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PAD

HUMANIZING ENERGY

PAD. Pages on Arts and Design
International, peer-reviewed,
open access journal
founded by Vanni Pasca in 2005

Publishing Consultant
Vincenzo Castellana, Architect, Italy

Art Direction
Francesco E. Guida

Web Site
Pietro Forino, www.pietroforino.com

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Publisher
Aiap Edizioni
via A. Ponchielli 3 – 20129 Milano – Italy
aiap@aiap.it – www.aiap.it

PAD © ISSN 1972-7887
#26, Vol. 17, June 2024
www.padjournal.net

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VALUES

ENERGY CULTURES & BEHAVIOURAL CHANGE

Towards Design Fiction for Human-Centered Energy Transitions

Imagining Infrastructures and Worldbuilding

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Keywords
Design Fiction, Energy Transitions, Worldbuilding, Infrastructure, Design Anthropology.

Abstract
This article proposes to support human-centered energy transitions through design fiction. Design fiction is conceptualized as a form of worldbuilding in the sense that design fiction not only represents alternative realities but also intervenes in the processes of their emergence. For the context of energy transitions, this article proposes to approach worldbuilding through an understanding of and engagement with energy infrastructures.
The distributed agencies and lengthy time horizons that characterize infrastructural development pose interesting challenges for designers and can be subverted by leveraging the poetic and aesthetic qualities of infrastructure through design fiction.
The article discusses such aspects of energy infrastructures and expected developments in the transition to renewable energy. The approach is illustrated using seven emerging energy worlds, and future steps are identified to develop these into proper design fiction further. Overall, our approach draws together technological, political, and economic trends in the energy sector and provides pointers for designers and artists to intervene and co-shape energy transitions.

1. Introduction

Energy transitions are multidimensional and distributed processes that unfold over multiple decades. This creates challenges for designers who intend to intervene, as a local, human-centered focus is quickly overshadowed by systemic and infrastructural issues (Van Leeuwen & Singh, 2023). Furthermore, energy systems and infrastructures emerge through the distributed agency of many actors, including engineers, policymakers, and administrators, which raises questions about the impact a single designer can make. To address these challenges, this article proposes using *design fiction* to support shifts in values, mindsets, and practices across the distributed networks that shape energy transitions. Through this use of design fiction, the agency and autonomy of all who co-shape energy transitions are acknowledged and respected, as opposed to intervention through political or technological means.

The approach is fleshed out using the concept of *worldbuilding,* which we interpret in two different senses. First, worldbuilding serves to construct representations of alternative and emerging realities. Through worldbuilding, designers and artists can draw the interrelations between emerging technologies, political-economic structures, sociocultural values, and novel forms of community organization, all of which are important aspects of the transition from fossil to renewable energy. Second, by invoking worldbuilding, we recognize and utilize the performativity of design fiction, as it has the capacity to *intervene* in emerging energy transitions. By stimulating the imagination and critical reflection, design fiction can shape sociocultural values and meanings of energy tran-

sitions, thereby intervening in the coming about of alternative realities and emerging worlds.

This article proposes to take energy infrastructures as an entry point to characterize how such worldbuilding might occur in the context of energy transitions. Infrastructures draw together technological innovations, political regimes, economic paradigms, and cultural meanings, thus providing a natural underpinning for building an integral vision of alternative futures. Furthermore, infrastructural developments are at the core of the transition to renewable energy. This paper draws from various scholarly perspectives on energy infrastructures, which serves to understand how design fiction can represent various energy transition realities and intervene in emerging infrastructural developments.

Finally, we illustrate our approach by sketching seven *emerging energy worlds* and identifying future steps to turn these into complete design fictions. Overall, this approach to design fiction serves to shift mindsets and value judgments among the distributed actors that co-shape energy transitions.

2. Design Fiction as a Form of Worldbuilding

An early, important work on design fiction is the 2009 essay *Design Fiction* by Julian Bleecker. In his account, design fiction inhabits a middle ground between science fiction and science fact, combining creative speculation with a grounded understanding of real possibilities. He further characterizes this using the term diegetic prototypes, which denotes how speculative technologies, products, or services are experi-

enced by subjects in their idiosyncratic manner. Since then, design fiction has been adopted by the design research community and explored from various perspectives, including user personas and scenarios, narratology and literary theory, and speculative and critical design (Baumer et al., 2020).

This article proposes to understand design fiction through the concept of worldbuilding. We draw from the work of Coulton et al. (2017), who argue that design fiction is a form of worldbuilding rather than a form of storytelling or narrative. They retain the diegetic perspective – i.e., a first-person, subjective view "from within". However, instead of focusing on characters and plotlines, Coulton et al. (2017) emphasize how design fiction can reveal the elements of an imaginary world, as well as the meanings and interrelations of such diverse aspects. This way, design fiction imagines how technoscientific prototypes interact with individual human understandings, situated cultural meanings, and greater societal structures and systems. Design fiction can represent alternative worlds and realities by understanding worldbuilding in this manner.

There is an important second sense in which worldbuilding can be understood, as design fiction can also enact and perform worldbuilding in the social context where it is deployed. This perspective builds on authors like Markussen et al. (2020), who propose that design fiction should be understood through its potential to create social transformation rather than its ontological foundations. Another proponent of this approach is Zaidi (2019), who suggests that designers can support the transformation of cultural meanings and societal

structures through worldbuilding practices. Various applications of design fiction show how such transformations can concretely manifest. For example, Wu et al. (2019) use design fiction to stimulate ethical awareness and reflection among professionals, and Blythe et al. (2016) show how design fiction subverts solutionist thinking. Furthermore, the field of design anthropology may provide useful pointers, as it combines an understanding of emergent, alternative worlds with interventionist and performative action (Smith & Otto, 2016; Halse & Boffi, 2016; Singh, 2019). Building on such perspectives, this article proposes to use design fiction to support co-shapers of energy transitions in their judgments, reflections, practices, and actions. It does so by pointing toward alternative realities and possibilities, illustrating the diverse ways sociocultural meanings and values can manifest.

3. Energy Infrastructures as a Starting Point for Worldbuilding

This section argues that infrastructures form an interesting point of departure for worldbuilding due to their interconnective, heterogeneous, and pervasive nature. By discussing various important dimensions of energy infrastructures, including their political, economic, and aesthetic dimensions, a conceptual toolbox is constructed to conduct worldbuilding in the context of energy transitions.

First, we argue that an understanding of infrastructures creates an integral picture of a world that ties together technology, societal structures, cultural values and meanings, and individual, subjective perspectives. Infrastructures can

be considered the backbone of modern civilization, as they create the interconnective tissue for the flow of people, materials, and ideas (Larkin, 2013). More than a material network of interconnected technological components, infrastructural ecosystems consist of entangled technologies, administrating organizations, financial techniques, and regulatory structures (Hughes, 1983). As such, infrastructures create the enabling background conditions for society to function.

In particular, energy infrastructures are closely tied to political and economic systems. In his 2011 work, *Carbon Democracy: Political Power in the Age of Oil*, Timothy Mitchell analyzed how the materiality of coal- and oil-based infrastructures co-shaped with the political paradigms of their time. While labor-intensive coal logistics enabled worker strikes and hence socialist politics, oil pipelines and extraction wells centralized control with Western governments and corporations. Dominic Boyer (2019) provided a more present-day perspective, who coined the term *energopower* to show how wind energy development in Mexico co-developed with diverse political and institutional processes, including the interests of local indigenous groups.

Whilst this is only a brief indication of the significance of these works, they show the necessity for worldbuilding practices in the energy context to take matters of power and politics seriously and how infrastructural properties shape these. In the second, interventionist sense of worldbuilding, infrastructures pose interesting challenges for designers. Thomas Hughes' 1983 book *Networks of Power* shows these in two important ways. Firstly, the electrical grid is shown as a fun-

damentally distributed system where no single actor controls its development. While individual entrepreneurs like Edison played an important role, competing systems and models emerged in diverse regulatory regimes and geographical contexts, stabilizing beyond the control of any individual actor. Designerly intervention in infrastructural development must somehow account for this distributed agency. Furthermore, Hughes described how various phases of infrastructural development unfolded over decades. The long development time of infrastructures means there is a fundamental uncertainty about how early interventions will develop over time.

To deal with these challenges, we propose that designers can participate in infrastructural change by supporting informed reflection, decision-making, and judgement for people who are a part of infrastructural ecosystems. Design fiction can support this by leveraging the *aesthetic* dimension of energy infrastructures. This aspect is identified by Brian Larkin (2013), who argues how the materiality of infrastructure – e.g., the concrete of a road or the iron of industrial machinery – produces a certain aesthetic sensibility in the beholder, which shapes the subjective meanings associated with the infrastructure. He also argues that infrastructures have a *poetic* quality, as they are often associated with promises and visions of societal progress. Since infrastructures are so extensive and heterogeneous, Larkin argues that the definition of an infrastructure is a political act. This would make exploring energy infrastructures through design fiction a political project in its own right, as would how designers give shape and form to the aesthetics of infrastructures. This article holds that leverag-

ing the aesthetic and poetic qualities of infrastructures within design fiction is a promising avenue for designers to pursue and co-shape infrastructural developments. This is opposed to traditional forms of product design, which occupy a limited space downstream of an infrastructural ecosystem and are subject to dominant economic and political paradigms.

4. Infrastructural Innovation in the Transition to Renewable Energy

Having established the relevant aspects of energy infrastructures for worldbuilding, this section discusses the infrastructural overhaul required for the renewable energy transition, touching on technological, political, and social dimensions. The current electrical grid is organized in a hierarchical, centralized manner, as it transports electricity from a few centralized power plants to many end-consumers. Renewable energy requires a fundamentally different, more decentralized architecture. Solar and wind energy are geographically dispersed, and new sources of flexibility are required to compensate for the uncontrollability of the weather. Under the smart grid paradigm, digital technologies are expected to play a larger role in data collection, predicting future energy flows, and controlling the grid (Skjølsvold et al., 2015). Furthermore, new end-user-facing technologies are also emerging, such as electric vehicles, smart home energy systems (Geelen et al., 2013), and digital energy platforms (Boekelo & Kloppenburg, 2023).

Existing research provides several pointers for understanding these developments' political, economic, and aesthetic qualities. A common expectation is that bottom-up actors like

prosumers and energy communities gain power by practicing *energy citizenship* and *energy democracy* (Wahlund & Palm, 2022). Households and communities can become more autonomous by utilizing locally sourced renewables and energy storage, such as batteries. Hence, the renewable energy transition may not only lead to a more distributed infrastructural architecture but also a more decentralized political system (Funcke & Bauknecht, 2016). At the same time, the increasing reliance on smart technology may centralize control in the hands of a select few actors, as has been the case in other sectors. Since smart technology is associated with technocratic and solutionist forms of governance, its use in energy systems may have a depoliticizing or even *antipolitical* effect (Sadowski & Levenda, 2020). An example of this could be *demand response* practices, which are techniques for grid operators to steer behavior using price signals to secure the grid's stability (Calver & Simcock, 2021).

Similar arguments can be made about novel modes of energy exchange. A common expectation is that households will evolve from consumers of energy to *prosumers* of energy who engage in peer-to-peer (P2P) energy trading on local energy markets. While this is often hailed as a positive and empowering development, it is not difficult to recognize the framing of the *homo economicus* in these perspectives, where end-users of energy are seen as rational individuals who are optimizing for self-interests (Singh, 2019; Singh et al., 2017). This approach may be distinguished from perspectives on energy communities, where access to energy resources is shared collectively (Bauwens et al., 2022), the energy justice framework which prioritizes a just

distribution of costs and benefits (Hanke et al., 2021), and alternative forms of energy exchange which prioritize social relations (Singh et al., 2018). While these discussions briefly show what contested aspects of renewable energy infrastructures are emerging, they indicate potential directions designers and artists may explore in their worldbuilding efforts.

5. Seven Emerging Energy Worlds

The above sections discuss what could be the conceptual building blocks for designers and artists to explore the significance of energy transitions through worldbuilding. This section presents early versions of what we take to be *emerging energy worlds*. These worlds are constructed using concepts discussed above and from empirical research conducted in a local energy transition project in Amsterdam South-East. Through ethnographic fieldwork and co-creation sessions, the authors explored tensions between diverse stakeholders, the potential for community involvement, and the design of infrastructural innovations. This research is not further elaborated within this paper, but for more details, readers can refer to Van Leeuwen & Singh (2023) and Van Leeuwen & Singh (2024).

The worlds described here are not exhaustive of all possibilities but indicative of directions that might be pursued in future work. For the present article, these worlds are described at a high level – they are not complete design fiction but provide directions for further development. If sections provide the grounding realities of 'science fact,' the section proposes avenues for creative speculation. Several steps should be taken to further develop these directions into concrete design fic-

tion. For each emerging energy world, suggestions are made about what these steps could look like.
The first step is to consider the *transformative purpose* of the design fiction, i.e., the shifts in mindsets, values, or practices this design fiction should support. The second step is determining the *social context* in which it will be deployed, regarded, and explored. Design fiction may be strategically mobilized within projects, networks, or organizations that make up the process of infrastructural development. The third step is to define the *aesthetic form* the design fiction will take, including the subjective perspective from which the energy world is perceived. This is crucial for creating immersion and imagination beyond present-day constraints and realities.

5.1. A Crumbling Grid

What would the world look like if the electrical grid failed to provide a stable electricity supply and the power went out for days or weeks? Supply chains, digital communications, digital payments, and other systems we have taken for granted could fail and become inaccessible. As a result, authorities might implement emergency measures to reduce and control energy consumption to safeguard the grid's stability.

- **Transformative purpose**: to make people aware of the crucial reliance of our society on the electrical grid and how it enables our daily practices.
- **Social context of intervention:** with end-users of energy, i.e., citizens who are not particularly aware or conscious of how the grid is functioning.

- **Aesthetic form:** a day-in-the-life of end-users of energy to explore how daily life is impacted by a lack of stable electricity supply.

5.2. Techno-Capitalist Monopoly

What if large technology corporations assume complete control over the energy system and own the energy supply and grid infrastructure? Such actors could use advanced technologies like artificial intelligence to predict and control energy flows in the grid, which would be completely invisible to outsiders. Volatility in energy markets could increase corporate profits at the expense of household energy expenditures.

- **Transformative purpose**: to make people aware of the consequences of excessive use and reliance on smart technology and free market mechanisms.
- **Social context of intervention:** with technologists, innovators, and economists in the energy sector, to explore the consequences if a technology-centric, market-based approach is taken too far.
- **Aesthetic form:** a speculative smart energy product-service system or a "job-of-the-future" description for a smart energy technologist working at a large technology corporation.

5.3. Autonomous Energy Community

What if local communities isolated themselves from the rest of the system, aiming to become as independent as possible? Such tight-knit communities might jointly share access to energy resources without a notion of individual ownership. Technical skills in infrastructural maintenance would be

highly valued, and social relations could be characterized by in-kind exchanges.

- **Transformative purpose**: to support reflection on an approach to energy systems that prioritizes social relations and values rather than technology and efficiency.
- **Social context of intervention:** with citizens looking to start an energy community, as well as professionals who develop tools, products, and services for energy communities, or who work with energy communities.
- **Aesthetic form:** a day-in-the-life of members of the autonomous energy community, using visuals that represent local community life.

5.4. Smart Energy Household

What if households embraced smart technology, combining household solar energy, batteries, and algorithms to optimize their own consumption? Automated systems could trade this energy on local energy markets to maximize profit and minimize costs. Through apps and other product-service systems, households are engaged through gamification and energy competitions to change their behavior.

- **Transformative purpose**: to explore peoples' preparedness to adopt new home energy systems and services and to support a more user-centric design of such products.
- **Social context of intervention:** in design and innovation processes where professionals are working on new smart energy systems and services, as well as with potential future adopters of these technologies.

- **Aesthetic form:** a day-in-the-life, or other representation, of how end-users of these speculative technologies adapt their daily routines to a home smart energy system.

5.5. National Energy Commons

What if national governments assumed top-down, technocratic control over the energy supply? Expert knowledge and scientific instruments could be mobilized to meet national goals for reducing the energy system's CO2 emissions. Energy budgets could be imposed on end-users, and national campaigns could be organized to educate people about energy use and recruit people for energy-related jobs.

- **Transformative purpose**: to stimulate reflection on the controversial decisions that might emerge around energy governance and the degree to which political control should be centralized.
- **Social context of intervention:** with policymakers, energy policy researchers, and anyone else interested in energy system governance.
- **Aesthetic form:** explore decision-maker's perspective in energy governance and the tensions and dilemmas they encounter.

5.6. Smart Energy Hub

What if businesses and commercial actors worked together to better maintain the stability of the local electricity grid? Businesses could strike special contracts with the grid operator to share access to the grid and use smart technology to jointly optimize the use of solar energy, battery and heat storage, and flexible consumption.

- **Transformative purpose**: to support businesses and other commercial actors in collaborating and exploring joint energy transition solutions.
- **Social context of intervention:** with business representatives who are open to exploring collective energy solutions.
- **Aesthetic form:** a speculative contract or interface that represents how energy resources among different actors are interconnected and interoperate, which shows the social agreements that are in place for local energy governance.

5.7. Local Energy Institution

What if the energy system were governed democratically, with local institutions for political decision-making? Such institutions could govern a particular grid section and impose their own form of energy taxes and regulations. They would make political decisions about how scarce energy resources are distributed, exchanged, and organized.

- **Transformative purpose**: to explore what kind of political decisions and reasonings factor into local energy system governance and what a democratic institution in this regard could look like.
- **Social context of intervention:** with policymakers, citizens, researchers, or other professionals interested in exploring alternative forms of local energy system governance.
- **Aesthetic form:** represents the perspective of local leaders or politicians who are tasked with making decisions about local energy system governance.

6. Towards Design Fiction for Human-Centered Energy Transitions

Transitions and infrastructural developments unfold over decades, and, likely, many future developments in technology, governance, and economy cannot be foreseen. Furthermore, the extensive scale and distribution of agency in systemic transitions is such that local, human-centered interventions are limited in scope. This article provides pointers for how design fiction can serve to intervene at a local level while not losing sight of greater systemic trends.

While this article aims to make steps toward developing design fiction that supports the emergence of human-centered energy transitions, these efforts are far from complete. From the descriptions provided in Section 5, several important steps still need to be taken to develop design fiction, as we have defined in this article. Design fiction should go beyond textual descriptions and consist of visual and material prototypes. Such prototypes should illustrate diverse aspects, including the social, political, and technological, at various scales, including local, national, and global, and through diverse perspectives, including end-users, professionals, or decision-makers. While we intend to explore these in future work, we encourage other designers, artists, and researchers to do the same.

Design fiction can support nuanced perceptions, reflections, and actions among energy transition actors by sensitizing people to these diverse realities and possibilities.

References

Baumer, E. P. S., Blythe, M., & Tanenbaum, T. J. (2020). Evaluating Design Fiction: The Right Tool for the Job. In R. Wakkary, & K. Andersen (Eds.), *Proceedings of the 2020 ACM Designing Interactive Systems Conference*, (1901–1913). ACM. https://doi.org/10.1145/3357236.3395464

Bauwens, T., Schraven, D., Drewing, E., Radtke, J., Holstenkamp, L., Gotchev, B., & Yildiz, Ö. (2022). Conceptualizing Community in Energy Systems: A Systematic Review of 183 Definitions. *Renewable and Sustainable Energy Reviews*, *156*, 111999. https://doi.org/10.1016/j.rser.2021.111999

Bleecker, J. (2009). Design Fiction: A Short Essay on Design, Science, Fact, and Fiction. In S. Carta (Ed.), *Machine Learning and the City* (pp. 561–578). Wiley. https://doi.org/10.1002/9781119815075.ch47

Blythe, M., Andersen, K., Clarke, R., & Wright, P. (2016). Anti-Solutionist Strategies: Seriously Silly Design Fiction. In J. Kaye, A. Druin, C. Lampe et al. (Eds.), *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems* (pp. 4968–4978). ACM. https://doi.org/10.1145/2858036.2858482

Boekelo, M., & Kloppenburg, S. (2023). Energy Platforms and the Future of Energy Citizenship. *Energy Research & Social Science*, *102*, 103165. https://doi.org/10.1016/j.erss.2023.103165

Boyer, D. (2019). *Energopolitics: Wind and Power in the Anthropocene*. Duke University Press.

Calver, P., & Simcock, N. (2021). Demand Response and Energy Justice: A Critical Overview of Ethical Risks and Opportunities Within Digital, Decentralised, and Decarbonised Futures. *Energy Policy*, *151*, 112198. https://doi.org/10.1016/j.enpol.2021.112198

Coulton, P., Lindley, J., Sturdee, M., & Stead, M. (2017). Design Fiction as World Building. In *Proceedings of the 3rd Biennial Research Through Design Conference* (pp. 163–179). https://doi.org/10.6084/m9.figshare.4746964.v1

Funcke, S., & Bauknecht, D. (2016). Typology of Centralised and Decentralised Visions for Electricity Infrastructure. *Utilities Policy*, *40*, 67–74. https://doi.org/10.1016/j.jup.2016.03.005

Halse, J., & Boffi, L. (2016). Design Interventions as a Form of Inquiry. In R. C. Smith, K. T. Vangkilde, M. G. Kjaersgaard, T. Otto, J. Halse, & T. Binder (Eds.), *Design Anthropological Futures* (pp. 89–103). Bloomsbury.

Hanke, F., Guyet, R., & Feenstra, M. (2021). Do Renewable Energy Communities Deliver Energy Justice? Exploring Insights from 71 European Cases. *Energy Research & Social Science*, *80*, 102244. https://doi.org/10.1016/j.erss.2021.102244

Hughes, T. (1988). *Networks of Power*. Johns Hopkins University Press.

Larkin, B. (2013). The Politics and Poetics of Infrastructure. *Annual Review of Anthropology*, *42*(1), 327–343. https://doi.org/10.1146/annurev-anthro-092412-155522

Zaidi, L. (2019). Worldbuilding in Science Fiction, Foresight and Design. *Journal of Futures Studies*, *23*(4), 15–26. https://doi.org/10.6531/JFS.201906_23(4).0003

Markussen, T., Knutz, E., & Lenskjold, T. (2020). Design Fiction as a Practice for Researching the Social. *Temes de Disseny*, *36*, 16–39. https://doi.org/10.46467/TdD36.2020.16-39

Mitchell, T. (2011). *Carbon Democracy: Political Power in the Age of Oil*. Verso.

Sadowski, J., & Levenda, A. M. (2020). The Anti-Politics of Smart Energy Regimes. *Political Geography*, *81*, 102202. https://doi.org/10.1016/j.polgeo.2020.102202

Singh, A., Strating, A. T., Romero Herrera, N. A., Mahato, D., Keyson, D. V., & van Dijk, H. W. (2018). Exploring Peer-to-Peer Returns in Off-Grid Renewable Energy Systems in Rural India: An Anthropological Perspective on Local Energy Sharing and Trading. *Energy Research & Social Science*, *46*, 194–213. https://doi.org/10.1016/j.erss.2018.07.021

Singh, A. (2019). *Conceptualizing Inter-Household Energy Exchanges: An Anthropology-Through-Design Approach* [Doctoral Dissertation, TU Delft]. Library. https://doi.org/10.4233/UUID:57BE7165-2726-4A1A-B076-C5ED3988E00B

Singh, A., Strating, A. T., Herrera, N. R., van Dijk, H. W., & Keyson, D. V. (2017). Towards an Ethnography of Electrification in Rural India: Social Relations and Values in Household Energy Exchanges. *Energy Research & Social Science*, *30*, 103–115. https://doi.org/10.1016/j.erss.2017.06.031

Skjølsvold, T. M., Ryghaug, M., & Berker, T. (2015). A Traveler's Guide to Smart Grids and the Social Sciences. *Energy Research & Social Science*, *9*, 1–8. https://doi.org/10.1016/j.erss.2015.08.017

Smith, R. C., & Otto, T. (2016). Cultures of the Future: Emergence and Intervention in Design Anthropology. In R. C. Smith, K. T. Vangkilde, M. G. Kjaersgaard, T. Otto, J. Halse, & T. Binder (Eds.), *Design Anthropological Futures* (pp. 19–36). Bloomsbury.

van Leeuwen, G., & Singh, A. (2023). Local Frictions in the Energy Transition: Design Anthropology for the Emergence of Energy Communities. In M. Cuciurean-Zapan, & E. Hanover (Eds.), 2023 *EPIC Proceedings* (pp. 277–294). Epic. https://www.epicpeople.org/local-frictions-in-energy-transition-design-anthropology-for-energy-communities/

van Leeuwen, G., & Singh, A. (2024). Design Anthropology for Ethics of Care and Emergence: Reflections From an Energy Transition Project. In C. Gray, E. Ciliotta Chehade, P. Hekkert, L. Forlano, P. Ciuccarelli, P. Lloyd (Eds.), *DRS2024: Boston*, (pp. 23–28). DRS. https://doi.org/10.21606/drs.2024.797

Wahlund, M., & Palm, J. (2022). The Role of Energy Democracy and Energy Citizenship for Participatory Energy Transitions: A Comprehensive Review. *Energy Research & Social Science*, *87*, 102482. https://doi.org/10.1016/j.erss.2021.102482

Wu, Y., Lyckvi, S., & Roto, V. (2019). "What is Fair Shipping, Anyway?": Using Design Fiction to Raise Ethical Awareness in an Industrial Context. In S. Brewster, & G. Fitzpatrick (Eds.), *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems* (pp. 1–13). ACM. https://doi.org/10.1145/3290605.3300666

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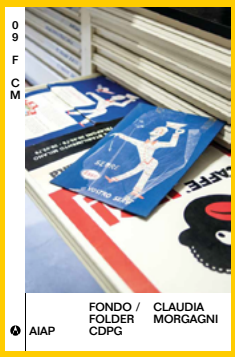

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PAD. Pages on Arts and Design
International, peer-reviewed,
open access journal
ISSN 1972-7887

#26, Vol. 17, June 2024

www.padjournal.net

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associazione italiana design
della comunicazione visiva