

# Ecological Design Futuring with Transition Templates

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Transition Templates brings ecological economists' proposals for a good life for all within planetary boundaries into design with a transition-oriented futuring tool to envision pathways towards "Design Within Planetary Boundaries" (DWPB). The method investigates gaps between the imperatives described by the planetary science, the systemic transformations proposed by ecological economics, and the current design industry provision. Since ecological knowledge has historically been undervalued across design landscapes, new methods are needed to support ecological forms of design thinking and practice. Transition Templates Four Futures Framework (TT-FFF) offers a structure to imagine and explore diverse ecological design futures. This ecological design futuring exercise prompts participants to map pathways beyond current extractive and defuturing design trajectories to sustainable, restorative, and regenerative alternatives (i.e., pathways to DWPB). The TT-FFF encourages emergent ecological imaginaries at the intersection of political, economic, social, and technological change.

**Keywords:** design futures; transition-oriented futuring; regenerative design; transition design; participatory systems mapping; design within planetary boundaries

## 1. Introduction

In this paper I present a tool that invites readers and workshop participants to imagine pathways to the design of future ways of living within planetary boundaries. One central feature of the contemporary polycrisis is the deterioration of the global commons, i.e. the climate system and other ecosystems (IPPC 2023; Steffen *et al* 2020; Rockström *et al*, 2009), "exacerbating energy, food, and water insecurity, and increasing the risk of disease, disaster, displacement, and conflict" (Gupta *et al* 2024, e813). Ecological economists have proposed and modelled alternative models of developments. The recent "A just world on a safe planet" report on Earth-system boundaries (Gupta *et al* 2024) describes possibilities and strategies for systems transformations, offering translations of Earth Systems Boundaries to inform science-based targets for action. Critically, the window of opportunity to create these "safe and just spaces for humanity" (Raworth 2015, Dearing 2014) will not be open indefinitely – as many ecosystems cannot be regenerated in meaningful timescales once



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ecological thresholds are passed. Since the global majority in all hemispheres already do not have access to “safe and just spaces for humanity,” proposed “just” transitions (Agyeman et al., 2003; White & Pevzner, 2026) includes restorative and redistributive justice to address historic appropriations and associated inequities and injustices. There is an urgent need to envision, design, and enact sustainable, restorative, and regenerative future ways of “Designing Within Planetary Boundaries” (DWPB) – no matter how difficult or unlikely it might seem from current political conjunctures. This paper presents a tool for the envision phase of this work to expand ecological imaginaries.

Like all design, Transition Design is a future-oriented practice. While design is inherently oriented towards futures, no amount of speculative, experimental, and generative work can create ecologically viable futures without a critical orientation to extractive modes of design and development and the harms they generate. Transition design disrupts assumptions as a necessary step to enable changes in trajectory.

A central assumption of Transition Design is that whilst our societies are in crisis, these crises are not being, and will never be, experienced in sufficiently motivating ways. There is never going to be a crunch time necessitating Promethean responses. These are slow motion crashes with which humans, especially while still moderately wealthy, are adept at coping. Transition Design, as with the Transition Town movement by which it is inspired, attempts pre-emptive change before change is unavoidable (which this may be never) (Tonkinwise 2015, 89).

The Transition Town movement uses creative approaches to futures visioning to help local groups work towards preferred resilient futures (Hopkins 2008, 2025). In Transition Design, this commitment to envisioning positive futures is necessarily combined with an explicit recognition of the defuturing (Fry 2009, 2020) nature of contemporary design activities and designed systems. Transition Templates follows Transition Design’s ecologically oriented approaches (Kossoff 2011; Boehnert 2018a, 2019). This combination of an active practice of envisioning positive alternatives with an honest confrontation with the scale of the challenge in defuturing contemporary systems is a hallmark of Transition Design.

The Transition Templates: Four Futures Framework (TT-FFF) follows Transition Design’s commitment to envisioning long-term futures to generate visions of preferred options in the present (Irwin 2015; Irwin, 2018, 5). The method builds on strategies for co-creating desirable future visions and the literature on transition-oriented futuring (Yu 2024), imaginaries (Bendor 2025), and lenses (Lockton & Candy 2018). The TT-FFF exercise supports critical and imaginative capacities using an ecological lens to prompt envisioning future ways of “Designing Within Planetary Boundaries” (DWPB). The practice brings ideas from regenerative design theory, ecological economics, and transition design together in a novel DWPB futuring exercise that can be applied to any context.

The prospect of designing future ways of living within planetary boundaries is a radical proposition that would only become remotely possible with dramatic changes across political, economic, social-cultural, and technological systems. Systemic transformations on this scale require trans-disciplinary and trans-sector collaborations and are also fiercely

contested political problems. Zaga, Castano, and van der Voort's recent provocation on "keeping it real with responsible futuring" (2026) describes the many difficulties in making substantive contributions with transdisciplinary work. In the spirit of responsible futuring, I attempt to capture at least some of the many tensions, political challenges, and shortcomings of this experimental method.

Transition Templates: Four Futures Framework (TT-FFF) is an exercise within a participatory system mapping method called "Transition Templates." The method was developed as part of the *Transition Templates: Pathways to Net Zero+* (TTPNZ+) research project. Transition Templates (TT) is a four-step process developed to support organisations creating strategies for decarbonisation in five sectors of the UK economy. The method is transferable to other socioecological challenges. TT guides groups in participatory systems mapping with a four-step process (framing, future visioning, strategizing, and planning) to develop vision, insight, and strategy at the intersection of socio-political change (Boehnert 2025, Boehnert 2026a, Boehnert 2026c). This paper focuses on the second step, "Envisioning Futures," with the TT-FFF, a tool that sits at the heart of the Transition Templates method.

Transition Templates: Four Futures Framework (TT-FFF) prompts participants to consider future ways of living and their socioecological consequences. It makes futures generated by extractive contemporary systems explicit by asking users to consider the under-examined socioecological consequences of all designed socio-technical artefacts, services, spaces, and systems. The method encourages reframing with an ecological lens and therefore depends on a critical mass of ecological, sustainability, and energy literate participants in the group. The TT-FFF prompts future visions that align with, and not against, the patterns of living systems – stretching social imaginaries and building capacities for ecological forms of design thinking. With this work, we explore alternative sustainable, restorative, and regenerative options across domains. Transition Templates encourages envisioning pathways to design within planetary boundaries by prompting a more deliberate focus on what it means to "design for planet" (Design Council 2021, 2025). The TT-FFF build capacities for DWPB by reframing the problem space with an ecological lens, envisioning diverse types of ecological futures, and exploring the priorities and activities that would make these possible. With careful delivery and a critical mass of sustainability, ecological, and energy literate participants in the workshops, the exercise builds ecological imaginaries, re-directing design imaginaries and design thinking to orientations that sustain, restore, and regenerate living systems.

## **2. Research context, problem, and question**

Ecological economists have proposed diverse sustainable models of development including steady state (Daly 1972) and post-growth (Jackson, 2009; Kallis *et al.*, 2025) with variations such as degrowth (Hickel, 2021) and donut (Raworth 2015) economics. All seek to make prosperity within planetary boundaries possible. Recent models demonstrate possibilities for "a good life for all within planetary boundaries" (O'Neill *et al.*, 2018; Schlesier *et al.*, 2024). These studies describe the social indicators and thresholds supporting safe and just futures.

Assuming that regenerative design is committed to regenerating ecosystems and not just niche products and spaces, ecological economics is a necessary foundation for regenerative design and design economies. There is a seriously under-investigated gap in the practice and theory of translating ecological imperatives described by both the planetary sciences and ecological economics into the various applied fields of design. In design research, movements in the direction of DWPB can be found at the intersection of regenerative design theory (Mang & Reed 2012; Wahl 2016), transition design (Irwin *et al*, 2015), design for sustainability (Ceschin & Gaziulusoy 2019; Coop *et al* 2024) and emergent work in design and ecological economics (Boehnert 2018b; Ritouet, Tanguy, Reyes, and Laforest 2026; Bessai 2026). Riel Bessai argues in his PhD dissertation “The Carbon Commons: Design Practice for a Post-Growth Society” that design will only be become capable of meaningful sustainable transitions “when it critically confronts the structural drivers of ecological crisis and reorients its practices toward convivial, commons- based, and care-centered modes of world-making” (2026, 18). Regenerative Design, Transition Design, and Design for Sustainable Transition (DfST) all offer concepts and approaches that contribute to a critical confrontation and re-orientation for DWBP. So far, Transition Design and DfST have more deliberately engaged with transdisciplinary socio-economic and political theory necessary to scale socio-ecological transitions for DWPB. These ideas and traditions inform the ecological design futuring method I introduce in this paper. The research question prompting the construction of the TT-FFF is: ***How can design futuring support ecological imaginaries and build capacities to activate transition pathways towards design within planetary boundaries (DWPB)?***

### 3. Mindsets, postures, and ontoepistemologies

The four core orientations in Transition Design described are: (1) vision; (2) theories of change; (3) mindset/posture; and (4) new ways of designing (Kossoff, Irwin, Willis 2015; Irwin, Kossoff, & Tonkinwise 2015). Transition Design asks designers, “to examine their own value system and the role it plays in the design process” where solutions depend on “more holistic worldview that informs more collaborative and responsible postures for interaction” (Irwin, Kossoff, & Tonkinwise 2015, 9). Mindsets, postures, and worldviews for transition are described as open, mindful, collaborative, and active. Ontoepistemology describes premises and the interrelationship between ethics, ontology, and epistemology in knowledge production (Barad 2007). Design for sustainable transitions challenge ontological assumptions in design theory and practice (Tonkinwise 2022; Escobar 2018; Fry 2009; Willis 2006) where legacy ontoepistemologies reproduce reductionist and othering assumptions (Boehnert 2018a) creating conditions for extractive and exploitative modes of design and development.

Legacy reductionist epistemologies are inadequate starting points for engaging with complex socioecological phenomenon. Planet Earth’s ecosystems are cyclical and regenerative – but designed systems are cradle to grave and polluting. Humans are in dynamic entanglement

with each other and the more-than-human ecological context – but design operates according to different sets of assumptions and priorities, with different logics and sets of metrics (generated by economic structures) than those that would enable long term socioecological wellbeing and DWPB. Design within contemporary economic and political structures defutures (Fry 2009, 2020) by default. This extractive dynamic extends not only from the priorities embedded in capitalism, but in the ways of knowing inherited from intellectual traditions that deny ecological entanglements.

Western ways of knowing are described by anthropologist and cybernetician Gregory Bateson as “epistemological error” comprised of “an ecology of bad ideas” that propagates itself “like a rooted parasite through the tissues of life” (1972, 490-491). The identification of this systemic false consciousness in our relation to nature (Goodbun 2011, 4) enabled the emergence of ecological theory and relational sustainability over the past half century. In ecological theory for design for sustainability, Yilmaz, Rolfes, and Robbers describe Bateson’s embodied, embedded, enactive, and extended dynamics of reasoning and cognition for collective sensemaking (2026, 2). Understanding design ecologies as reflecting planet Earth’s regenerative ecologies, the patterns of living systems are relational, participatory, plural, and systemic (Boehnert 2026b; Escobar 2018). Redirecting design practice to reflect complex patterns of living systems is a foundation for sustainable design transitions.

Design futuring can easily reproduce visions of preferable and desirable futures disconnected from ecological consequences and even the ecological viability of a proposed vision. Transition-oriented design futuring confronts these assumptions. Regenerative and relational sustainability presents a break in the epistemological errors of modernity with their denial of ecological entanglement. Samuel Yu describes epistemological futuring as oriented towards a “shift away from the unsustainable dominant paradigms of thought...to engage new and alternative ways of seeing, thinking and designing. Critical and epistemological futures offer tools and approaches from post-modern analysis to problematise, deconstruct, and re-frame” (2024, 8-9). Ecological ontoepistemologies are a foundation safe and just futures and capacities for DWPB. The TT-FFF tool prompts an explicit exploration of extractive forms of design and development and invites imagining (sustainable, restorative, and regenerative) alternatives. This work exercises epistemic imagination reflecting shifts in ontoepistemological premises and capacities to envision, design, and enact sustainable, restorative, and regenerative alternatives. The TT-FFF prompts these epistemic shifts to focus on ecological forms of future transitions.

Lockton and Candy (2018) link mindsets in transition design to the notion of imaginaries, arguing “that, as a lens, tuning into and investigating the ‘imaginary,’ with regard both to current situations and to possible futures, promises invaluable insights for visioning” (910). Design futuring makes socio-technical imaginaries into tangible visions of the future. Futuring supports designing transitions as design is a means of making imaginaries “real enough to be critiqued and reflected on” (Ibid, 910). Imaginaries emerge from both worldviews and ideologies that shape basic assumptions as “collectively held beliefs about

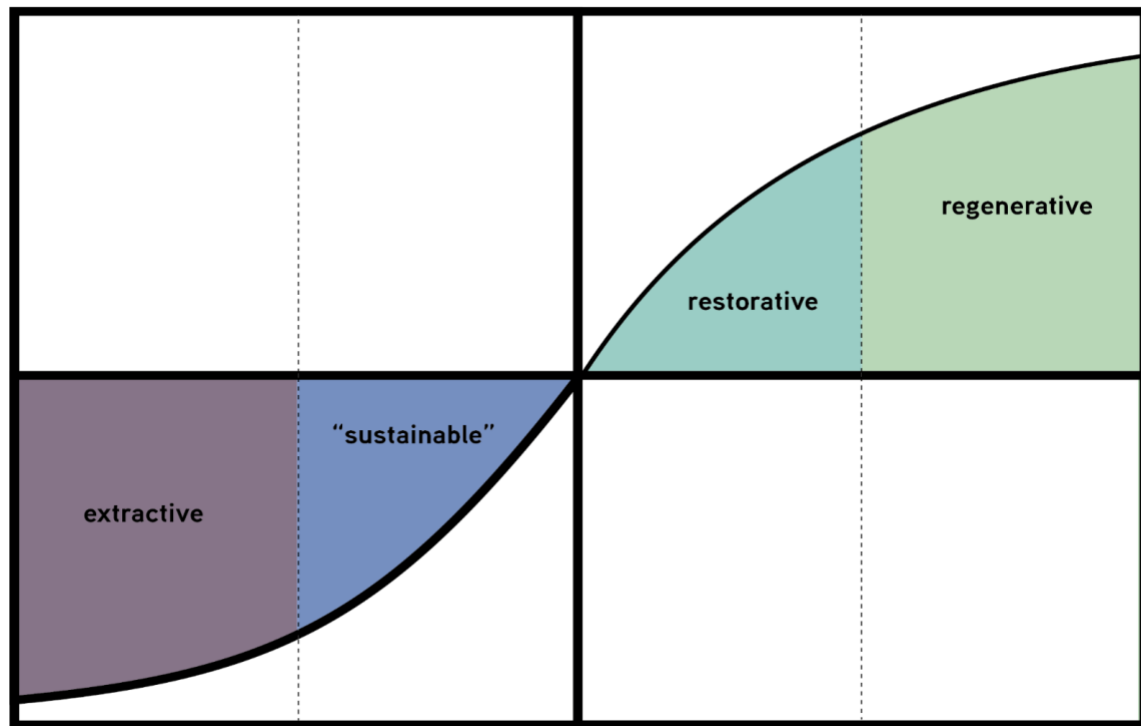


Figure 1 Extractive, Sustainable, Restorative, Regenerative Design - Adapted from Mang & Reed's *Contrast of Technical System Design and Living System Design* (2012).

the world that are embedded in, and orient the structures, institutions, values, and norms that govern society" (Bendor 2025, 2). The TT-FFF prompts interrogations of contemporary future imaginaries, the futures circumstances generated by the diverse types of approaches to ecological relationships, and the possibilities to orient design futures towards sustainable, restorative, and regenerative priorities.

## 4. Approaches

Design's potency in constructing viable long-term futures depends on design knowledge that works with, rather than against, the patterns of living systems. The TT-FFF builds on ideas of transition design, regenerative design, and ecological economics to support more ambitious ecological design imaginaries. Transition design offers approaches such as speculative futures, social imaginaries, and situated possibilities in everyday life to the project to address wicked problems no single person can "solve" (Irwin 2015; Irwin *et al* 2015; Kossoff & Irwin 2022). With the TT-FFF these are explored with participatory system mapping. Participants map futures created by design practices, technologies, and modes of development, along with the "unintended," or rather traditionally under-explored and neglected, socio-ecological consequences. The TT-FFF explores how long-term futures visions can generate ideas for the present.

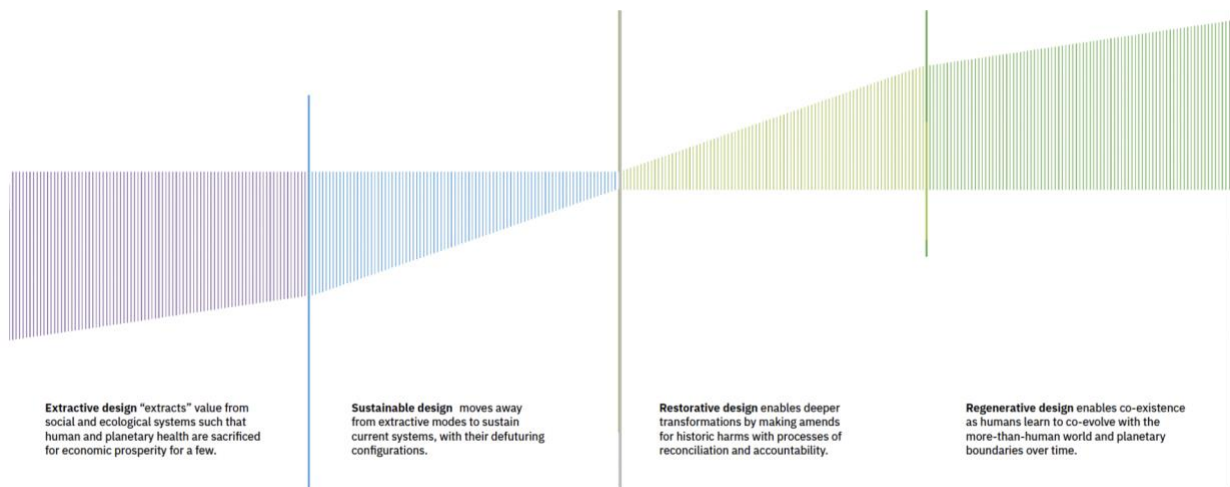


Figure 2. *Extractive, Sustainable, Restorative, Regenerative Design - adapted from Mang & Reed's Contrast of Technical System Design and Living System Design (2012).*

The TT-FFF creates visions for transition following regenerative design theory to encourage imagining futures beyond sustainability. The iconic and influential diagram "Contrast of Technical System Design and Living System Design" by Pamela Mang and Bill Reed (2012) visualises ecological forms of design beyond sustainability. This vision has subsequently been developed by Daniel Wahl (2016), McSweeney *et al* (2024) at Architects Declare, and other leading practitioners and institutions advancing regenerative design as a means not just sustaining, but regenerating living systems. Regenerative design theory creates more ambitious commitments to co-exist and co-evolve with natural systems over time (McSweeney *et al* 2024, 8). Transition Templates adapts Mang and Reed's diagram to create categories for the TT-FFF (Figures 1 and 2) where participants map "extractive", "sustainable", "restorative", and "regenerative" futures. The categories are defined in the *Transition Template Toolkit* (Boehnert 2026a) in the following ways:

- **Extractive design** "extracts" value from social and ecological systems such that human and planetary health are sacrificed for economic prosperity for a few.
- **Sustainable design** starts by moving away from extractive modes that sustain current systems with their defuturing configurations, to sustain life in all forms.
- **Restorative design** enables deeper socio-ecological transformations by making amends for historic harms with processes of reconciliation and accountability.
- **Regenerative design** enables co-existence as humans learn to design to co-evolve with each other and the more-than-human world, within planetary boundaries.

The TT-FFF prompts envisioning design futures that include the design activities that create these various extractive, sustainable, restorative, and regenerative futures and the worlds generated by these activities. In the exercise futures are examined as generated by ideas put

into practices with technologies, systems, and structures across political, economic, social, and technological domains. The exercise links ideas, practices, and future ecological conditions to imaginaries.

The tool provokes an ecological framing of transition beyond sustainability to restorative and regenerative options. Theorising regenerative sustainability as progress away from extractive modes of development with deeper types of sustainability available in restorative and regenerative design, this theory draws on the long-standing critique of “sustainable development” as “sustaining” development – which is inherently extractive in its current constellations. To be clear, in using the regenerative design framework, this work does not intend to undermine the concept of sustainability or create a false distinction between sustainability and regenerative design. It uses regenerative design theory to advance a critique of forms of “sustainability” that are inadequately ambitious, i.e. they enable continued forms of ecological harms will not support DWPB. This critique has existed since sustainable development was first coined in the 1980s as sustainability has been associated with development since the 1987 Brundtland Commission report. For this reason, sustainability has been described as the “conservation of development, not for the conservation of nature” (Sachs 1999, 34). This double meaning has been strongly critiqued in development discourses:

With sustainable development there are no limits to growth. Greens and environmentalists who today still use this concept display ecological illiteracy. There is a basic contradiction between the finiteness of the Earth, with natural self-regulating systems operating within limits, and the expansionary nature of industrial capitalist society. The language of sustainable development helps mask this fundamental contradiction, so that industrial expansion on a global scale can temporarily continue (Orton 1989, unpaginated).

With the use of the regenerative design theory, Transition Templates brings the contradictions more explicitly into focus. Meanwhile, the concept of “regenerative” is equally fraught with tensions. There is abundant superficial use of the concept, and not just in corporate marketing. The term regenerative is used in ways that dismisses the complex challenges of sustainable transitions altogether. It is as easy to greenwash using the term “regenerative” as it is using term “sustainable” so claims cannot be taken at face value, without interrogating socioecological implications. In Transition Templates regenerative design is theorised as a deeper type of sustainability that cannot be achieved without restorative social relationships emerging from just sustainability. Attending to the tensions in all contested terms in sustainability transitions supports ecological learning necessary for widening ecological imaginaries.

The TT-FFF prompts questions on the relative value of diverse transition activities by stacking them as levels of transition towards regenerative DWPB. The exercise starts by identifying the specific problems with extractive contemporary systems. This strategy follows John Ehrenfeld’s three-step process to address unsustainability by design: 1) bring destructive patterns to view; 2) replace modernist view of reality; and 3) replace structures and strategies (Ehrenfeld 2008, 8). Mapping the extractive dynamics in a problem space makes

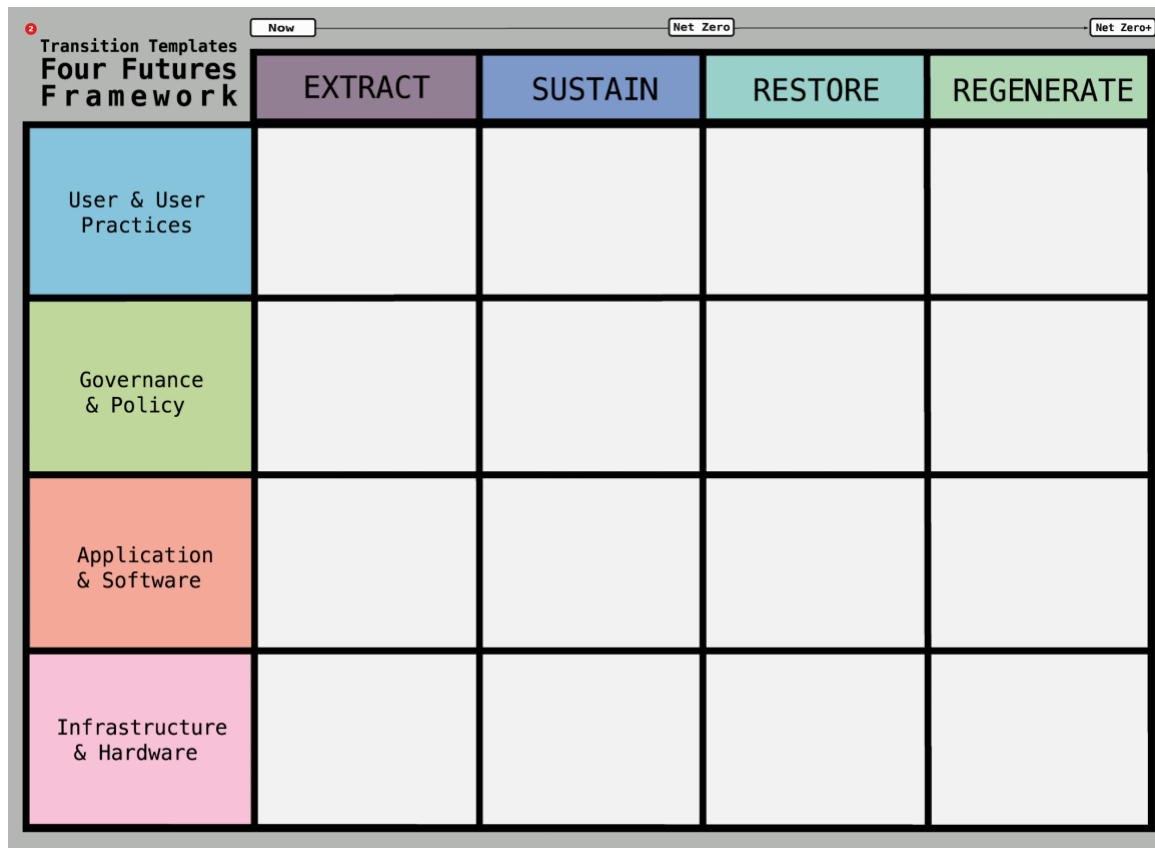


Figure 3 Transition Templates: Four Futures Framework (TT-FFF) AI & Digital.

the systemic drivers of unsustainability explicit. This process of naming supports the next steps in replacing the extractive mindsets, structures, and systems with the sustainable, regenerative, and restorative options. The method additionally serves to resist tendencies towards superficial appropriation of the sustainability agenda (with presentation of green design that camouflage continued extractive modes of development) by encouraging groups to discuss the distinctions between sustainable, restorative, and regenerative futures. The exercise prompts an interrogation of premises necessary to enable new frames and sensemaking capacities.

## 4. Method

The TT-FFF encourages groups to expand and ecologise their vision of future horizons in a specific sector or problem space. The template invites participants to explore Extractive, Sustainable, Restorative, and Regenerative options across Political, Economic, Social, and Technical domains of a sector (or any other problems space under review). The process starts by first using (or making) a sector (or problem) specific PEST or PESTEL analysis model (I use PEST for simplicity in this paper) where interpretations of “Political, Economic, Social, and Technical” domains are made relevant for the sector/problem space. These terms create the categories in the column on the left of the TT-FFF. The TT-FFF template is constructed by combining these categories of the sector/problem specific PEST in the column on the left

with extract- sustainable- restorative- regenerative spectrum (the row on the top). The matrix then has a box for each of the “four futures” for each category of the PEST model.

The TT-FFF illustrates movement from extractive to regenerative design in each domain (see figure 3). The tool invites comparisons between extractive pathways, i.e. futures that continue to “extract” more economic value from nature (where human and planetary health are sacrificed for economic prosperity for a few) to sustainable, restorative, and regenerative alternatives. Participants map ideas, practices, technologies, systems and structures that create different futures. The template prompts reflections of how a particular sector evolves across political, economic, social, and technological domains and across degrees of ecological transitions. It asks participants to imagine stages of transition options beyond current carbon intensive extractive modes of design and development. The TT-FFF focuses on the ways that futures are created with ideas, practices, technologies, economies, and policies.

The TT-FFF exercise can be used as part of the longer Transition Templates four-step process (as a two-hour session within a day-long TT workshop) or on its own. It can be delivered both in-person or online. It is ideally delivered with 12 to 24 participants forming small groups of 3-6 people. The entire group will focus on one topic (a sector, a problem space, or theme), but each small group will investigate one domain space (Political, Economic, Social, or Technical) within this topic. For the in-person workshops, we use tables with Post-it notes on A2 or A1 templates in small groups. For online sessions, we use a Miro board with the templates and digital Post-it notes. There are also A0 versions of the templates on the wall to bring the group visions together. The mapping happens in small groups with the entire group coming together at the end of small group sessions. Participants contribute knowledge and ideas using Post-it notes. Post-it notes are reorganized on A0 templates as part of a group discussion.

The Transition Templates Toolkit can be sent to participants before the workshop so background information can be read before the working session (the toolkit and TT-FFF templates can be downloaded from the project website). On the day of the workshop, we ask each of four small groups to take one of the domains in the TT-FFF and map futures across the extractive, sustainable, restorative, and regenerative row in the matrix, starting with extractive and then jumping to regenerative and working backwards. Each small group maps one domain at their tables. After about an hour, the entire group comes together, and the small groups present their work while transferring Post-it notes to a larger TT-FFF on the wall where all ideas are collected. The group discussion includes how the ideas from different domains intersect, and what pathways might already be visible.

## 5. Results

We have now used the TT-FFF on its own, within day-long Transition Templates workshops, as a “flash” workshop at an anti-conference, and as online workshops. It has been

prototyped with groups in two sectors (home energy and digital). The TT-FFF concept has also been shared with colleagues who have used it with students at two institutions. In this section, I describe some of these experiences. The future visions have come to life by making future scenarios visible and tangible with images and artefacts. The method provoked ideas for speculative design to engage preferable futures as described below.

### **5.1 Home Energy Sector Prototype at the Regenerative Design Symposium**

We prototyped the TT-FFF for the first time in a two-hour workshop as part of an event for the regional regenerative design community in Southwest England. This event engaged mostly design engineers, architects, and landscape planners – both practitioners and academics. The templates were printed as A1 sheets and used on tables with small groups. The workshop was highly experimental at this stage. The feedback was variable. The terms used on the left-hand column were a source of frustration for a few participants. This and other issues were raised in the feedback session and addressed for later versions of the template and facilitation strategies. On the other hand, participants easily understood the assignment. The “restore” and “regenerate” options were more easily identified in this sector than in the AI & digital sector that we prototyped in the next stage.

### **6.2 Flash AI & Digital Sector Prototype at Sparks Regenerative Design Anti-Conference**

We brought an updated TT-FFF to explore the AI & Digital sector to the Regenerative Design Anti-Conference. The event was held at Sparks, a Bristol city centre repurposed department store turned into a community centre with a small vendors market and event space. Workshop participants were primarily ecologically oriented designers, engineers, and educators. The revised TT-FFF was easier to navigate. Identifying restorative and regenerative options in the AI & digital sector was challenging in comparison to the Home Energy sector. There was advanced understanding of regenerative principles and digital technologies amongst the participants, so the session generated dozens of ideas with at least something in all categories. There was an enthusiastic response.

### **6.3 Transition Templates workshops**

We used the TT-FFF in two daylong in-person Transition Templates workshops in the AI & digital sector. The TT-FFF was used as Step Two in the four-step Transition Templates process. Participants for these workshops were digital design practitioners, academics (in disciplines including design, STS, and/or sustainability), programmers, environmental campaigners and advocacy organisers, startup founders, a journalist, and other environmentally engaged citizens and activists. The group included numerous people working in digital sustainability. The extract column was quickly filled out by all small groups. Participants had some difficulty finding examples under the “sustain” and/or “restore” categories, but ideas emerged for all groups. While the advanced knowledge in the room generated some ideas for the restorative and regenerate options, these categories remained elusive due to the energy and material demands of all digital infrastructure. Using the TT-FFF within the longer Transition Templates workshop created space to consider the actors



Figure 4 Transition Templates: Four Future Framework, AI & Digital, by Harijs Lukevics (2025)

involved in transition work, along with strategies and activities needed to enact different visions. We also used the TT-FFF in three shorter on its own in online workshops.

### 6.3 Post Workshop Speculative Design

The Transition Template workshops described above generated ideas that were documented with Post-it notes, photographs, research notes, and spreadsheets. These ideas provided starting points for speculative design outputs including a set of scenario visualisations, a set of digital decarbonisation toolkits, and the plans for an AI/Digital NetZero+ Visualisation Widget as described below:

- The *Transition Templates Four Futures AI & Digital Ecosystems* by Harijs Lukevics (2025) is a set of illustrations of four alternative AI and digital futures – extract, sustainable, restorative, regenerative digital ecosystems. Lukevics' four scenarios visualises the ideas generated in the TT-FFF exercise across the various workshops.
- Two Digital Deculturing and Decarbonisation Toolkits were created by Ruth Wright-Palmer (2025). One toolkit offers behavioral entry points for individuals, educators, and teams. A second offers a compact starter kit to help organisations begin decarbonising their apps, platforms, and content ecosystems.
- The AI/Digital NetZero+ Visualisation Widget is a proposal by Simon Gough, Martin Howitt, and Lucy Knight to use self-assessment and voluntary disclosure to engage individuals and organisations in reflections and dialogue around the realities of Net Zero+.

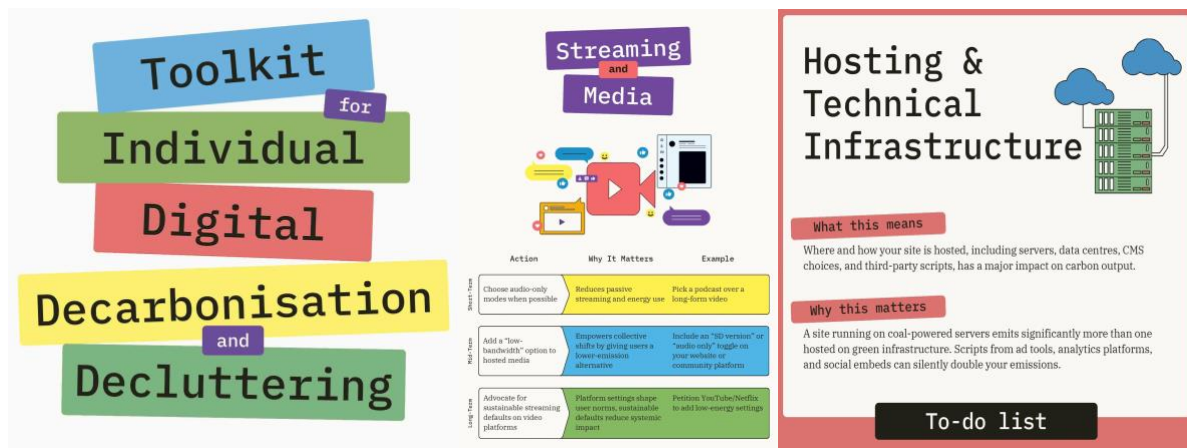


Figure 5 Images from the Digital Deculturing Toolkits by Ruth Wright-Palmer (2025). Available on the website.

## 6.4 TT-FFF in Design Education

In sharing the TT-FFF concept in conversation and in conference papers during the development period (Boehnert 2025; Boehnert and Alexander 2025) the idea was adopted by colleagues for use in design education. At the Bath School of Design, Bath Spa University (UK) Rachel Bynoth included an adapted version of the TT-FFF in a third year undergraduate Critical Design Thinking module with an assignment on design futures. In the School of Design, Carnegie Mellon University (USA), Peter Scupelli used the TT-FFF with his first-year students in a required Design Studies course called "Futures." In email correspondence, Scupelli explains:

"The goal of that course was to get students to begin to look beyond short-term design for industry. While it is true that entry level design jobs tend to be about short-term thinking, my goal was to prepare the students for when they would be promoted to leadership positions where long-term strategic thinking is an incredible asset. So, I taught the Futures Studies methods that companies, non-profits, and government use: Futures signs, STEEP forces of change, alternative futures (e.g., Dator's Generic Futures, GBN's 2x2 matrix of critical uncertainties, Adam Kahane's Transformative Alternative Futures, ARUP's Chris Luebkmann's Alternative Scenarios for year 2050).

At LxD2025 at Aveiro, we discussed the issues with using the ARUP alternative scenarios for year 2050. I was aware of the critiques that Richard Slaughter made of using alternative futures that are not possible anymore because of the advancement of the climate emergency (i.e. it is wrong to propose impossible future scenarios because they breed complacency). I used the ARUP scenarios because they were well documented and constructed. Easy to understand. There were SDGs benchmarks for year 2050. A timeline from 2019 until 2050 for each scenario explaining how that future came to be. For students it was very clear and scaffolded materials where they could understand step by step the assumptions. I was stuck, I knew the issues and the critique, but for a first-year student those ARUP scenarios were accessible but, in some ways, wrong.

So, when you suggested that I give your Transition Templates Four Futures Framework scenarios (i.e., extractive, sustainable, restorative, regenerative) a go, it solved a real problem I'd been struggling with as a design educator. My teaching objective for the course was to make students critical consumers of scenarios. So, the shortcomings of the ARUP scenarios were discussed as limitations of that scenario set. The Transition Templates: Four Futures Framework has the lovely feature of being connected. Meaning how do we get from extractive to sustainable, then to restorative, and finally to regenerative. It provides designers with an aspirational pathway and road map to navigate through" (Peter Scupelli, May 2026).

Here Scupelli describes the problem of design futuring reproducing scenarios disengaged from ecological and social implications of climate and ecological emergencies. In this tradition design futuring contributes to the climate denial that prevents necessary climate action. Scupelli adapted the TT-FFF as an educational tool to address this problem. The framework invites an exploration of futures with increasing commitments to ecological priorities, prompting the development examples of ecological transitions, and flexing ecological imaginaries.

## 6. Conclusion

The TT-FFF is an ecological design futuring exercise that prompts collective envisioning of alternatives to dominant narratives and future visions reproducing legacy dismissal of ecological entanglement. While the exercise depends on a critical mass of ecological, sustainability, and energy literacies in the group, this limitation can also be an opportunity for knowledge exchange when participants bring diverse knowledges and skills to the experience. The quality of the results depends on openness to learning and transdisciplinary collaboration. No tool can replace knowledges, skills, and competencies in sustainability – so learning is an integral part of the transition process. The method refocuses the scope of inquiry and ambition in design futuring towards DWPB. The TT-FFF prompts a process of collaborative mapping future visions of ecologically oriented products, spaces, services, and systems while also exposing the defuturing dynamics that undermine human and more-than-human rights to a stable climate, clear air and water, etc. It is a replicable model that makes extractive logics of legacy modes of design practice explicit to create conceptual and imaginative space for alternatives. It enables collective flexing imaginative capacities and envisioning future scenarios where ecological regeneration is already happening, bringing design within planetary boundaries into the horizon.

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