

Retracing Critical Energy Fictions with Youth through a Comparative Analysis of Community-Based Interventions

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Abstract

Understanding both human and ecological histories in the Anthropocene demands participatory methods that include diverse voices. This research examines community interventions using worldbuilding, which is a systems-thinking approach that imagines alternative realities and challenges existing assumptions through multi-scale analysis using a timeline tool, which is based on Cultural-historical activity theory (CHAT) as an analytical lens to examine chronological triggers in selected case studies.

Through comparative analysis of six case studies (four Belgian, two Turkish), we investigated how participatory design and youth engagement create critical fictions that question current paradigms and explore alternatives for ongoing energy transitions. We examine the role of emotions in transitions, mostly related to energy, and analyze how worldbuilding tools can deepen or change emotional layers related to participatory transition processes. The analysis identifies design strategies where material and embodied elements make speculative practices concrete and generate emotional resonance.

Results demonstrate that worldbuilding serves as an effective participatory methodology for fostering critical dialogue and envisioning just futures rooted in community knowledge while confronting systemic inequalities. The research particularly emphasizes youth agency, often overlooked but vital in shaping these transformative processes.

Keywords: energy transitions; youth; participatory design; worldbuilding; emotions

Introduction: Setting the Context

The Anthropocene shows its presence through “deepening entanglement of human and more-than-human histories,” demanding we abandon the comfortable fiction of human separateness. Life reveals itself as fundamentally symbiotic; through symbiogenesis and sympoiesis (Tsing et al. 2017), we discover all organisms “tangled up with each other,” bound in “interdependent agential and cognitive systems between humans and non-humans.”

In this entangled world, community-based interventions emerge as laboratories of possibility. Through worldbuilding, critical fictions, and speculative design, they make tangible the complex choreographies of more-than-human relationships. These methods enable “worlding”, which is a process rooted in “historical materialities of meetings between humans and nonhumans”, to create “speculative fabulations” that envision radically different configurations of life.

This work sidesteps the trap of crude anthropomorphism, that peculiar form of human exceptionalism that projects our narratives onto other beings (Chang, 2019). Instead, it cultivates “entirely new modes of attention” attuned to “nonanthropocentric difference” (Haraway, 2016).

Participatory design becomes the vessel for this inquiry, engaging diverse groups, with a specific focus on youth, in reimagining relationships between humans and the more-than-human world. The focus sharpens around critical ecological issues: energy production and consumption, spatial justice, the urgent choreography of ongoing energy transitions.

Critical fictions emerge as potent participatory tools, closely allied with speculative design and design fiction. They harness imaginative thinking to explore potential futures, challenge assumptions, and foster creative problem-solving within energy transitions’ complex terrain.

Rather than seeking immediate answers, they use design as a medium for asking deeper questions, creating “what-if scenarios” and “parallel worlds” that probe established values and transcend perceived limitations.

To analyze these interventions, we employ worldbuilding as a theoretical lens, conducting comparative case studies across six community-based interventions in Belgium and Turkey, based on a selection chosen to span grassroots to municipal engagements across different socio-cultural contexts.

A timeline methodology, developed by Devisch (2018) through Cultural-Historical Activity Theory (CHAT) as popularized by Engeström (1987), reconstructs the chronological progression of selected interventions. We map key stages, durations, and critical ‘tipping points,’ tracing how temporal dynamics shape participants’ emotional landscapes and reveal tacit knowledge.

While digital worldbuilding offers powerful lenses for exploring complex systems, our case studies reveal the irreplaceable value of diverse modalities, including non-digital approaches. Analogue, tangible methods prove essential for accessing “knowledge from below,” vital for pursuing “radical just futures”. It helps in grounding speculative practices in lived realities and ensuring participation beyond digital access or literacy.

Yet something else moves through these participatory spaces; something that resists measurement but shapes everything: the emotional landscapes that emerge when people gather to imagine otherwise. Emotions don't simply accompany worldbuilding; they become its hidden architecture, the invisible scaffolding upon which speculative futures are constructed. A teenager's sudden silence when confronted with climatic disasters, the collective exhale when a group finally names their shared fear, the spark of recognition when someone else's story mirrors your own; these affective moments create the conditions within which new worlds become thinkable.

Our inquiry turns toward these emotional currents, asking how worldbuilding practices don't just engage the mind but activate the full spectrum of human feeling. We begin to notice how certain design strategies trigger emotional responses that either open pathways to collective imagination or close them down, how the materiality creates different affective textures than digital interfaces, and how the temporal rhythms of participatory processes create their own emotional weather systems. The timeline tool becomes not just a method for tracking chronological events, but a way of tracing the emotional geographies that develop as communities move together through speculative territories.

Through this mosaic of worldbuilding lens, temporal analysis, emotional attunement, and diverse engagement modalities, the study seeks novel perspectives on energy systems and spatial justice. It aims toward a framework for co-designing critical fictions in participatory processes with youth: a methodology for imagining otherwise that honors both the rational and the felt dimensions of planetary entanglement.

2. Literature Review

2.1. When Design Becomes Speculation

In the spaces between what is and what could be, speculative design emerges as both methodology and attitude; a way of thinking that refuses the constraints of immediate needs and market demands. These approaches harness imaginative thinking to explore alternative futures, challenge assumptions, and foster creative problem-solving, particularly within energy transitions' intricate choreographies.

Speculative design operates not as pragmatic problem-solving but as a framework for speculating about potential realities, examining broader implications of current trends and proposed solutions (Auger, 2013). It uses design as medium, focusing on concepts and artifacts to ask questions rather than provide immediate answers (Mitrovic et al., 2013). The overlapping territories of Critical Design and Design Fiction share this remove from commercial constraints, employing models, prototypes, and fiction to present alternative products, systems, or worlds (Auger, 2013).

Within this landscape, practitioners distinguish between exploring speculative futures (extrapolations of contemporary systems) and designing alternative presents that reconfigure existing elements, motivations, and structures.

The most poignant speculations stay close to the present, creating “perceptual bridges” between audience’s world and fictional concept through the mundane and familiar (Auger, 2013).

Critical fictions weave themselves into this fabric through deliberate creation of “what-if scenarios” and “parallel worlds”; potent instruments for exploring ramifications and challenging established values. These hypothetical situations provoke deeper thinking, encouraging stakeholders to transcend perceived limitations. When someone imagines a “Positive Energy Neighbourhood,” they enter a low-stakes, imaginative space where energy transition strategies can unfold their possibilities and reveal their shadows.

2.2. The Architecture of Other Worlds

Worldbuilding emerges as the key mechanism through which speculative design and critical fictions operate; the deliberate construction of fictional settings that embody speculative ideas. From visual arts like murals to digital game art, performance scenography, and participatory design, worldbuilding makes alternative worlds visible and tangible.

This methodology draws from phenomenology’s philosophies of experience and pragmatism’s emphasis on praxis, informed by cybernetics and imagism. In participatory contexts, it involves collaboratively creating and playing “design language-games” (Ehn, 2017) that bridge different perspectives and practices. Worldbuilding links to creating “alternative nows”; tangible, present-day examples of different realities (Hickey et al., 2012), while challenging purely linear views of time.

The craft of new worlds involves imagining assemblages otherwise, recognizing the world’s entangled state where opportunities emerge from exchange rather than imposed expectations (Mitrovic et al., 2021). In gaming contexts, worldbuilding becomes continual cross-disciplinary process involving narrative, gameplay, art, programming, and audio, with intentional gaps inviting audience imagination and co-authoring (Tremblay, 2023). These practices gain deeper resonance when explicitly incorporating systems thinking frameworks (Betley et al., 2021). Worldbuilding “depends on systems thinking” (Bucknell, 2025), offering holistic approaches to understanding “multi-scalar relationships and entanglements” within complex systems. Systems thinking moves beyond discrete parts to examine dynamic interactions, patterns, and underlying causes: particularly through leverage points where interventions prove most effective.

Donella Meadows’ work reveals that deeper leverage points at changing system goals or underlying paradigms have far greater potential for lasting change than interventions targeting parameters or buffers (Betley et al., 2021). Critical fictions and worldbuilding function precisely to challenge these deeper points, intervening at the level of mental models—deeply held abstractions, beliefs, and assumptions that drive system function and limit perception of possibility.

The participatory nature of community-based interventions aligns with systems thinking’s critical dimension, asking: “Who has power?” “Who is defining the system?” “Whose knowledge counts?” Deep community engagement reveals “subjugated knowledges” and “friction points” symptomatic of deeper systemic barriers (Betley et al., 2021).

The “Emissary” concept (Cheng, 2018) suggests that successful worldbuilding interventions require governance functions to ensure long-term health and growth, reconciling speculation with reality through “Containers”, finite projects that act as portals implying further consequences. This function sustains “potential for aliveness” beyond temporary engagement.

2.3. The Emotional Weather of Imagined Futures

Yet something else moves through these speculative territories: the emotional landscapes that emerge when communities gather to imagine otherwise. Beyond cognitive tools for critical thinking, these interventions engage with affect and emotion as “hardwired, shifty and unsteady but palpable” forces more “directly compelling than ideologies” and “fractious, multiplicitous, and unpredictable than symbolic meanings” (Barthes, 1970).

Ordinary affects draw attention to “forces that come into view as habit or shock, resonance or impact” (Stewart, 2007), highlighting “intimate impacts of forces in circulation” and prompting reflection on what one truly cares about (Cheng, 2018). Emotions intertwine with power relations and form social norms (Zembylas et al., 2012); disrupting these norms necessitates changing associated emotions.

Narrative and worldbuilding prove particularly potent here, as story provides “direct route to our emotions” and thus becomes “important to decision-making” (Saltmarche, 2018). Storytelling “creates meaning out of patterns,” “coheres communities,” and “engenders empathy across difference,” making possible feel probable in ways purely rational approaches might not. Emotional events are remembered more clearly, accurately, and for longer periods than neutral events (Tyng et al., 2017), suggesting emotionally resonant narratives significantly enhance impact and retention of envisioned futures.

Critical fictions, by making “alternative possibilities visible or tangible,” possess significant potential to cultivate empathy: not only toward other people but crucially toward the more-than-human world implicated in energy transitions. This capacity to foster emotional resonance makes abstract realities more tangible and personally relevant, “expanding our circle of concern” through sympathy and care (Roeser et al., 2016).

The spatial and environmental dimensions of worldbuilding interventions interweave deeply with affect. Emotional space is defined by experiences it affords, aesthetic feelings it inspires, and memories it evokes (Ryan et al., 2016). Even movement through space elicits strong feelings—from “sense of freedom” to “disorientation” of being lost. By designing or reimagining spaces within narrative storyworlds, interventions directly engage participants’ emotional responses to environment and potential future states.

The unfolding timeline of participatory processes itself acts as powerful mechanism for revealing and shaping emotional landscapes. As interventions encounter real-world complexities, critical moments or ‘tipping points’ elicit strong emotional responses offering insights into participants’ “underlying concerns, hopes, and anxieties related to energy transitions.” These responses reveal tacit knowledge, namely the practical understanding and lived experiences, that might remain hidden in purely hypothetical discussions.

While urgency of climate change and energy transition can generate anxiety, particularly for youth, critical fictions and worldbuilding offer facilitated spaces to explore these feelings within imagined scenarios. Hope, understood as “sense of the possible” that prevents being “overcome by the absoluteness of the present” (Ahmed, 2004), becomes emotional counterpart to fear. Cultivating hope through speculative methods can actively reshape participants’ orientation toward future, potentially expanding capacity for action.

2.4. Knowledge from Below

Threading through these practices runs a deeper current: the recognition that effectively navigating energy transitions and pursuing spatial justice requires moving beyond conventional, expert-driven approaches to knowledge production. This involves recognizing “subjugated knowledges” (Halberstam, 2011), forms of knowledge “buried or masked in functional coherences” or “disqualified” as “naïve knowledges, hierarchically inferior knowledges.”

Community-based interventions employing speculative design, critical fictions, and worldbuilding offer potent methodologies for accessing, validating, and elevating these subjugated knowledges. Unlike traditional approaches that might “disqualify” non-expert perspectives, creative and narrative-based methods create spaces where lived experiences, local understandings, and non-conventional insights can emerge and integrate into envisioning alternative futures.

This becomes inherently antidisiplinary practice, challenging rigid boundaries and hierarchical structures of established disciplines. Antidisciplinarity resists “mastery” and embraces less conventional ways of knowing, including what might be considered “naïve” or “nonsensical” (Khan, 2021), recognizing these perspectives can offer valuable insights outside dominant frameworks.

The very act of worldbuilding can be seen as “knowledge from below” (Halberstam, 2011), allowing participants to articulate understandings, desires, and concerns through creative expression rather than prescribed technical language. By constructing “microworlds” and speculative scenarios, interventions enable participants to draw on practical knowledge and critique existing systems from lived perspectives. This aligns with “seeing unlike a state” (Halberstam, 2011), contrasting with the state’s preference for “legibility,” order, and standardization.

Embracing potential “illegibility” and messiness of knowledge derived from diverse community experiences becomes powerful resistance to top-down impositions and source of genuinely innovative solutions. Integrating diverse perspectives: poets collaborating with scientists, bringing together different realms of discourse within “polyvocal” spaces (Wark, 2015); embodies this antidisciplinary spirit, creating conditions where multiple ways of knowing can cross-pollinate and generate new possibilities for collective futures.

3. Methodology: Comparative Case Study through the ‘Timeline Tool’

In the tangled web of participatory worldbuilding, emotions don’t simply appear. They emerge through a choreography of encounters, materials, and moments that resist easy categorization. To trace these affective currents, we turned to the timeline tool developed by Devisch (2018), itself rooted in the ground of Cultural-Historical Activity Theory (CHAT), as popularized by Engeström (1987). This was an analytical lens that could reveal not just what happened, but how feeling moved through spaces of collective imagination.

The timeline tool becomes more than methodology; it transforms into a practice of archaeological attention, excavating the sedimentary layers of emotional response that accumulate around participatory encounters. Each project timeline unfolds as a sequence of tipping points and triggers, revealing the precise moments when participants’ inner landscapes shifted, when new possibilities crystallized, or when resistance hardened into protective withdrawal.

Reconstructing these timelines as sequences of tipping points and triggers provides crucial insights that might otherwise remain buried beneath the surface narratives of project success or failure. We began to notice how certain moments acted as emotional lightning rods, drawing and redirecting the collective energy of worldbuilding processes. The methodology allowed us to pinpoint potential triggers for emotional responses among participants, whose seemingly small gestures or design choices that created ripples across entire groups. These emotional landscapes develop their own topography over the course of interventions, forming peaks of excitement, valleys of frustration, and unexpected clearings where new understanding emerges. By mapping these terrains, we could begin to see patterns in how feelings flow through participatory spaces, how they pool around certain activities, and how they create the affective conditions that either nourish or constrain collective imagination.

Our research questions emerged as interconnected patches in a larger tapestry: What role do emotions play in worldbuilding practices? How does worldbuilding itself become a method for designing with emotions? Our aim crystallized around identifying specific design practices that trigger emotional responses; those moments of methodology that open or close pathways to collective futures.

The analysis unfolded through four interwoven dimensions:

- **Triggers and Emotions:** We traced the delicate choreography between events and feelings, asking what specific moments, materials, or encounters catalyzed emotional responses. Sometimes it was the collages based on historical photo archives during a material speculation exercise; other times, the sudden recognition of one’s own story reflected in another participant’s vision of the future.
- **Actors and Emotions:** The emotional landscape revealed itself as deeply relational. We mapped not only who experienced emotions, but who triggered them. Youth participants often emerged as unexpected emotional catalysts, their unguarded responses creating permission for adults to access their own vulnerability. Facilitators, too, became emotional actors, their own affective states rippling through group dynamics in ways that shaped entire sessions.

- **Tools and Strategies:** We examined which design strategies generated the most profound emotional resonances. Material practices (e.g. working with found objects) often created embodied pathways to feeling that bypassed rational defenses. Storytelling circles generated different emotional textures than mapping exercises, each tool carrying its own affective potential.
- **Responses and Consequences:** Perhaps most revealing was tracing what emotions triggered in return: moments of breakthrough that led to deeper engagement, or emotional overload that caused participants to withdraw, stand still, or leave entirely. These responses became their own triggers, creating feedback loops that either amplified collective energy or dampened it into protective silence.

From this analysis, we selected design strategies that demonstrated particular potency in generating emotional resonance, illustrating each through the voices of participants themselves. These quotes became more than evidence and became more a series of small windows into the lived experience of worldbuilding, revealing how abstract methodologies translate into the messy reality of collective imagination.

Each selected strategy was chosen not for its representativeness, but for its ability to reveal something unexpected about the relationship between design, emotion, and worldbuilding. In doing so, it hopes that the methodology transcends technique and becomes a practice of collective sensing into possible futures.

4. Comparative Analysis: Worldbuilding and Emotion Across Six Case Studies

What emerges when communities gather to imagine energy otherwise? In the spaces between Brussels' social housing blocks and the broader landscapes of Belgian neighborhoods, between Turkish contexts yet to be fully mapped and European regulatory frameworks, we begin to notice the delicate choreographies through which collective futures take shape. Each intervention carries its own emotional weather, its particular rhythms of hope and frustration, its unique ways of making the impossible suddenly thinkable.

The timeline tool becomes our method of attention: a way of noticing not just what happened, but how feeling moved through these participatory territories. Following Devisch's framework grounded in Cultural-Historical Activity Theory (CHAT) as popularized by Engeström (1987), we reconstruct these interventions as sequences of tipping points and triggers, moments when the emotional landscape shifted, when new possibilities crystallized or dissolved into disappointment.

Six case studies offer themselves as patches in a larger mosaic: four Belgian interventions and two Turkish explorations, each carrying different textures of engagement, different relationships between individual aspiration and collective possibility. Through the analytical lens of triggers and emotions, actors and affects, tools and their consequences, we begin to trace the often-invisible infrastructure of feeling that either nourishes or constrains the emergence of energy alternatives.

Table 1 maps these emotional geographies across selected cases, revealing patterns that resist simple categorization. Notice how *triggers* often emerge not from grand revelations but from quiet realizations, such as the dawning recognition that house-by-house renovation cannot meet climate goals, the slow understanding that traditional energy systems systematically exclude the marginalized. These moments of collective noticing become catalysts for different ways of organizing attention and action.

The *actors* column reveals the complex webs of relationship that either enable or constrain transformation: residents and municipalities, design firms and energy communities, technical experts and neighborhood cooperatives finding themselves in new configurations of possibility. Yet the table also hints at who remains absent, whose voices echo through the margins of these documented interventions.

Tools emerge not as neutral instruments but as specific ways of materializing speculation; from info display panels that make energy visible to workshops that transform everyday objects into vessels for collective dreaming. Each tool carries its own affordances for emotional resonance, its particular capacity to generate either excitement or exclusion.

The *results* column captures something more elusive, in the ways these interventions ripple outward into broader systems of feeling and knowing. Some foster hope and collective agency; others reveal the brutal friction between vision and implementation, generating frustration when co-designed futures encounter regulatory barriers and bureaucratic resistance.

Across these cases, certain patterns begin to emerge from the intersection of worldbuilding and emotion. The most powerful triggers often arise from moments of structural revelation, like when participants suddenly see the systemic nature of problems they had experienced as individual failures. The shift from “how to install solar panels” to questions of “who controls energy, who benefits, and who gets left out” marks a tipping point where technical problems become political possibilities.

The tools that generate the deepest emotional resonance tend to be those that make abstract systems tangible and relational. Display panels don’t just show energy data; they create new forms of collective attention. Workshops don’t just transfer knowledge; they become spaces where residents can touch and reshape the material conditions of their daily lives.

Yet **Table 1** also reveals the precarious nature of these emotional transformations. The same interventions that foster hope can trigger profound frustration when systemic barriers prevent the implementation of collectively envisioned futures. The gap between participatory imagination and institutional possibility becomes a site of intense affective charge; sometimes generative, sometimes devastating.

As we prepare to expand this analysis across all six cases, including the Turkish contexts that will bring different cultural and institutional textures to our understanding, we begin to notice questions that demand further attention: How do different regulatory environments shape the emotional possibilities of participatory worldbuilding? What happens to collective agency when it encounters the stubborn materialities of existing infrastructure? How do the temporal rhythms of institutional change interact with the more urgent temporalities of climate crisis and community need?

Table 1 becomes not just a record of what happened, but a map of how feeling moves through spaces of collective imagination, or a guide to the emotional infrastructure that either enables or constrains the emergence of energy futures we can believe in.

Table 2 that follows becomes a different kind of listening practice. Where the first focused on external choreographies (triggers and (worldbuilding) tools, actors and outcomes) this one turns inward toward the felt experience of worldbuilding itself. Here we encounter not just what happened, but how it *felt* to happen, how the possibility of energy alternatives registered in bodies and voices, in the spaces between what people said and what they couldn’t quite articulate.

Notice how **Potential Emotional Dimensions** invites us to attend to the full spectrum of feeling that participatory futures-making can generate; not just the celebrated emotions of empowerment and collective agency, but also the more difficult textures of overwhelm, confusion, and the grief that comes with recognizing how much needs to change. These dimensions remind us that transformation is never purely celebratory; it carries its own shadows and complications.

The **Emotional Triggers** column returns us to those crucial moments when feelings shifted. But now, through the lens of lived experience rather than analytical observation. Here we might encounter the precise moment when a resident realized their voice actually mattered in technical decisions, or the instant when bureaucratic obstacles transformed collective excitement into bitter disappointment.

Quotes from Interviews become our most direct access to these interior landscapes. The actual words (hesitant, passionate, contradictory) carry affective information. They reveal the ways that transformation sounds when filtered through individual experience yet shaped by collective encounter.

Together, these columns create a more intimate geography of energy transition: one that acknowledges both the political dimensions of systemic change and the deeply personal ways that such change registers in the daily lives of those bold enough to participate in its unfolding. They prepare us to notice not just how worldbuilding happens, but how it feels to build worlds together, and what those feelings might teach us about the conditions that either nourish or constrain the emergence of livable futures.

5. Discussion

Listen closely to the resident from oPEN Lab, speaking about the heat pump that brings migraines alongside promised efficiency: *"It is very annoying when it makes this sound. That is my biggest problem. There is no solution for that."* In these words, we encounter something that technical reports rarely capture—the way transformation sounds in a body, the way progress can become a persistent ache that follows you through your daily routines. This complaint echoes across our comparative landscape, revealing patterns that resist the clean narratives of participatory success. The Architecture Workroom's collaborative visions bump against regulatory barriers; La Pile's energy-sharing dreams encounter the stubborn realities of landlord-tenant relations; the Turkish children's spatial insights confront mega-city pressures that dwarf their small voices. Each case carries its own frequency of friction, its particular rhythm of hope meeting constraint.

Yet notice what else emerges from these same spaces of difficulty. Sofie van Bruystegem's declaration: *"We believe in 'Can do', the joy of trying something"*, which tells that it arrives not despite the frustrations but through them. The Turkish children, despite growing up under the pressure of surrounding mega-projects, develop what Yaşar Adnan Adanalı observes as the perception that is "very clear" and awareness that is "highly developed." The young people at Architecture for All move from timidity to what the Yeşil Gazete (Green Gazette) describes as "a sense of hostility that comes from being the user of that place"; a transformation that sounds less like conventional empowerment and more like the cultivation of productive anger.

The most striking pattern across our cases involves the emergence of what we might call *emotional infrastructures*; the often-invisible networks of feeling that either enable or constrain collective worldbuilding. In La Pile, the monthly newsletters about solar production become more than information transfer; they create new rhythms of collective attention, ways of belonging to energy that had never existed before. The display panel made by residents doesn't just visualize consumption; it materializes a different relationship to power itself.

But these same infrastructures reveal their fragility when they encounter larger systems. The Brussels resident who notes that "the solar panels are from us, but the state uses this energy for itself" identifies a crucial disjuncture—the gap between participatory imagination and institutional capture. The energy belongs to the community in emotional and creative terms, yet remains trapped within regulatory frameworks that extract value elsewhere.

This tension appears differently across contexts. In Genk, the Transisthor mural creates what participants describe as aesthetic appreciation and emotional significance, yet a strategic manager in energy observes that "a lot of people don't know what it is there." The boundary object succeeds at generating conversation among those already engaged while remaining mysteriously invisible to others moving through the same neighborhood. The archive of mining history speaks powerfully to young people who feel connection with the former mining district, yet fails to translate into broader community recognition.

Perhaps the most complex emotional territory involves the relationship between local transformation and systemic change. Across our cases, participants develop profound attachments to small-scale possibilities, where the workshop where Turkish and Syrian children "have taken ownership of this space," the Genk resident who declares gratitude for gaining "a brand new house," the collaborative energy community that enables new forms of collective agency.

Yet these same attachments become sites of particular vulnerability when they encounter the temporal rhythms of institutional change. The Brupower representative's frustration about projects that "stay very local" while lacking pathways to regional scaling captures something essential about the emotional costs of participatory worldbuilding. The very intimacy that makes these interventions meaningful also constrains their capacity to address the systemic dimensions of the problems they engage.

Notice, however, how different cases navigate this choreography of scale differently. The Center for Spatial Justice's documentary approach creates a form of scaling that moves through representation rather than replication, in which the 95cm perspective travels as a method rather than an institution, creating possibilities for recognition across different contexts without requiring identical implementation.

The Architecture Workroom's network approach attempts a different form of scaling; creating connections between local experiments while maintaining their contextual specificity. Yet here too we encounter the emotional friction between vision and implementation, the frustration that emerges when "co-designed visions cannot be practically realised due to external systemic barriers."

The interviews reveal emotional territories that extend far beyond the celebratory narratives often associated with participatory design. DBV Architekten representative's observation about the first test house being "unoccupied and minimally furnished" points toward a crucial gap. Namely, the difference between technical prototypes and the complex realities of inhabited space. When the same techniques encounter "the techniques inside the homes," they generate frustration that might have been avoided through different forms of attention to the social dimensions of technical change.

The Turkish contexts bring additional layers of complexity. The Architecture for All workshops navigate language barriers and cultural differences that create initial timidity, yet this same friction becomes generative when children begin to "become aware of their rights" and develop "information ranging from working conditions to how children feel about working." The emotional trajectory moves through discomfort toward forms of empowerment that couldn't emerge without first encountering difference.

These patterns suggest that the most meaningful transformations often occur not through the smooth implementation of pre-designed interventions, but through the creative navigation of friction itself. The heat pump that causes migraines also provides warmth; the regulatory barriers that constrain energy sharing also reveal the political dimensions of technical choices; the language differences that create initial timidity also enable new forms of cross-cultural solidarity.

One of the most subtle yet significant patterns involves the different temporal rhythms of emotional engagement and institutional change. Participants often develop strong attachments to possibilities within relatively short timeframes; the workshops that generate excitement and creativity, the collaborative design processes that foster hope and collective agency. Yet the implementation of these visions often requires navigating bureaucratic processes that operate on entirely different temporal scales.

This temporal mismatch creates particular emotional challenges. The Architecture Workroom participants who develop integrated neighborhood visions may experience "significant frustration and disillusionment" when external barriers prevent realization. The OPEN Lab residents who expected smooth renovations encountered delays that "brought frustration" and "created mistrust."

Yet some interventions find ways to work creatively with these temporal disjunctures. La Pile's approach of making "structural exclusions visible" rather than offering "scalable technical fixes" creates value that doesn't depend on immediate implementation. The project succeeds by shifting conversations rather than installing technologies, creating emotional and intellectual resources that can persist even when regulatory barriers constrain immediate action.

As we step back from these six patches of engagement, certain meta-patterns begin to emerge about the relationship between emotion and transformation. The most resilient interventions seem to be those that cultivate what we might call livable complexity. These are approaches that can hold both the joy of collective imagination and the frustration of systemic constraint, both the excitement of local possibility and the overwhelm of broader challenges.

This capacity for emotional complexity appears most clearly in cases that avoid simple narratives of either success or failure. La Pile's recognition that "real transition is relational, spatial, and political" creates space for ongoing engagement even when technical solutions remain elusive. The Turkish children's clear perception of

spatial problems becomes valuable regardless of their immediate capacity to reshape urban planning processes. The Architecture Workroom's emphasis on long-term institutionalization points toward approaches that can sustain engagement across the temporal rhythms of both emotional attachment and systemic change. Rather than treating participatory processes as discrete interventions, these approaches create ongoing relationships that can evolve as circumstances shift.

6. Conclusion

What emerges from this comparative analysis is less a set of worldbuilding tools than an ecology of transformation. In other words, a recognition that meaningful change occurs through complex interactions between technical possibilities, social relationships, institutional constraints, and emotional infrastructures. The cases that generate the most sustainable engagement are those that attend carefully to all these dimensions rather than privileging any single aspect.

The emotional geographies revealed through our analysis suggest several crucial insights for future worldbuilding efforts:

- **Friction as Strength:** Rather than obstacles to overcome, the frictions between vision and implementation, between local attachment and systemic change, between different cultural contexts and temporal rhythms, often become the most generative sites for learning and adaptation. The heat pump that causes migraines teaches us something about the social dimensions of technical transition that smooth implementation might never reveal.
- **Infrastructures of Feeling:** The most powerful interventions create what we might call emotional infrastructures. In these ongoing relationships, rhythms of attention and forms of collective meaning-making can persist across changing circumstances. These infrastructures often prove more valuable than specific technical implementations, creating resources for continued engagement even when immediate goals remain unrealized.
- **Scaling Through Empowerment:** Rather than replicating successful interventions, the most effective forms of scaling seem to occur through the circulation of methods, perspectives, and forms of attention that can be adapted to different contexts. The 95cm perspective travels as a way of seeing rather than a specific intervention, creating possibilities for recognition across different urban contexts.
- **Temporal Complexity:** Meaningful transformation requires attending to multiple temporal rhythms simultaneously, where the immediate experience of participation, the medium-term processes of technical implementation, and the longer-term trajectories of systemic change are involved. Interventions that can create value across these different temporal scales prove more resilient than those dependent on immediate technical success.
- **Polyvocal Engagement:** The richest interventions seem to be those that can hold multiple voices and perspectives simultaneously, creating space for both excitement and frustration, both hope and criticism, both local attachment and systemic analysis. This polyvocal capacity enables continued engagement even when participants hold different relationships to the same processes.

Perhaps most significantly, our analysis suggests that the emotional dimensions of participatory worldbuilding are not peripheral to technical and political concerns but constitute the very medium through which transformation becomes possible. The feelings that move through these spaces (i.e., hope and frustration, belonging and exclusion, excitement and overwhelm) don't simply accompany change but actively constitute the conditions under which different futures become thinkable and livable.

As we face the urgent challenges of energy transition and climate change, attending to these emotional geographies becomes not a luxury but a necessity. The futures we need require not just technical innovation and policy change but the cultivation of emotional infrastructures that can sustain engagement with complexity, nurture resilience in the face of setback, and generate the forms of collective imagination necessary for systemic transformation.

The voices captured in our interviews with residents dealing with heat pump noise, with children perceiving spatial injustice, with activists navigating bureaucratic barriers; remind us that transformation is always also a matter of feeling, of the particular ways that change registers in bodies and communities and daily life. Learning

to listen to these voices, to notice the emotional territories they reveal, becomes an essential skill for anyone committed to building worlds we can actually live in.

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Figures and Tables:

Table 1: Comparative Analysis of six cases

Case Study	Activity	Trigger	Actors	(Worldbuilding) Tools	Result
Architecture Workroom Brussels (BE)	An initiative designed to accelerate the energy transition at the neighborhood level through collective action and integrated strategies. Recognizing that current renovations are insufficient to meet the ambitious goal of renovating 95,000 homes annually by 2050, the project advocates for a collaborative approach that is more cost-effective and inclusive. Aiming to translate collaboratively developed neighbourhood action plans into tangible interventions and bridge the implementation gap.	-A critical realization emerged that the prevalent house-by-house renovation approach was insufficient to meet the ambitious climate goals. This showed the need for a more collective strategy, a shift towards a neighborhood-wide energy transition model. -The project emphasized the importance of involving a diverse range of stakeholders, while leaving out the focus on isolated experiments. Including local authorities, addressing technical, social, and policy dimensions. -The need for integrated future steps is underlined. The importance of institutionalizing these processes. -Following up after the projects are completed with periodically arranged public programs is a means of building trust with the communities.	Local municipalities, Flemish Region, EU,VITO, KU Leuven, design firms, Residents, neighbourhood groups, cooperatives, 100 Neighbourhoods, Open Workroom network	-Small exhibition. (Figure 1) -Public programme, which consist of A series of workshops and debates invited stakeholders to collaborate on integrated neighborhood approaches. -Open workrooms, in which the project opened its doors to support cities, experts, designers, businesses, and policymakers working on strategic transformations, including energy neighborhoods, sponge landscapes, and societal infrastructure. Each track featured a public programme and a small exhibition contributing to a broader transformation.	Shaping systemic change at a local level. Likely fostered hope and a sense of collective agency. Could trigger significant frustration and disillusionment among participants if co-designed visions cannot be practically realised due to external systemic barriers like regulations, bureaucracy, or funding.
La Pile (BE)	Collective envisioning and subsequent implementation of a localised and equitable energy-sharing system within a social housing block (SunSud project). Developing pertinent and equitable solutions through profound community engagement and co-creation.	-Traditional energy systems often exclude marginalized communities, particularly social tenants. This realization prompted a shift towards creating inclusive, community-driven energy solutions. -The establishment of the Pilone energy community marked a milestone. It served as an example of collective energy ownership and management. -The complexities of energy sharing regulations and technical infrastructure highlighted the need for collaborative problem-solving.	City Mine(d), Residents from Brussels' Midi and North neighborhoods, Energie Commune, Pilone Energy Community, Remorque Réno, Technical and Legal Experts	-Residents participated in free workshops focusing on artefacts about energy, design, electronics, and fabrication. -Info display panel to visualize the building's solar energy production and consumption, made by residents. (Figure 2) -Monthly newsletters about solar production levels and individual consumption.	SunSud did not offer a scalable technical fix, but rather a provocation: it made the structural exclusions of the energy transition visible. In doing so, it shifted the conversation from "how to install solar panels" to who controls energy, who benefits, and who gets left out. It showed that real transition is relational, spatial, and political.

oPEN Lab (BE)	Renovation of houses into energy-positive buildings in Nieuw Texas. (Figure 3) Developing a "technological playground" vision for a neighbourhood. Gathering data on inner climate, energy consumption, and installation performance. The project by DBV Architecten is using prefabricated timber systems, BIM modeling, and Lean planning to test and implement scalable, low-disruption upgrades in a real-world living lab setting.	-Adoption of prefabricated system (HSB) -Use of BIM modeling -First test house, as it was a prototype, didn't reflect the possible social outcomes. -Residents not foreseeing the end results.	Residents, who experienced disruptions and provided tacit knowledge. Participants in imaginative activities. Architects. Other local NGO members, such as STEBO, WIL, GIGOS, Luca School of Arts	-Co-authored socio-spatial story shaped by logistics, human agency, and infrastructural constraint. -Simulated futures and engineering scripts that anticipate and pre-structure the spatial world. -Worldbuilding in the present tense: rather than modeling utopian futures, the project builds on top of and within the lived complexities of Genk's housing realities. -Incorporating specific activities like the "Wishing Lab" and postcard prompts to encourage imaginative thinking about desired energy futures.	-Established method for minimal disruption renovations - Enabled digital prototyping and coordination, however caused delays in process which brought frustration. - Exposed real-time technical and social challenges - Created mistrust towards WIL and accelerated the feelings of unfairness.
Transisthor (BE)	Artistic and technological creation of speculative narratives about energy futures on a public mural. (Figure 4) Collaborative creation of a public mural integrating historical archives and AI-generated future imaginaries.	-Transisthor project uses art printed on solar panels as both an aesthetic and functional medium to engage and activate the community around sustainable energy, with participatory moments serving as natural triggers for awareness and involvement rather than formal trigger tools as used in other evaluation contexts. -Acting as a boundary object, this project triggered conversations around energy in the neighborhood through its tactility.	Specifically targeted youth as key participants. Genk residents. Atelier Zwiep's youth artists. Soltec (sponsor of solar panels). GIGOS and SAAMO.	-Integrated critical fictions through artistic and technological creation of speculative narratives on a public mural printed on solar panels to show energy transition's urgency. -Pointing out to the neighbourhood's specific energy related history context by looking at mining past and archival photos.	Increased creativity and a sense of shared purpose. Engaged participants in imaginative thinking and critical reflection on their relationship with energy. Co-created a dialogue and a tangible piece of critical fiction.
Architecture for All (TR)	Physical prototyping as a form of spatial speculation. Empowering young people to reimagine and physically prototype alternative spatial arrangements. Implementing temporary, low-resource interventions, often with a grassroots and volunteer-based structure. Conducting hands-on workshops.	-Discusses broader architectural concepts and spatial justice, extending beyond energy transition. -Faced direct conflict or resistance in public space and operational vulnerabilities (like burnout or resource scarcity) due to its grassroots/volunteer structure.	NGO: Multeciyim Hemserim (Translation: I am a refugee, my fellow countryman), Yarimbürgaz Neighborhood Protection and Solidarity Association, Youth	-Engaged in spatial speculative worldbuilding through empowering young people to reimagine and prototype spatial arrangements. -Employed creative and hands-on methodologies. (Figure 5) -Emphasised accessible, analogue, and material approaches (temporary installations).	- Encouraged critical engagement with their built environment and the envisioning of possibilities beyond the status quo within limited budgets and grassroots movements. - Evoked excitement and a sense of accomplishment among young participants. Potential for disillusionment from the limited impact of temporary actions.

Center for Spatial Justice (TR)	Envisioning and working towards "radical just futures" across inter-connected issues like environmental justice. The "Mini Citizens of the Mega City" project serves as a tangible speculative prototype. The documentary (Figure 6) follows the daily lives of four children from different neighborhoods of Istanbul through the eyes of the children. This approach reveals that cities should be made livable not only for adults but also for children.	-Children are not seen as active citizens in urban life; therefore, children's needs in urban planning -The desire to understand how accessible and livable cities are for children -Conveying the physical obstacles, access problems and spatial injustices in the city -Aiming to raise significant awareness that cities need to be made more inclusive and equitable	Kids. Refugees. Artists and architects, Urban95 initiative.	-Using the documentary as a tool to tell the story of Istanbul through the eyes of three-year-old children. - The project aims to make visible the physical obstacles and spatial injustices that children face in the city, with images taken from a height of 95 cm, the height of an average three-year-old child. -The follow-up "95cm: 3-2-1 Record!" campaign, encouraging individuals to document their own environment from a child's perspective	The documentary "95cm" exposes the inaccessibility of Istanbul from the eye level of a three-year-old child, and strikingly reveals that urban planning is actually made only for the adult, mostly male, body; it turns the understanding that postpones children as 'tomorrow's citizens' into a silent criticism.
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Table 2: Comparative Analysis of emotional dimensions

Case Study	Potential Emotional Dimensions	Emotional Triggers	Quotes from Interviews
Architecture Workroom Brussels (BE)	Hope, collective agency, empathy, sense of possibility/determination	Revealing long-term planning schemes in Belgium can lead to distinct emotional trajectories.	Joachim Declerck: "The narratives are a way to reformulate a problem. It's a mix between reality and rhetoric." "We can't reduce the energy transition to a regulation—it's a project to transform society." Hanne Mangelschots: "Local authorities, businesses, and citizens can join forces and create a public-private-civil energy company, as the city of Blankenberge has done, particularly with its Public Social Welfare Centre (CMWOC), in which citizens can acquire shares."
La Pile (BE)	Belonging, solidarity, empowerment, future anxiety, frustration, eco-powerlessness, joy, creativity	Directly confronting energy poverty. Not being able to do long-term plans, thus frustration and anxiety. Advancing social justice through community-driven solutions.	"A core challenge in the Midi and North neighbourhoods is the high percentage of tenants. In "Renover Bruxelles", it has been explicitly identified that the tenant/landlord issue is a major obstacle, where landlords may lack the incentive to renovate unless they can raise the rent, creating fear for tenants." Sofie van Bruystegem "Yeah, so one of the frustrations, for instance, that we sometimes have with CityMined when we do energy sharing on a very local scale, it's that it stays very local and it's hard to find ways to upscale these kind of projects while with an energy cooperative, potentially you could have a structure which is regional and which could share energy on a regional level." Brupower Representative "We believe in 'Can do', the joy of trying something." Sofie van Bruystegem

oPEN Lab (BE)	Frustration, uncertainty, disillusionment, anxiety, overwhelm, gratitude	Overlooked needs or unintended consequences creating mistrust and disagreements, while some residents enjoy it.	"It is very annoying when it(the heat pump) makes this sound. That is my biggest problem. There is no solution for that. I get migraines from it." Resident from oPEN Lab projects "The solar panels are from us, but the state uses this energy for itself. We are not affected by solar energy right now." Resident from oPEN Lab projects "Since the first test house was unoccupied and minimally furnished, it became clear, in the initial stages of the other homes, that the execution of the works was more complex (due to the techniques inside the homes), which caused frustration among the residents." Dbv Architecten Representative "We have gained a brand new house, I don't get it; what else do they(others neighbours) want?" Resident from oPEN Lab projects
Transisthor (BE)	Aesthetic appreciation, Emotional and commemorative significance, Lack of understanding, Positive outlook on making complex concepts accessible	Not seeing long-term implementations of the participatory processes.	"Young people from Winterslag feel a strong connection with the former mining district." Nele Bronckaers "...a lot of people don't know what it is there, because there is no info panel next to this bench... all the people who collaborated on this don't know what it is. Besides on that, even if people were working in the social house, they don't know what it is about." A strategic manager in energy "It allows architecture to be more, while integrating design with energy solutions." A professional from an energy NGO
Architecture for All (TR)	Excitement, creativity, ownership, accomplishment, shared purpose, curiosity	Timidity of language barriers and cultural differences	"The results of the workshop, especially the one with the theme of child labor, were striking; from the beginning to the end of the workshop, a process developed in which children began to become aware of their rights, and information was revealed ranging from working conditions to how children feel about working." Yesil Gazete "Since Turkish and Syrian children have taken ownership of this space, they have made great strides in producing together and adapting to each other's realities, and they are still making progress." Yesil Gazete "The timidity of the early days has now been completely replaced by a sense of hostility that comes from being the user of that place." Yesil Gazete

Center for Spatial Justice (TR)	Contemplation, pressure, Empathy, Trust in youth, empowerment	Some children, particularly those in neighborhoods like Başakşehir, grow up feeling the pressure of surrounding mega-projects, housing projects, and shopping malls. The "Mega Kent" is a complex and multi-layered city, and understanding it requires looking beyond central areas to include peripheral neighborhoods, squatter settlements, and newly built sites. This implies that some areas face greater challenges in terms of urban development.	Yaşar Adnan Adanalı: "Although the children who participated in our study were at most 5 years old, they were able to identify spatial problems better than most adults, and they expressed them in their own unique way." "Children's perception of the environment in which they live is very clear, and their awareness is also highly developed." "In order to make the difficult experiences of children (living in Istanbul) (being a refugee, socio-economic injustice) more visible, we lower the camera to a 95cm perspective and try to look at Istanbul through the eyes of children."
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Figure 1: from Architecture Workroom Brussels' Exhibition: Operation Energy Neighbourhoods



Figure 2: from La Pile's SunSud



Figure 3: from dbv architecten's oPEN Lab - Nieuw Texas Genk, prototype energy homes



Figure 4: from Transisthor's "Now or Never"



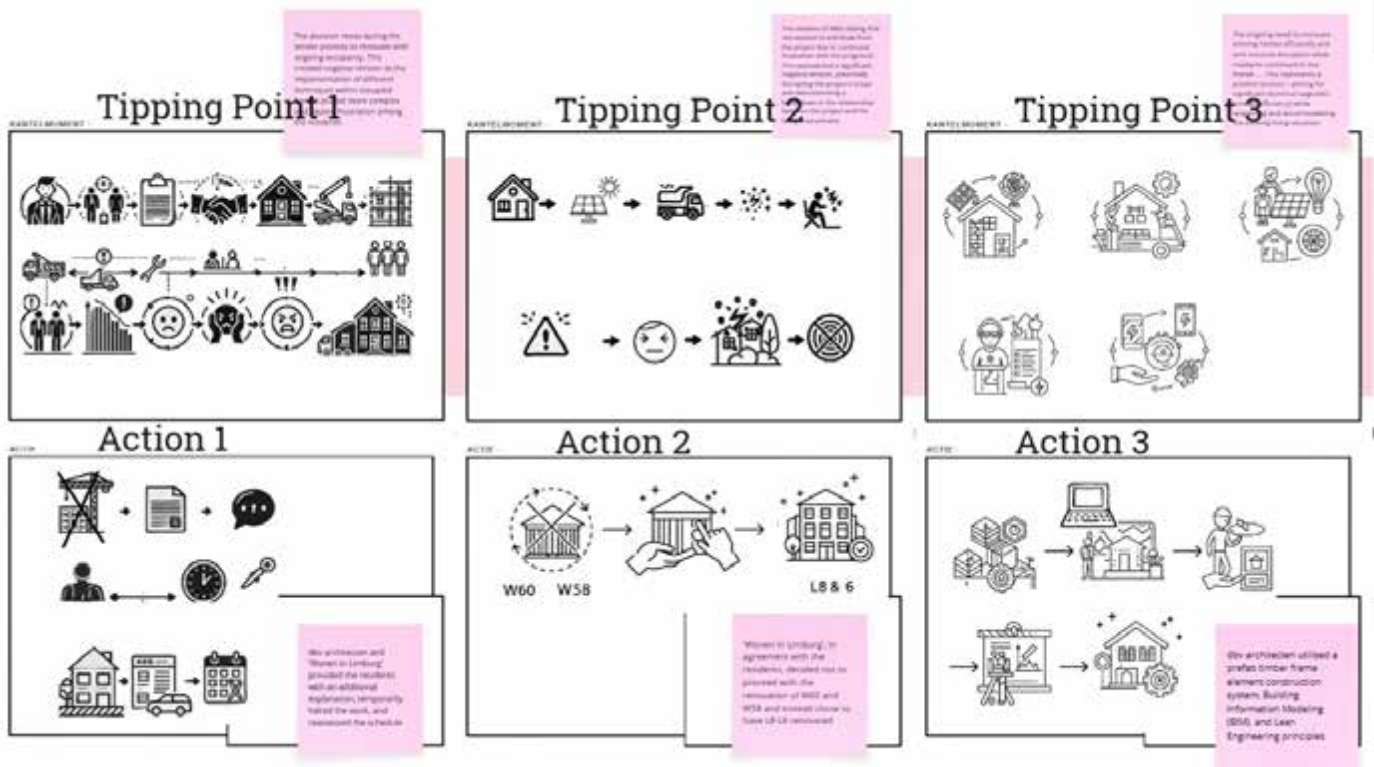
Figure 5: from Architecture for All - Yarimburgaz Youth Workshop



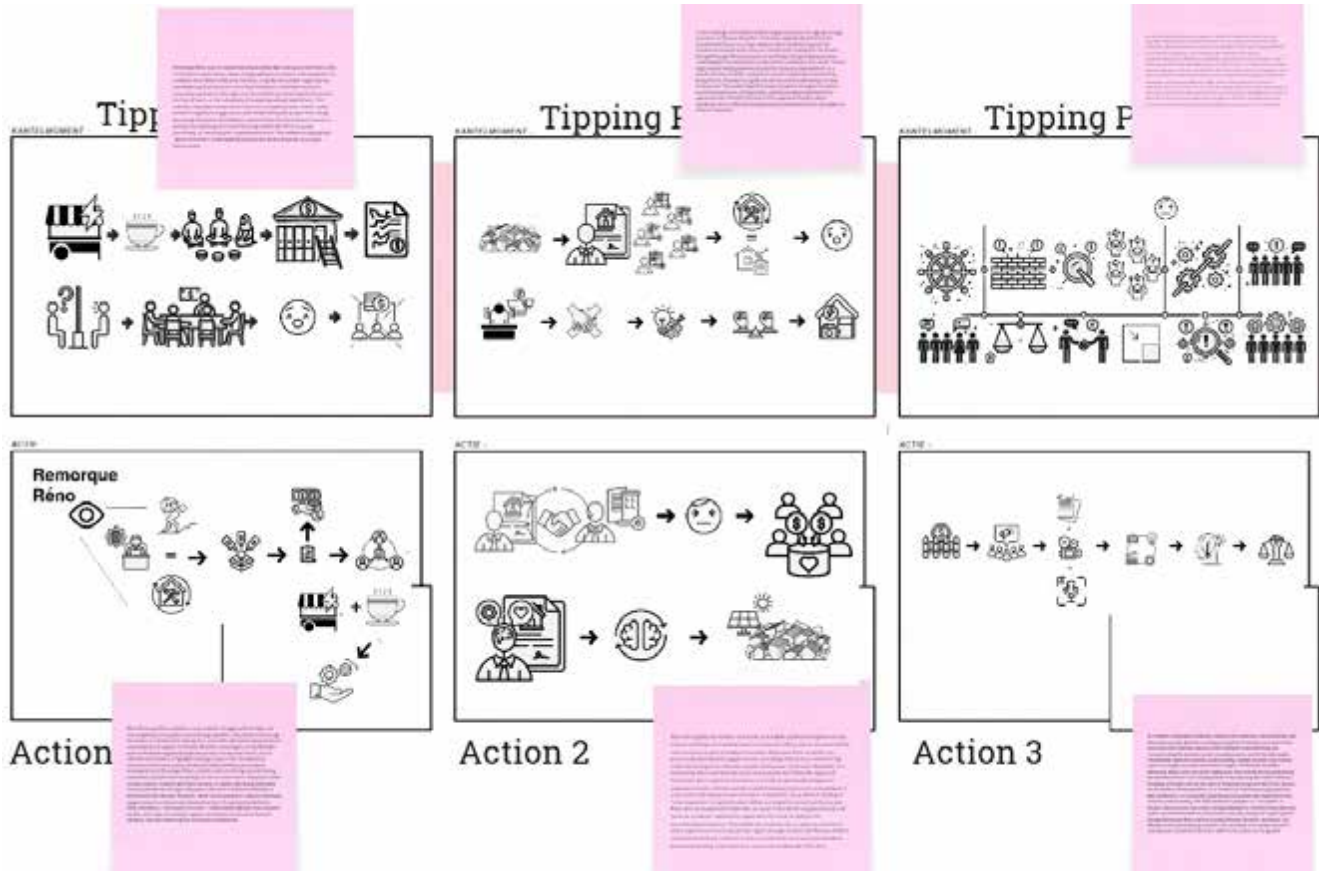
Figure 6: from Center for Spatial Justice's documentary "95 cm: Mega City's Mini Citizens"

Appendices;

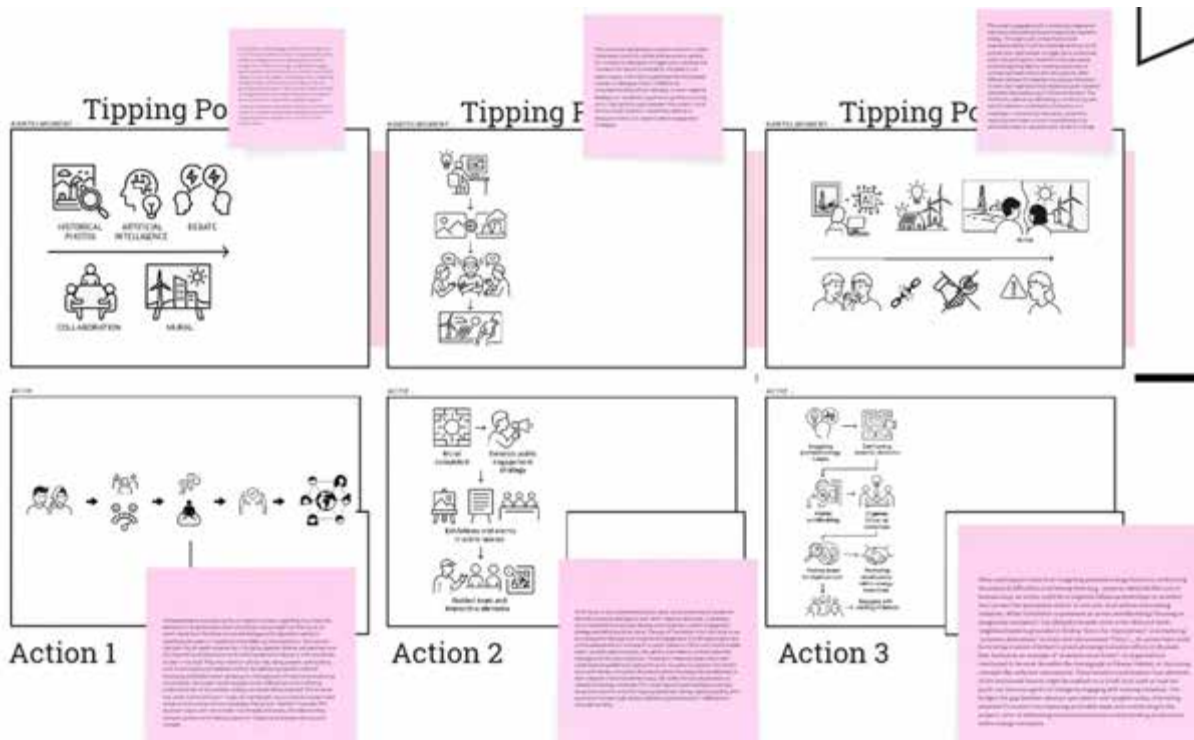
1. Timeline Tool visualised for Architecture Workroom Brussels Case:



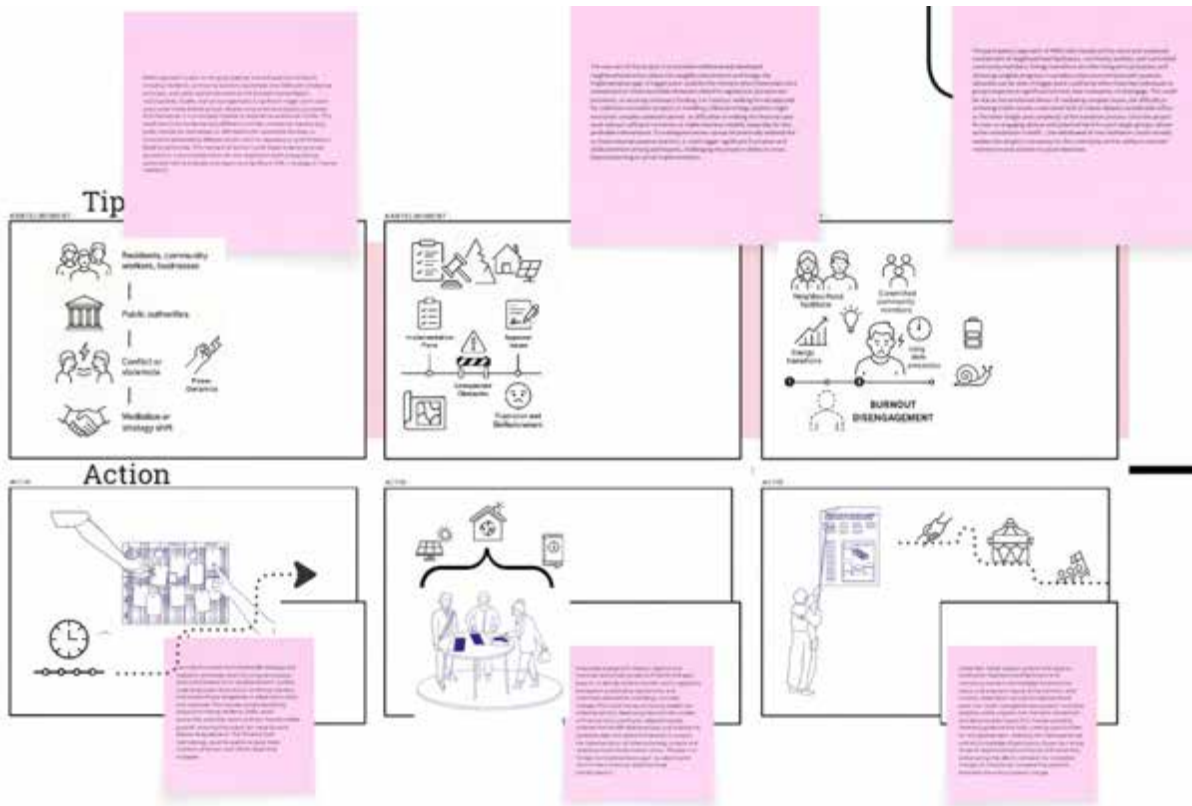
2. Timeline Tool visualised for La Pile Case:



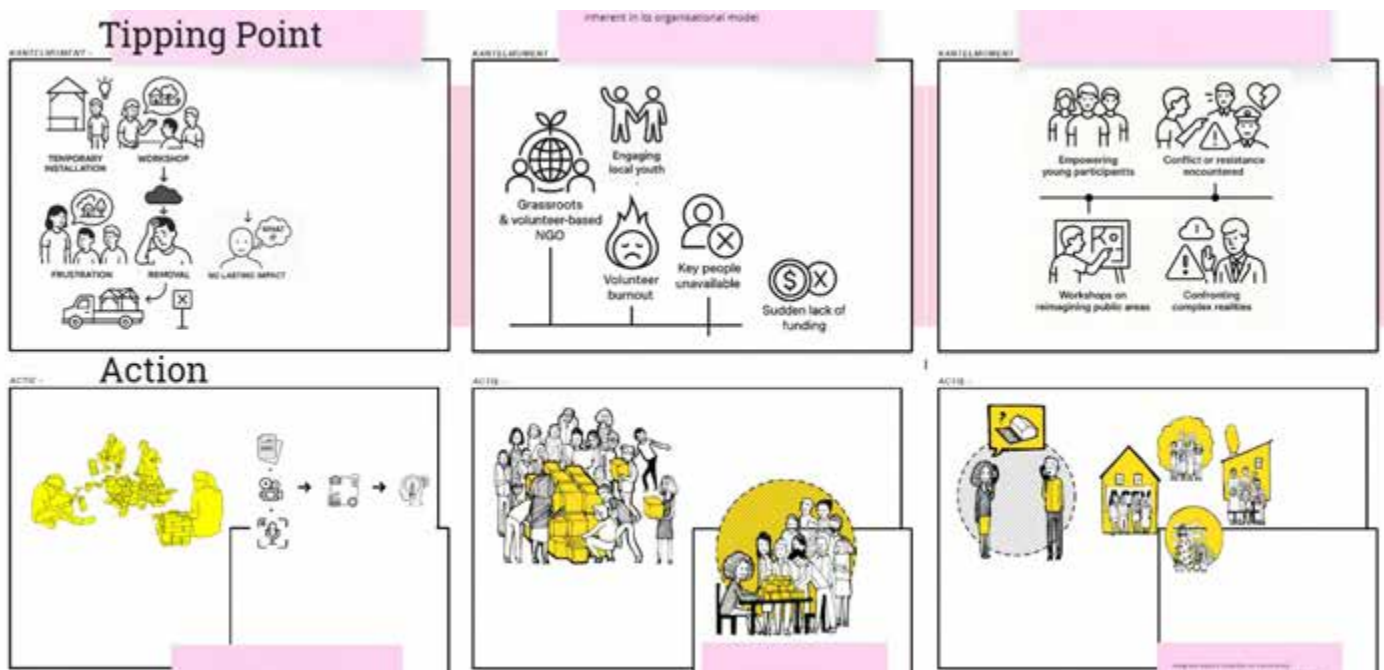
3. Timeline Tool visualised for oPEN Lab Case:



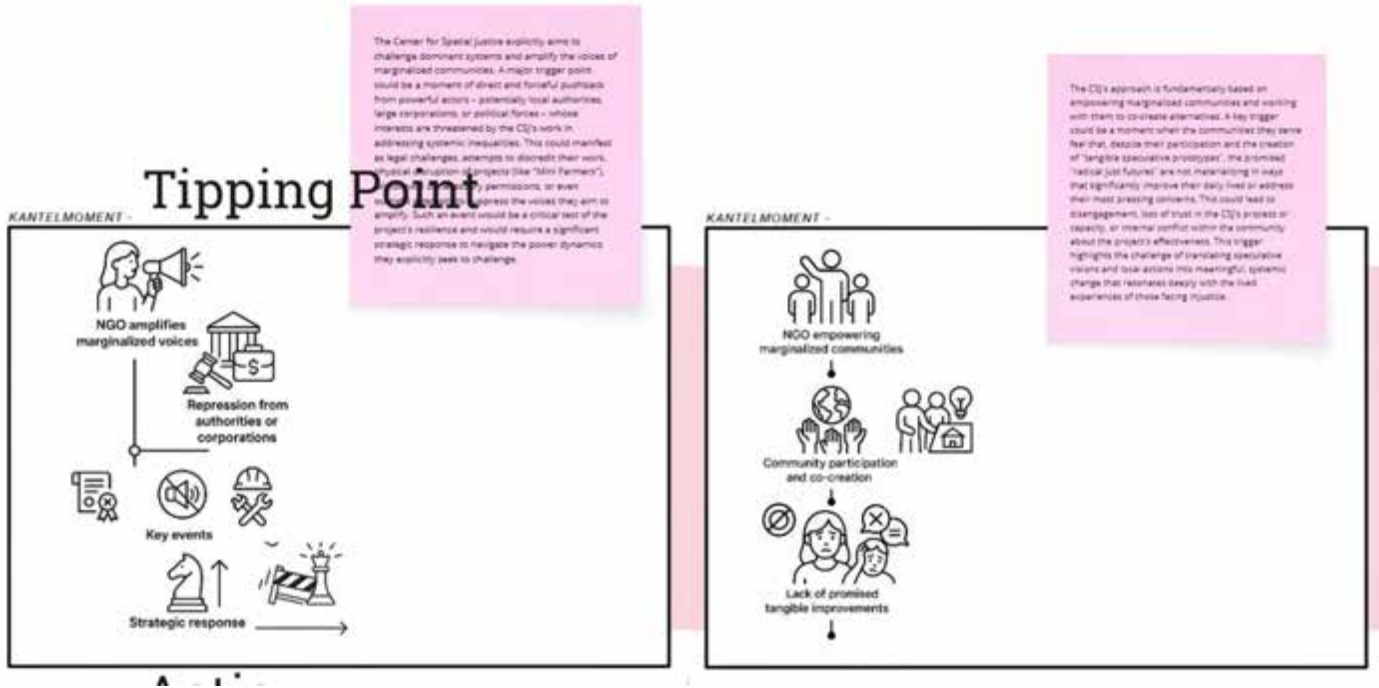
4. Timeline Tool visualised for Transisthor Case:



5. Timeline Tool visualised for Architecture for All Case:



6. Timeline Tool visualised for Center for Spatial Justice Case:



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