT operate. The LoT kiosk is situated within a community space (a library) and pays a rent for its premises which include the cost of utilities. This largely removes the pressure on the LoT to monitor or evaluate its policies and rationale in the context of energy, and the energy used for the charging, maintenance, cleaning and repair at the kiosk, keeping energy demand hidden. Furthermore, although the LoT website (borrowing platform) is designed to monitor the customer experience in terms of criteria such as cost, effort and level of engagement, it is not currently used to facilitate reduction in energy

demand or use through borrowing. The lack of importance of energy demand for the LoT translates into lack of importance for the borrowers, (re)producing energy demand as invisible, in line with Royston et al's (2018) definition. Borrowing is thus treated as a non-energy activity, with unacknowledged, or insufficiently acknowledged, impacts on energy demand. The boundaries between the 'visible' and 'invisible', and between 'energy' and 'non-energy' were blurred through the changes necessitated by the pandemic creating an opportunity to see the role of energy demand in borrowing in new light.

ENERGY DEMAND, BORROWING AND WELLBEING DURING THE PANDEMIC

In March 2020 the COVID pandemic led to the closure of the Library where the LoT kiosk in Crystal Palace was located and the company swiftly introduced a trial called Things on Wheels. Things on Wheels offered free delivery and collection of 15 items that could be borrowed through the LoT website. For the duration of the trial collections and deliveries were carried out by local volunteers who would travel up to 11 miles per day, collecting and delivery items to and from borrowers. Unable to use their kiosk the LoT moved its operation to a nearby Big Yellow Storage facility where it rented two rooms. One (shown on Photo 1) was used to store items which could not be cleaned between borrowing (such as Jazzy the Jigsaw) and instead were left for the recommended 72 hour period before being used again. The room was also used to store cleaning products. The other room became a cleaning facility, with one clean side from where sanitised items were collected by volunteers for delivery, and one "dirty" side where volunteers dropped off items that have been collected from borrowers. A small cleaning caddy (depicted on Photo 2) was used to move cleaning products between the two rooms. The most disruptive aspect of the pandemic to the LoT borrowing model was the lack of access to electricity and water. Although the storage areas had lighting, there were no plugs where items can be plugged in and charged or tested. Equally, there was no access to water facilities where items could be cleaned and tested (e.g. flushing of the carpet cleaner).

The importance of access to energy for the functioning of the LoT borrowing model suddenly became visible to the LoT. Not able to offer charged batteries or test the equipment, LoT changed its policy and asked borrowers to test items before use and to charge the batteries before they were collected to be returned. This necessitate the development of additional guidelines, protocols and prompts for borrowers on how to identify and deal with issues which were previously resolved inhouse. In energy terms, the Things on Wheels trial increased the energy demand associated with borrowing electrical items for some, shifting the act of charging entirely to borrowers. During this period of borrowing the popularity of electrical items like carpet cleaners and pressure washers increased significantly. With one volunteer lamenting that every single shift involved the collection and delivery of at least one carpet cleaner and quite often "the nightmare scenario of having to collect or deliver more than one [carpet cleaner] … with all its faffing, rearranging and thinking about what would fit in the boot of my car and what wouldn't, what was clean and what wasn't, and whether I needed to change my route and go back to the storage and drop one off before it becomes too complicate and I lose track of things". With many people unable to work and spending more time at home, the energy use and cost of increased domestic energy demand had the potential to make some borrowers think twice about borrowing, plugging and charging for others.

However, for the majority of borrowers energy demand associated with borrowing remained invisible during the pandemic, and many were surprised to consider that they have never thought about the connection between borrowing and the energy that this involves. As Borrower H (2020) explained "you don't really think about it, the energy. You think about how much it is per day to borrow and might even try to do it as quickly as possible but not about how much energy it uses or how much that costs". Borrower A commented that when they borrowed the carpet cleaner they thought that "it was in fact a good deal, because it comes with all bits that you need, the consumables, all the little things that you wouldn't think that you need and discover that you are missing only when you try to turn it on and start cleaning".

Others were aware of the energy cost and that they now needed "to use extra energy" (Borrower D, 2020) but saw it as

Figure 1. LoT storage unit used to leave collected items for 72 hours during the pandemic.

Figure 2. Tray with cleaning products used to sanitised items collected from customers.

a form of service to the local community. Borrower D commented that although usually careful about how much energy is being used and making sure that no lights are left unnecessary on, describing the whole household as constantly looking to make small adjustment to ensure that "we are doing our bit for protecting the environment and saving energy", saw the need to charge the batteries of the carpet and pressure washer borrowed during the pandemic as the "communal … right thing to do" For Borrower D this service fell outside of the usual energy practices of the household. Borrower A thought of charging the batteries for the next user as being considerate, "as they might not be able to charge it right away but might need the item urgently". Some borrowers were not sure if they had charged the battery as requested but hoped that they have also done their bit "to help other borrowers and the LoT". Although the majority of borrowers didn't feel like they were more concerned about their energy use during the pandemic, they did speak about the ways through which energy demand has increased. With the carpet cleaner becoming an ever so popular item of borrowing during the pandemic, one borrower explained that "with everyone spending more time at home, things like carpets, sofas, cushions and blankets get dirtier quicker and you are kinda sitting in your bedroom or living room and that tiny stain on the edge of the room is all you see and it suddenly becomes imperative that you do something about it … things that I wouldn't have noticed or wouldn't have bothered me before, because I was in and out most of the time, now become a priority". Another borrower concurred that the opportunity to have the items delivered and collected from their doorstep nudged them to finally borrow that carpet cleaner or pressure washer and get something done. For an elderly Borrower F it meant an opportunity to use the bulky and heavy carpet cleaner "without having to lug it around the bus or ask my sister for a lift to the Library".

For other borrowers energy demand depended on what they needed to get done, with "keeping getting on with things" a strong motivation for many. The need to keep doing things and "keeping oneself busy" was a priority for many borrowers which overrode any other considerations that might have been at the top of their minds previously, such as being kinder to the environment. Many interviewed borrowers have not considered the energy implications of borrowing and whether it enabled them to carry out activities that they would otherwise refrain from performing. Being able to borrow heavier things (through the new delivery service) and participate in this communal model was seen as a positive thing, as was borrowing to carry out activities associated with keeping oneself busy, active and looking after ones home during the pandemic.

There were a few exceptions with borrowers who actively tried to manage their energy use and although wanted to use some of the items available for borrowing would not do so because they didn't know how much energy that would cost them. Borrower G spoke about wanting to borrow a carpet cleaner to clean their old carpets in the house but resisting to do so because they didn't know if that "is not going to put another fiver on the meter, if I do all the carpets in the house". Instead, Borrower G washes the carpet by hand, knowing that "it will never make it as clean as it could be if cleaned with a machine". For those borrowers the cost of energy and how much energy an item would use is as important as the cost of borrowing and they spoke about opting to do things themselves (such as hand washing the carpet) or postponing doing things until it is really needed.

All interviewed borrowers were aware of and spoke about the environmental benefits of borrowing, with some treating it as a cheaper and better option for things that are needed from time to time, while others thought that borrowing would become more widely practiced and were actively thinking about "what else we can borrow". For many, more borrowing equates to showing more care for the environment and investing in their local community. Although LoT provides guides for using electrical items which includes advise on optimal usage and charging of batteries, at present there is no specific information about the energy intensity of individual electrical items. Most borrowers have also not been deterred in borrowing because of the need to charge batteries of electrical items during the period that LoT was operating from the storage lockers, where it was not possible to plug in chargers.

Many assumed that LoT would have chosen environmentally friendly and efficient items to start with because of the perceived strong environmental credentials of the organisation. Although some expressed an opinion that they would welcome more environmentally friendly items, others made it clear that they preferred more powerful electrical items, such as carpet cleaners which "would do the job quicker and save energy that way".

BORROWING AND WELLBEING IN A GLOBAL PANDEMIC

Although the pandemic imposed restrictions on the movement and gatherings of people (during parts of the lockdowns people in London were advised to leave their homes once a day/only when necessary and were advised against gathering inside) and introduced new elements to the exchange and sharing of goods and services (such as the need for social distancing, the need to wear face masks and to wash everything that was touched) the feeling of contributing to and belonging to a community played an important role in continued borrowing. Interactions with LoT volunteers who made possible the contact free delivery and pick up trial service during the pandemic called Things on Wheels indicate that for some, contributing to a local community become a more prominent driver to get involved in local initiative than before the pandemic. The volunteers who have gotten involved with LoT did so because they were either on furlough and/or not able to carry on working in dancing, performance, retail and catering (all jobs strongly impacted by the pandemic). Although all volunteers were offered the opportunity to borrow for free every few weeks during volunteering, not all of them have borrowed any items or planned to do so in the near future. As LoT Volunteer A (2020) explained "I could get [i.e. borrow]one of the pasta makers or ice-cream makers for free, that's true, but it also involves a lot of extra cost, buying ingredients. Right now it is all about survival and we focus on the bare minimum. Once this [the pandemic] is over I would like to borrow some of the things they have … Sometimes when I collect things from borrowers I chat to them and ask them what they have been doing and they show me their projects and what they have made. I think this looks fun … I would like to try it".

Two other LoT Volunteers, B and C, also talked about the personal positives of volunteering, as giving them "somethings

nice to look forward to in the week" and a way of "socialising with people" during the pandemic. The LoT volunteers were encouraged to chat to borrowers when dropping off and collecting items and to ask questions about what they have been doing. Many commented that borrowers were mostly only too happy to tell them their plans and even show them what they have done, as well as to pose for pictures with the items they have borrowed.

All volunteers were driven by the desire to take action against the "destructive impact of the pandemic on people's lives" and saw volunteering for LoT as a way of being able to contribute towards their community and avoid seeing "good local initiatives perish during the pandemic, like my job and my career". This was mirrored by some borrowers who found things to do around their homes and continued to borrow to "keep them [LoT] going".

Although the majority of survey participants indicated that in borrowing they were driven primarily by the need to carry out an activity and concern for the environmental impact of buying an item that would not be used all the time, concerns about wellbeing emerged as a strong theme in direct discussions with borrowers during interviews and focus groups. Wellbeing was connected to the desire to develop and nurture feelings of belonging to a place and community, and fighting feelings of being "helpless" and "idle". For some participants borrowing a pressure washer to spruce up the communal path or courtyard gave them an opportunity of "doing something" and "still making things happen". For others borrowing enabled them to contribute to and support their community, by trimming hedges, developing outside meeting or seating spaces for others, or painting their doors bright pink "to cheer people up".

From a wellbeing perspective, although the main drivers for borrowing tend to be linked to the cheaper cost of borrowing in comparison to buying, during the pandemic borrowing enabled multiple different ways of contributing to personal and community sense of wellbeing. For many the sense of belonging to a 'desirable' community of borrowers was not only linked to place, e.g. a street, a neighbourhood, a postcode or a cul-de-sac but was also strongly linked to the environmental credentials of borrowing, highlighted by the LoT. For many borrowing through the LoT was seen as an overall positive action towards reducing items "ending up in landfills" and supporting a good environmental model.

Borrowing, energy demand and wellbeing: conclusions and recommendations

With the fast-growing interest in borrowing, not only across the capital London but throughout the UK, and the expansion of the LoT community-based model (since the start of the project three more LoTs have opened up in London alone, with plans for more in Hastings and Cambridge) the community-based model of borrowing seems to offer an appealing service for many. The success of the community-based model seems to build as much on the desire of people to invest in and contribute to the development of local community initiatives, as it does on an environmentally friendly branding, which reduces the need of landfills and carbon emissions. During the pandemic wellbeing started to feature more prominently in the reasons for borrowing and the way borrowed item were used in the home and as part of the borrowing cycle. Disruptive changes to the borrowing model due to the pandemic did increase interest in the borrowing of more energy intensive items, such as carpet cleaners and pressure washers, and although made the energy demand of items more visible to both the LoT and borrowers, it did not lead to changes within the organisational (LoT), community or individual levels that recognise the implications of borrowing/the borrowing model on energy demand. Some changes introduced during the Things on Wheels trial (at the first 6 months of the pandemic) such as the new delivery and collection service were retained, making borrowing more accessible for people with restricted mobility. This service has also amplified demand for larger and energy intensive items such as carpet washers.

A surprising element of the study were the powerful linkages between borrowing and wellbeing, and the implications that these have for energy demand. For many borrowing enabled different ways of "keeping going" and fighting negative feelings of being "helpless" and "idle". Wellbeing was also presented in the way people borrowed to cope with the new demands of spending more time inside their homes and was an enabler for looking after others, by making outside spaces more appealing and accessible. Even volunteers who did not feel they could borrow at this point of time felt connected to the local community and their contribution to borrowing helped them nurture feelings of belonging. These powerful ways of seeking and contributing to wellbeing through borrowing during the pandemic shrouded the associated energy use in a positive light. Charging batteries became a way of supporting a local environmentally positive initiative (the LoT), a way of showing care for the next user, but mostly, rather than being perceived as an additional activity which is making use of energy at the home and costing money, borrowing and its associated impact on energy demand remained invisible for borrowers, something firmly outside of the way they organised their energy use on a daily basis.

Overall, the powerful connection between wellbeing and borrowing might be able to, at least partially, account for activities that were carried out during the pandemic, which might not have taken place without the borrowing model.

On one hand the community-based model for borrowing of the LoT is built around a distinctive claim for alleviating the environmental cost of buying things which are used only from time to time. The promised reduction of landfill waste and carbon emissions associated with borrowing are part and parcel of the model which is *for* the local communities in which it is being used. However, these environmental credentials are based on overall use of electrical items such as carpet cleaners and pressure washers, while the environmental impact of the borrowing model (including what items are made available for borrowing) and its implication for energy demand remain unknown, and invisible, particularly to customers. On the other hand, the focus on providing a good customer borrowing experience means that LoT suppliers industrial strength items for borrowing, without considering their energy intensity or the associated energy demand. Energy demand is also not part of the borrowing experience, with no information provided in terms of average energy use or advise on how to use the produces more efficiently.

Although the nature (whether overall positive or negative) of the impact of the powerful connections between wellbeing

and borrowing during the pandemic are yet unclear, these connections can be usefully expanded to include an explicit link to reducing energy demand through borrowing and contributing to grand social challenges and objectives such as Net Zero by 2050. This would involve making the multiple ways in which energy underpins and enables borrowing and fulfilment of needs and desires by borrowers, to complete an activity or contribute to their own wellbeing by feeling of belonging, visible. The visibility of the energy demand associated with borrowing, both for the LoT and borrowers, will open up opportunities for more equitable and just development of community-based models for borrowing, which could narrow the gap between experiences between borrowers, and be more accessible for people like the LoT volunteers and Borrower G. Furthermore, a community-based model should be accessible to people with different experiences and status within the community, rather than serve a homogenous group of people across different locations.

Considering some of the inherent trade-offs within the LoT model between providing industrial quality items for better customer experience and the reliance of the model on claims of reducing the environmental impact of activities associated with cleaning, DIY and entertainment, more complex social and environmental values can be developed and delivered through community-based borrowing as the model is scaled up across geographic areas and groups of people. If unchallenged, successful models for community-based borrowing can enable activities and practices at individual and community level which lead to more carbon emissions and the use of additional energy rather than nurture a more sustainable attitude towards energy demand. Not explicitly addressing the energy demand impact of borrowing through the community-based business model will also be a lost opportunity for empowering individuals and communities to understand and act on their environmental impact in a more systemic manner, rather than treat borrowing as an environmental get out of jail card, which offsets additional environmental impact from related activities. The existing engaging digital platforms and social media channels developed by LoT offer powerful ways of engaging current and future borrowers with a more visible and prominent understanding of the impact of borrowing on energy demand, to deliver a more ambitious environmental offering.

References

Acquiera A, Daudigeos T. and Pinkse, J. 2017, Promises and paradoxes of the sharing economy: An organizing framework, Technol. Forecast. Soc. Chang 125, 1–10.

Barry, M. M., Domitrovich, C., & Lara, M. A. 2005, The implementation of mental health pro-motion programmes . IUHPE: Promotion and Education (Suppl 2), 30–35.

Blair, E. 2015. A reflexive exploration of two qualitative data coding techniques. J. Methods Meas. Soc. Sci. 6 (1), 14–29.

Böcker, L., & Meelen, T. 2017. Sharing for people, planet or profit? Analysing motivations for intended sharing economy participation. Environmental Innovation and Societal Transitions, 23, 28–39.

Botsman, R. 2013. The sharing economy lacks a shared definition. Fast Company.

Cass, N. and Shove, E. 2017, Changing energy demand Concepts, metaphors and implications for policy Insights across DEMAND, http://www.demand.ac.uk/wp-content/uploads/2016/07/Changing-energy-demand.pdf.

Cockayne, D. G. 2016. Sharing and neoliberal discourse: The economic function of sharing in the digital on-demand economy. *Geoforum*, 77, 73–82.

Dabbous, A. and Tarhini, A. 2021, Does sharing economy promote sustainable economic development and energy efficiency? Evidence from OECD countries, Journal of Innovation and Knowledge, 6, 58–68.

Donovan, R.J. and Anwar-McHenry, J. 2015, Chapter 11: Promoting Mental Health and Wellbeing in Individuals and Communities: The 'Act-BelongCommit' Campaign, in Walter W. Wymer (ed) *Innovations in Social Marketing and Public Health Communication*, Cham: Springer, 215–226.

Donovan, R. J., Watson, N., Henley, N., Williams, A., Silburn, S., Zubrick, S., James, R., Cross, D., Hamilton, G., & Roberts, C. 2003, Mental health promotion scoping project . Report to Healthway. Perth: Centre for Behavioural Research in Cancer Control, Curtin University.

Egana-del Sol, P.A. and Nungsari, M. 2019, Sharing Economy and the Future of Energy, in *Affordable and Clean Energy*, Walter Leal Filho, Anabela Marisa Azul, Luciana Brandli, Amanda Lange Salvia, Tony Wall (ed.), https://doi.org/10.1007/978-3-319-71057-0_37-1.

Eckhardt, G. M., & Bardhi, F. 2016. The relationship between access practices and economic systems. Journal of the Association for Consumer Research, 1 (2), 210–225.

Herrman, H., Saxena, S., & Moodie, R. (Eds.). 2005. Promoting mental health: Concepts, emerging evidence, practice. Geneva: World Health Organization.

IEA, 2019, Multiple Benefits of Energy Efficiency, IEA, Paris https://www.iea.org/reports/multiple-benefits-of-energy-efficiency.

Mi, Z. & Coffman, D'M. 2019, The sharing economy promotes sustainable societies, COMMENT https://doi.org/10.1038/s41467-019-09260-4.

Murillo, D., Buckland, H., Val, E., 2017. When the sharing economy becomes neoliberalism on steroids: unravelling the controversies. Technol. Forecast. Soc. Chang.

Najine, A. 2017, Libraries of Things as a new form of sharing. Pushing the Sharing Economy, The Design Journal, 20: sup1, S3294-S3304, DOI: 10.1080/14606925.2017.1352833.

Patterson, A. 2009, Building the foundations for mental health and wellbeing: Review of Australian and international mental health promotion, prevention and early intervention policy. Hobart: Department of Health and Human Services.

Royston, S. Selby, J and Shove, E. 2018, Invisible energy policies: A new agenda for energy demand reduction, Energy Policy 123, 127–135.

Schor, J., 2014. Debating the Sharing Economy. In: Great Transition Initiative.

Stephany, A. 2015. The Business of Sharing – Making it in the New Sharing Economy. New York, NY: Palgrave MacMillan.

Wilhelms, M.-P., Henkel, S., & Falk, T. 2017. To earn is not enough: A means-end analysis to uncover peer-providers' participation motives in peer-to-peer carsharing. Technological Forecasting and Social Change.