

13-16 October | Turin, Italy



RELATING  
SYSTEMS  
THINKING  
& DESIGN

# AI Futures Beyond Net Zero+

Transition Templates AI & Digital for the Future Observatory

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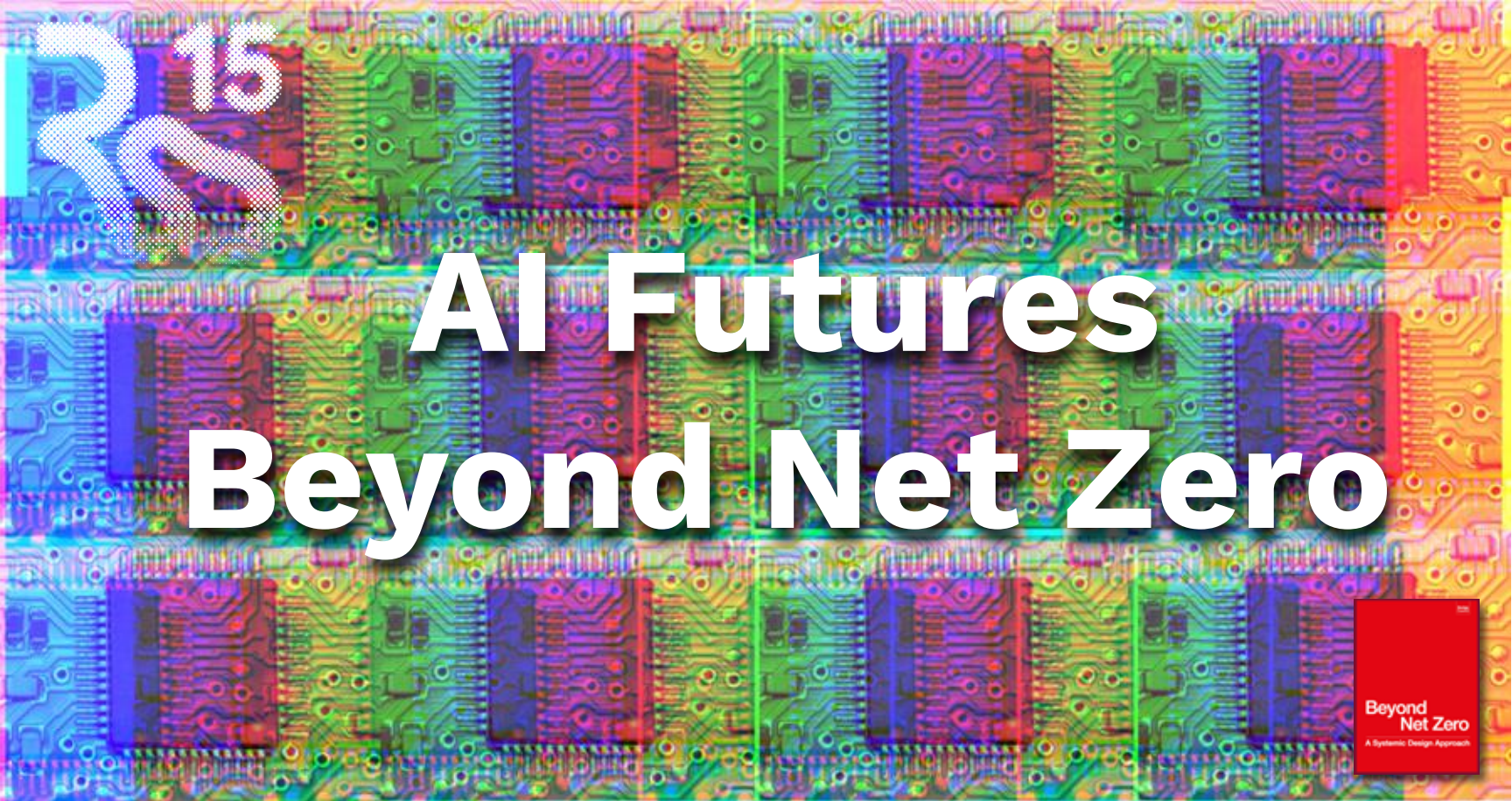
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Arts and  
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Research Council



# AI Futures Beyond Net Zero



# AI Futures Beyond Net Zero

**Transition Templates AI & Digital** for the Future Observatory

## Content

1. Digital Decarbonisation? – the context
2. Transition Templates AI & Digital: Pathways to Net Zero+
3. Transition Templates (TT) – workshop findings
4. Post-workshop: TT-inspired design futuring
5. Reflections & AI Futures

# Digital Decarbonisation ?





Transition Templates AI & Digital by Darren Raven 2025

Just ten of the largest data centres in development in the UK will cause annual emissions equivalent to 2.7m tonnes of CO<sub>2</sub>.

This increase in annual carbon emissions nearly obviates the carbon savings forecasted from the switch to electric cars in 2025 (2.9m tonnes) (CCC 2025).

Committee on Climate Change (2025, UK)  
Quoted in Foxglove & GAP (2025)

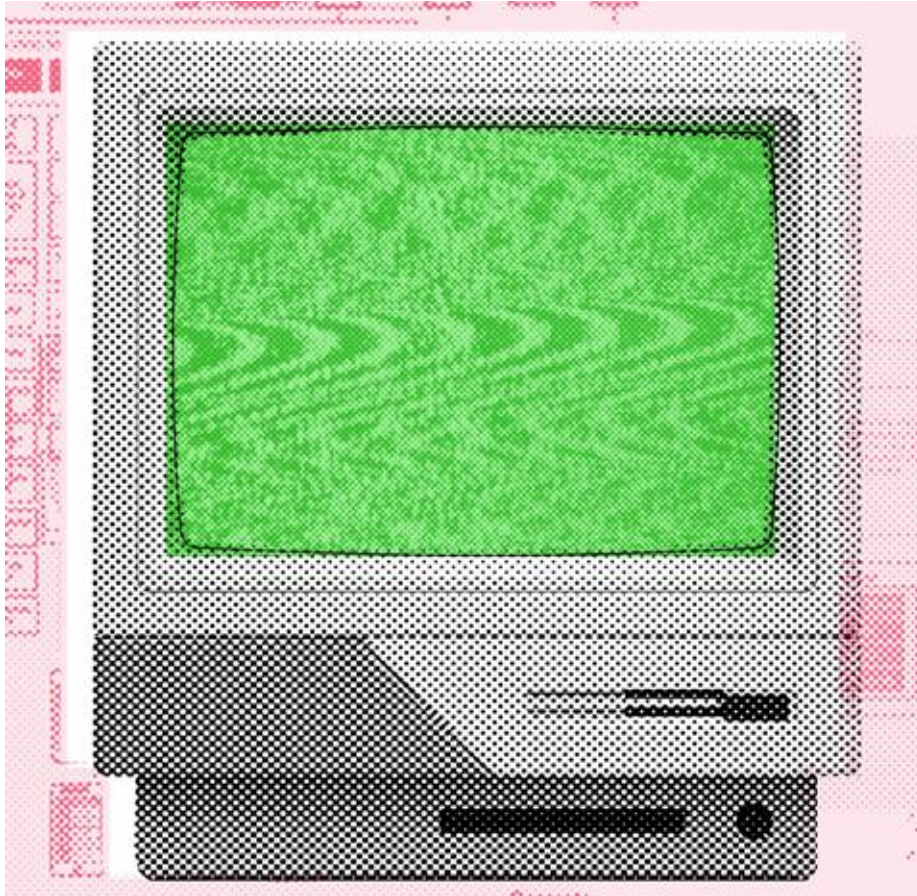


Transition Templates AI & Digital by Darren Raven 2025

In the UK, the CEO of National Grid estimated that demand from data centres will increase by six-fold in just the next ten years (Pettigrew 2024).

A typical AI-focused data centre consumes as much electricity as 100 000 households, but the largest ones under construction today will consume 20 times as much (IEA 2025, p.13).

Committee on Climate Change (2025, UK)  
Quoted in Foxglove & GAP (2025)



AI and digital technologies are not only massive new sources of carbon emission.

They also have new supply chains with new demands for critical resources (water, land, raw materials) and they create new sources of e-waste.

# Transition Template AI & Digital: Pathways to Net Zero+



Transition  
Templates

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# Transition Templates

## Pathways to Net Zero+

Empowering organisations and communities to map and enact energy transitions.

Home Energy  
AI & Digital  
Food & Agriculture  
Fashion & Textiles  
Higher Education

Facilitating collaborative approaches to Net Zero+



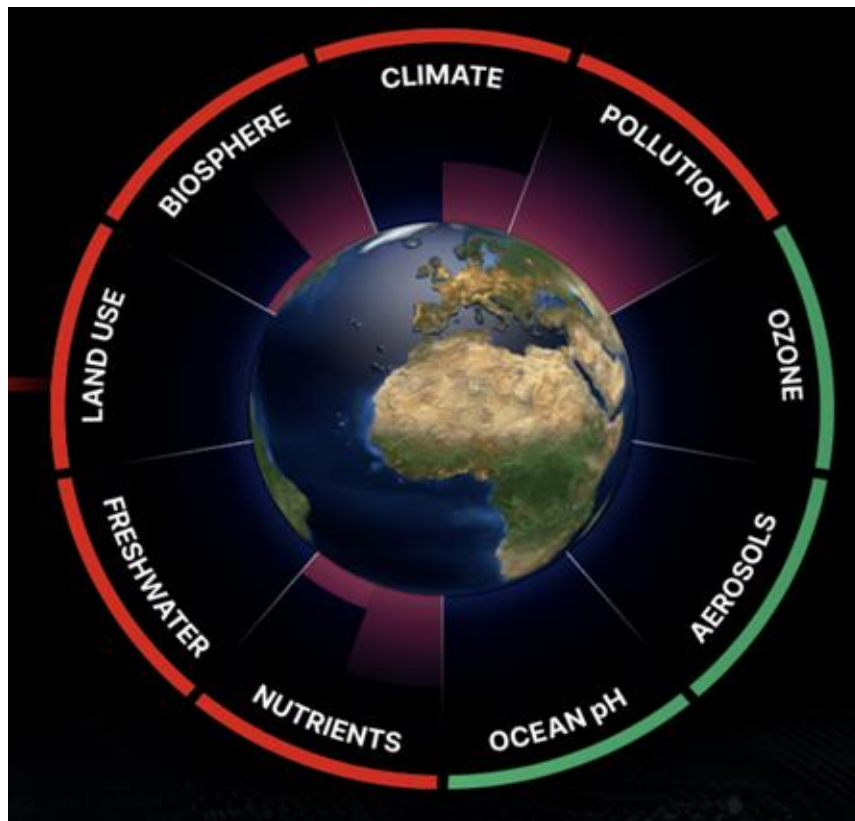
# Transition Templates

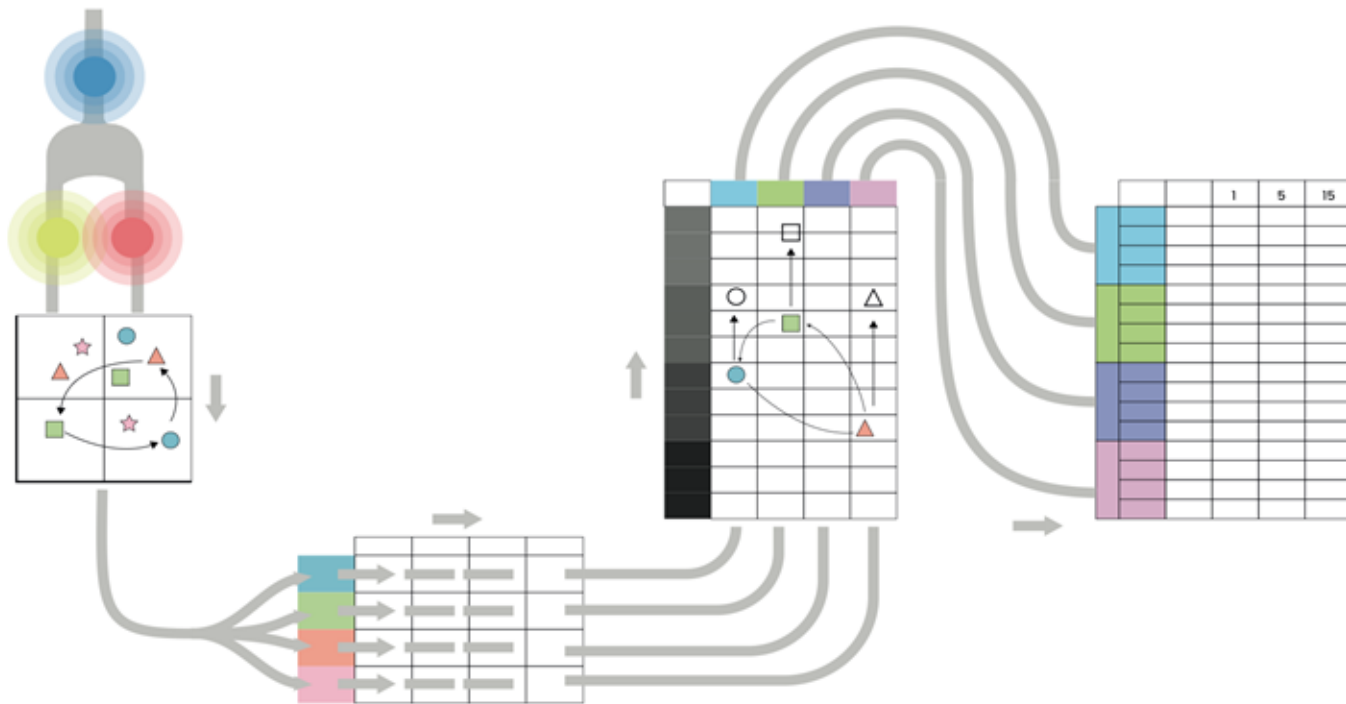
A structured systems mapping process guides participants through framing, envisioning, strategising, and planning **“pathways to net zero+.”**



# Net Zero+

Decarbonisation “plus” attention to the wider ecological emergencies.

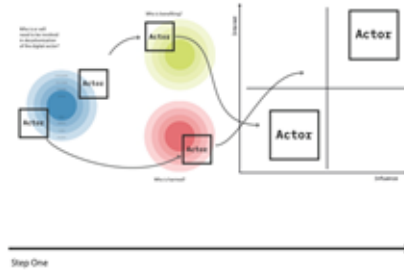




# Transition Templates Four-Step Process

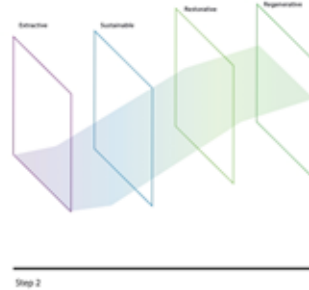
## Framing the System (1 hr)

- Ecosystem Framework (TT-EF)
- Power and Benefit analysis (TT-B&B)
- Influence and Interest analysis (TT-I&I)



## Envisioning Futures (2 hrs)

- Four Futures Framework (TT-FFF)



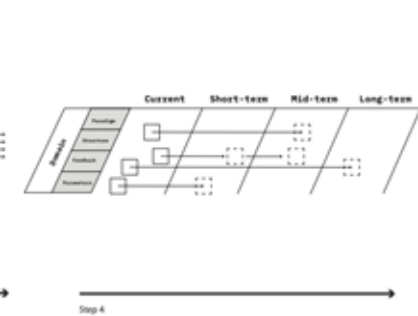
## Opportunity & Strategy (1.5 hrs)

- Leverage Point Framework (TT-LP)

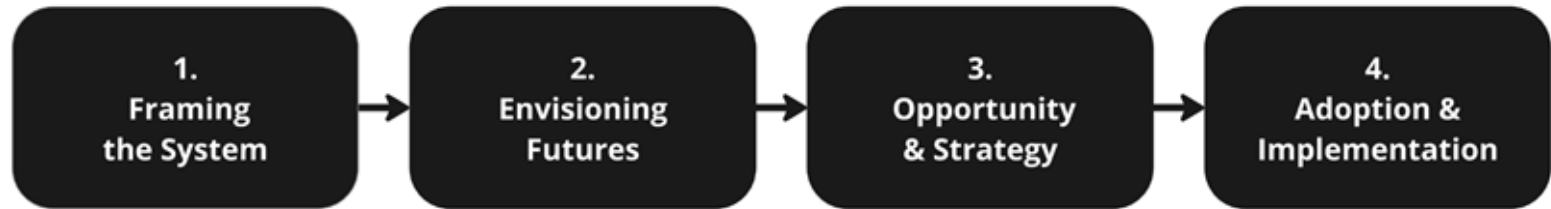


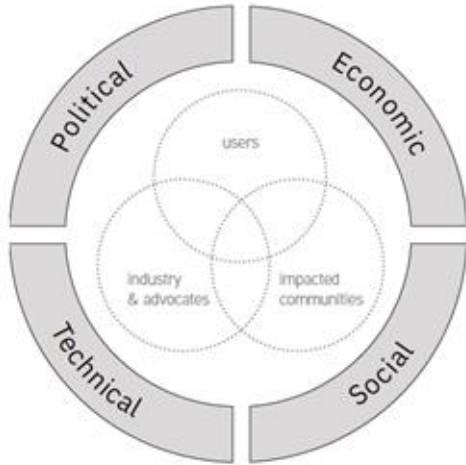
## Adoption & Implementation (1.5 hrs)

- Action Planning (TT-ACT)

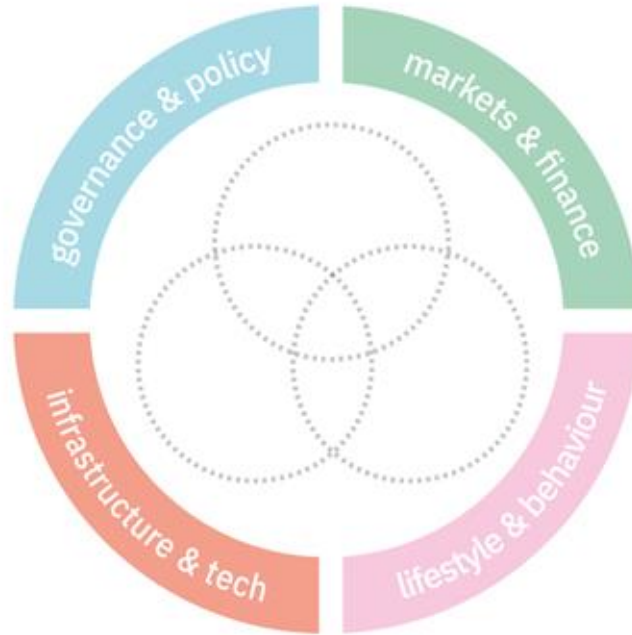


# Transition Templates: Four-Step Process

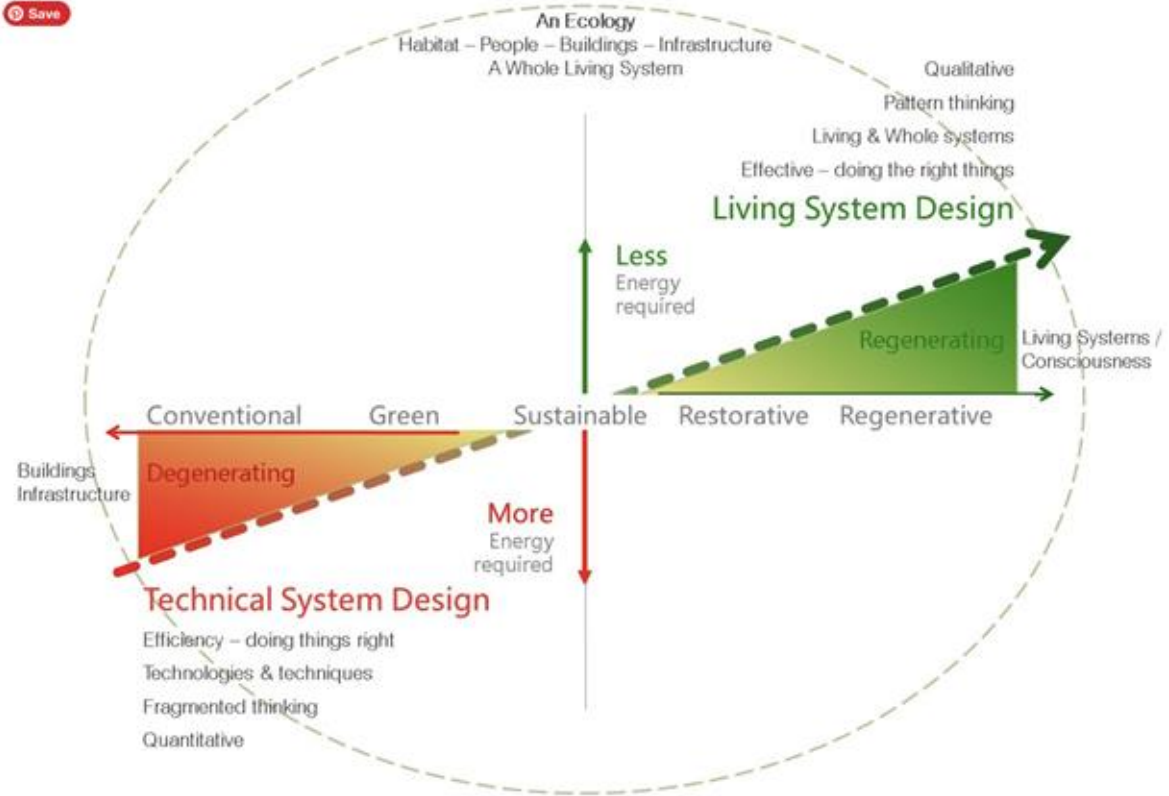




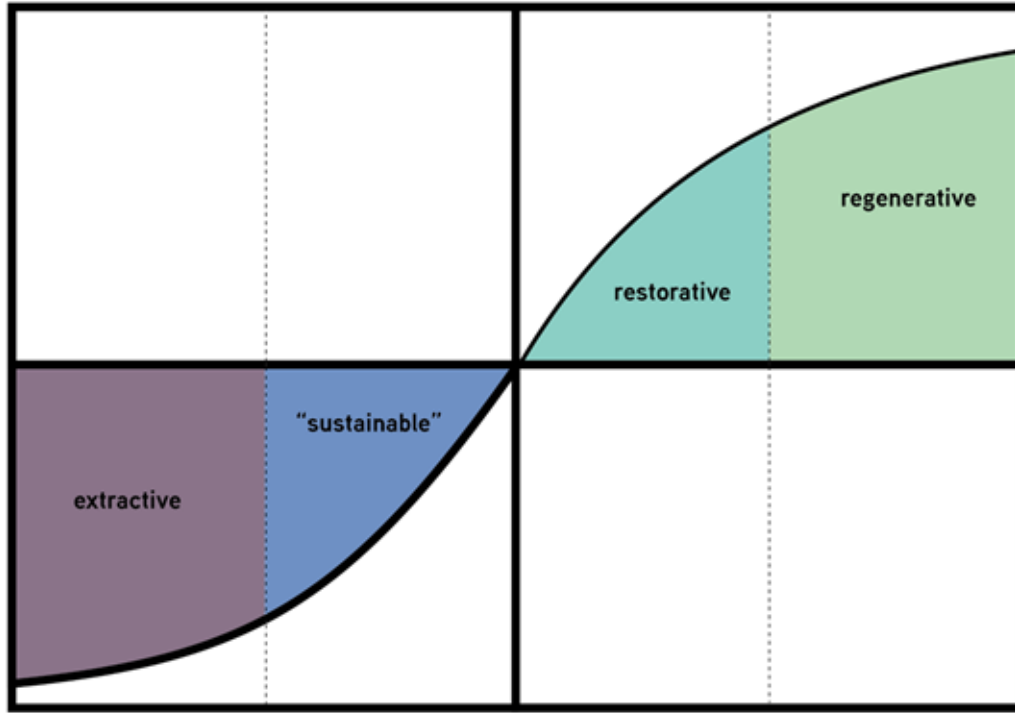
Generic TT-EF  
(PEST Analysis Model)



**AI & Digital  
Ecosystem Framework**  
(PEST Model)



**We create futures with activities that extract, sustain, restore, and/or regenerate.**

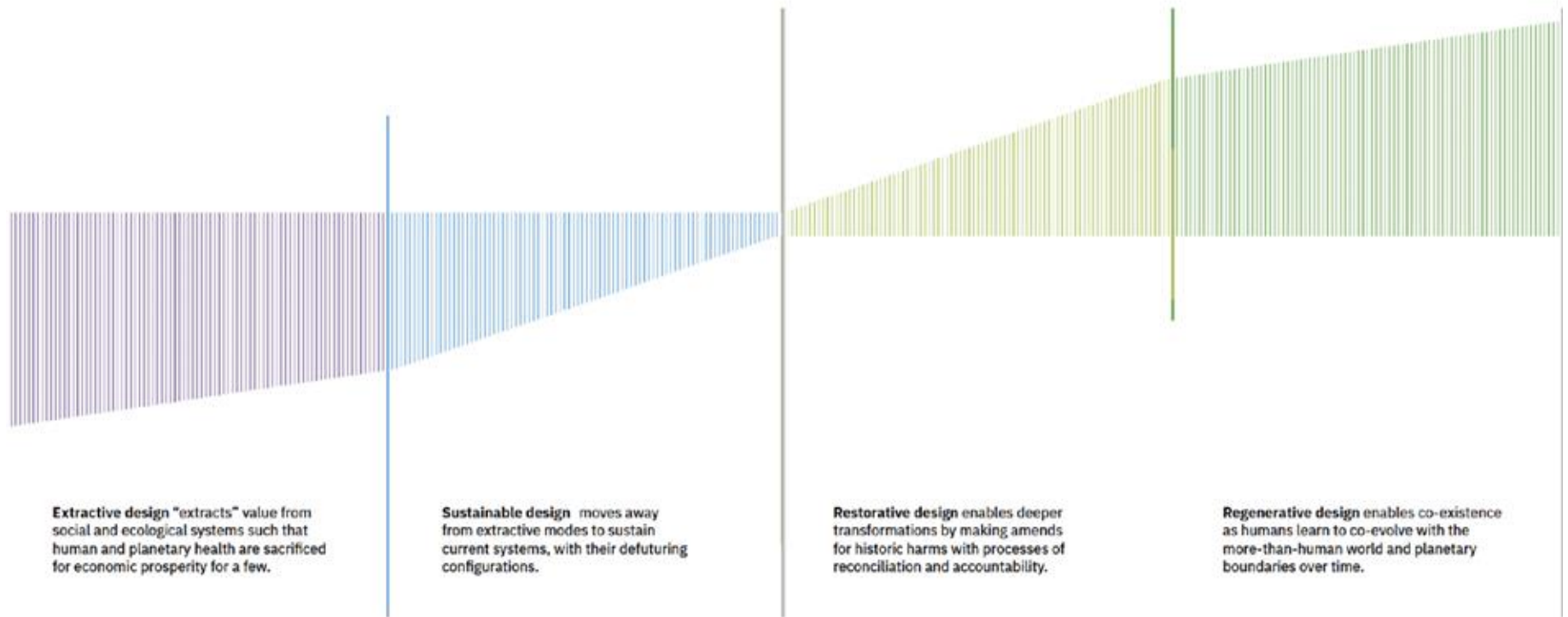


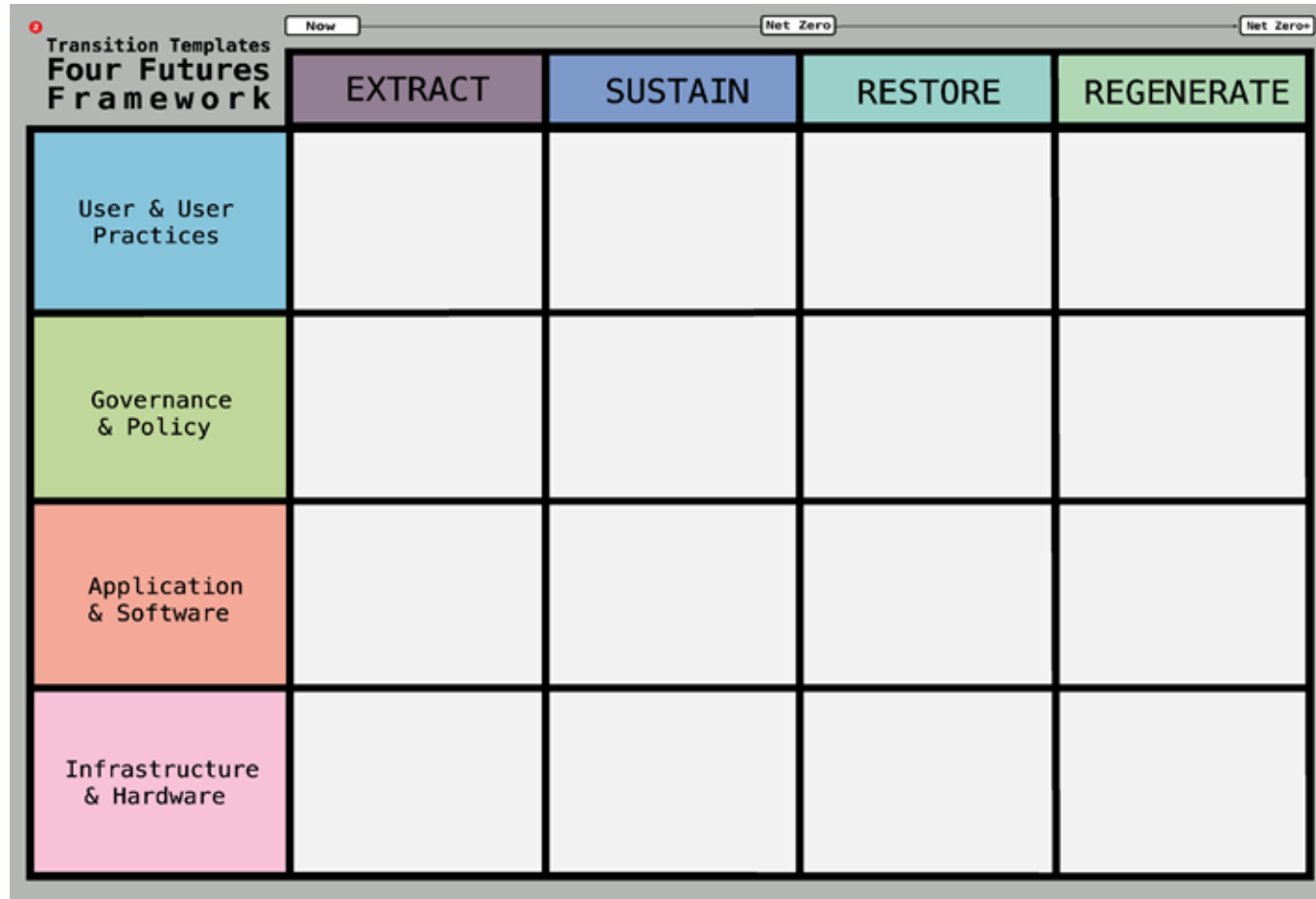
**Extractive** design extracts value from ecological systems – where human and planetary health are sacrificed for economic prosperity for a few.

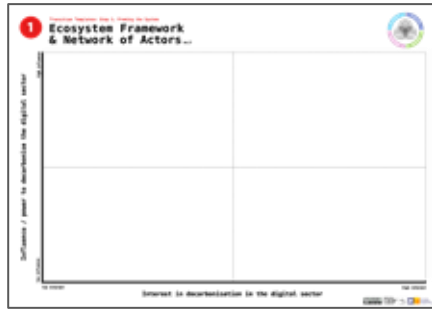
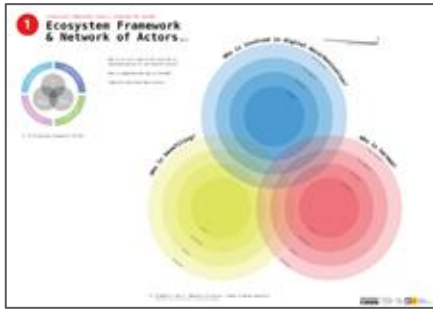
**Sustainable** futures that sustain current systems.

**Restorative** futures that enable reconciliation and make amends for historic harms with processes of accountability.

**Regenerative** design/futures co-exist and co-evolve with natural systems over time.







**Transition Templates Four Futures Framework**

|                           | EXTRACT | SUSTAIN | RESTORE | REGENERATE |
|---------------------------|---------|---------|---------|------------|
| User & User Practices     |         |         |         |            |
| Governance & Policy       |         |         |         |            |
| Application & Software    |         |         |         |            |
| Infrastructure & Hardware |         |         |         |            |

**3 Opportunities & Strategies Leverage Point Framework (TT-LPF)**

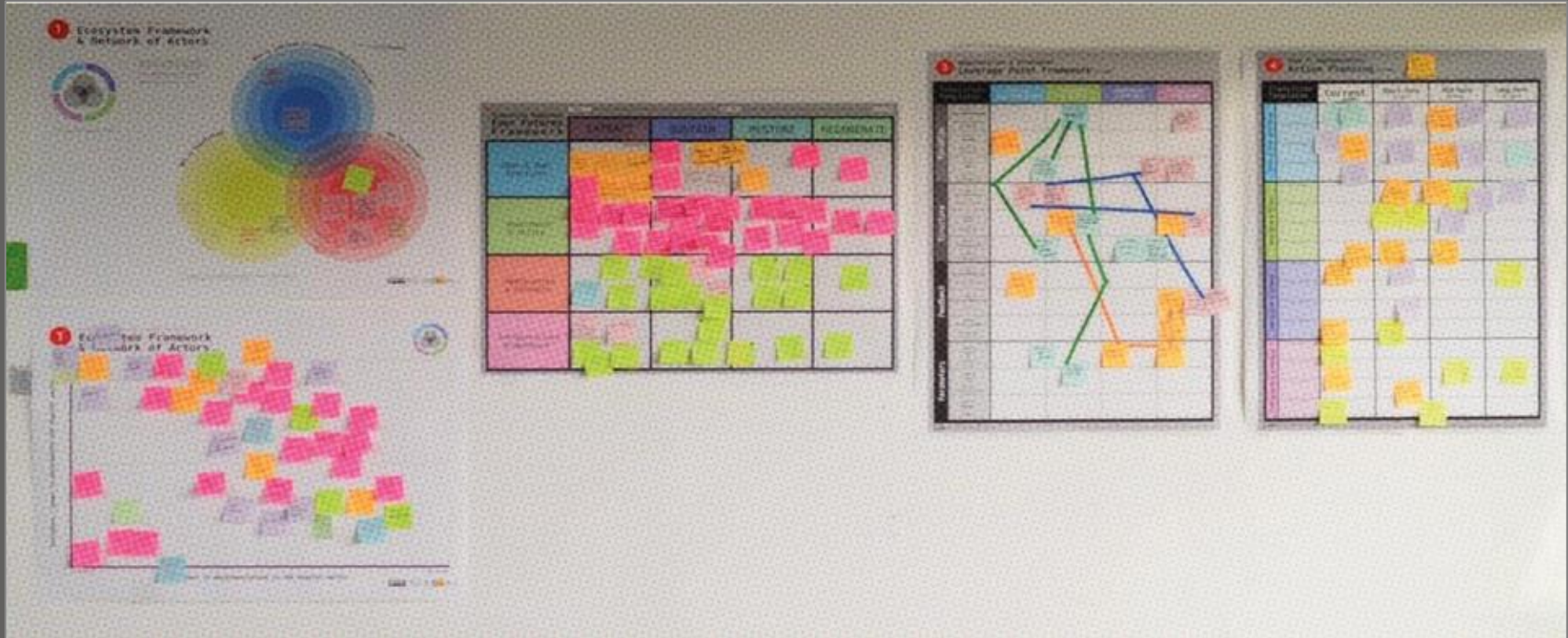
| Transition Templates | Users & User practices                                                                                                                                                                 | Governance & Policy | Application & Software | Infrastructure & Hardware |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------------|---------------------------|
| Paradigm             | Layer 1<br>Transcending Paradigms<br>• Welcome Ecosystem Perspective<br>Layer 2<br>Paradigms<br>• Regionalist Perspective<br>Layer 3<br>Barriers<br>• Net Zero Carbon Neutrality       |                     |                        |                           |
| Structure            | Layer 4<br>Self-organization<br>• Power to evolve<br>Layer 5<br>Rules<br>• Regulation<br>Layer 6<br>Information Flows<br>• Feedback & accountability                                   |                     |                        |                           |
| Feedback             | Layer 7<br>Balancing Feedback Loops<br>• Pricing Externalities<br>Layer 8<br>Reinforcing Feedback Loops<br>• Incentives<br>Layer 9<br>Structural Elements<br>• Infrastructure Overhaul |                     |                        |                           |
| Parameters           | Layer 10<br>Buffers<br>• Structure of stocks<br>Layer 11<br>Relays<br>• Buffers & stabilizing stocks<br>Layer 12<br>Parameters<br>• Numbers                                            |                     |                        |                           |

**4 Step 4: Implementation Action Planning (TT-AP)**

| Transition Templates      | Current                                                          | Short-term<br>5 Year | Mid-term<br>5 Year | Long-term<br>25 Years |
|---------------------------|------------------------------------------------------------------|----------------------|--------------------|-----------------------|
| Users & User practices    | Year 1 - 2025<br>Year 2 - 2026<br>Year 3 - 2027<br>Year 4 - 2028 |                      |                    |                       |
| Governance & Policy       | Year 1 - 2025<br>Year 2 - 2026<br>Year 3 - 2027<br>Year 4 - 2028 |                      |                    |                       |
| Application & Software    | Year 1 - 2025<br>Year 2 - 2026<br>Year 3 - 2027<br>Year 4 - 2028 |                      |                    |                       |
| Infrastructure & Hardware | Year 1 - 2025<br>Year 2 - 2026<br>Year 3 - 2027<br>Year 4 - 2028 |                      |                    |                       |

Transition Templates AI & Digital, 11 September 2025

AI Futures Beyond Net Zero. Transition Templates AI & Digital for the Future Observatory, #RSD15 Turin Italy



# Transition Templates: Workshop Findings





Digital

User  
ices

Finance  
olicy

lication  
oftware

BSU

Boehner, UK

Competition  
Consumer  
Techno  
behaviour  
Organise  
with cts

Trying to  
fit world  
into  
- current  
- reality  
Widespread  
use  
- non-  
critical

Teacher  
not  
active  
Participation  
of  
Market  
Ideology

public  
innovation  
IP  
Conception  
mindset  
for  
Growth

planned  
disobedience  
John  
Hawkins  
Hawkins  
for  
Digital  
Native

Control  
Software  
controlled

- AI shifting  
from a "tool"  
to a "medium"

AI shifting  
from a "tool"  
to a "medium"

AI shifting  
from a "tool"  
to a "medium"

AI shifting  
from a "tool"  
to a "medium"

AI shifting  
from a "tool"  
to a "medium"

AI shifting  
from a "tool"  
to a "medium"

WIDESPREAD  
TAKE UP OF  
DIGITAL  
WAYS OF  
LIVING  
AWARENESS  
OF ENERGY  
& RESOURCE  
COSTS OF DIGITAL  
PLATFORMS  
USING THEM

RESTRICT  
DATA  
CENTRE  
GROWTH  
BUILDING  
COMMUNITY  
FOCUSED  
PLATFORMS

AI shifting  
from a "tool"  
to a "medium"

TRANSFOR-  
MATIONAL  
GOVERNANCE

AI AS  
ACCESSIBLE  
TOOL

AI shifting  
from a "tool"  
to a "medium"

Net-gain  
calculation for  
whether AI is  
worthwhile for  
a given  
task

NEW  
ECONOMIC  
STRUCTURES

PARTICIPATORY  
DECISION  
MAKING  
COMMONS  
EMPOWER  
MENT

AI shifting  
from a "tool"  
to a "medium"

GROUND  
REPAIR POLICY  
OR MAKING  
AN EXPERTISE

OPEN  
SOURCE

COMMUNITY  
DECISION  
MAKING

Transition Tech  
encourages sec  
transition path  
the PEST analysis  
and Technology

Tran  
sem

Transitions  
are  
TT-FF  
active  
increasing comm  
activity. The IT  
to regenerative s

Transition Templates  
Four Futures Framework

## Extractive Digital Ecosystem



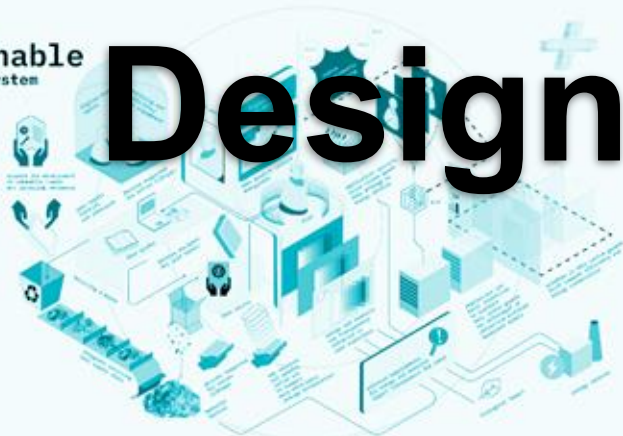
Transition Templates  
Four Futures Framework

## Restorative Digital Ecosystem



Transition Templates  
Four Futures Framework

## Sustainable Digital Ecosystem



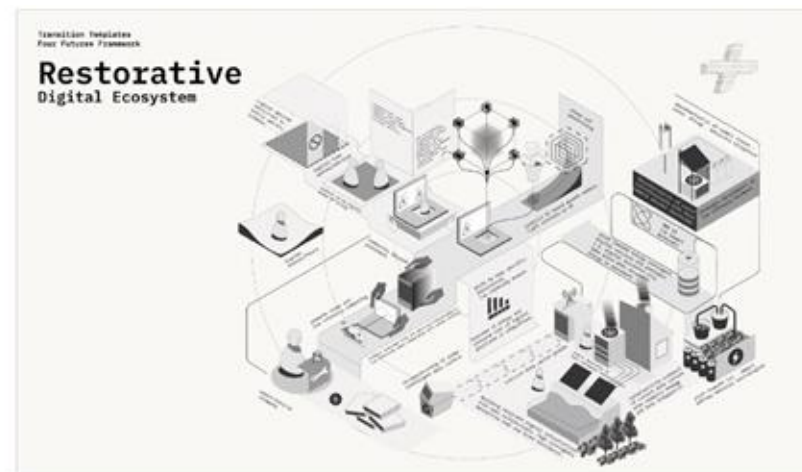
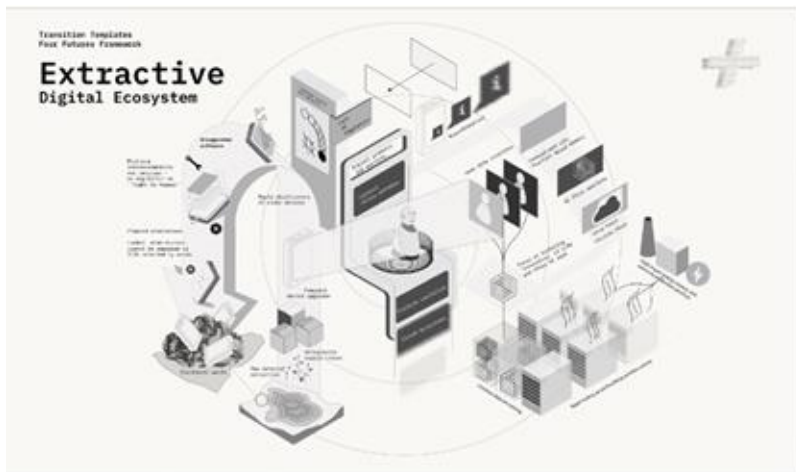
Transition Templates  
Four Futures Framework

## Regenerative Digital Ecosystem

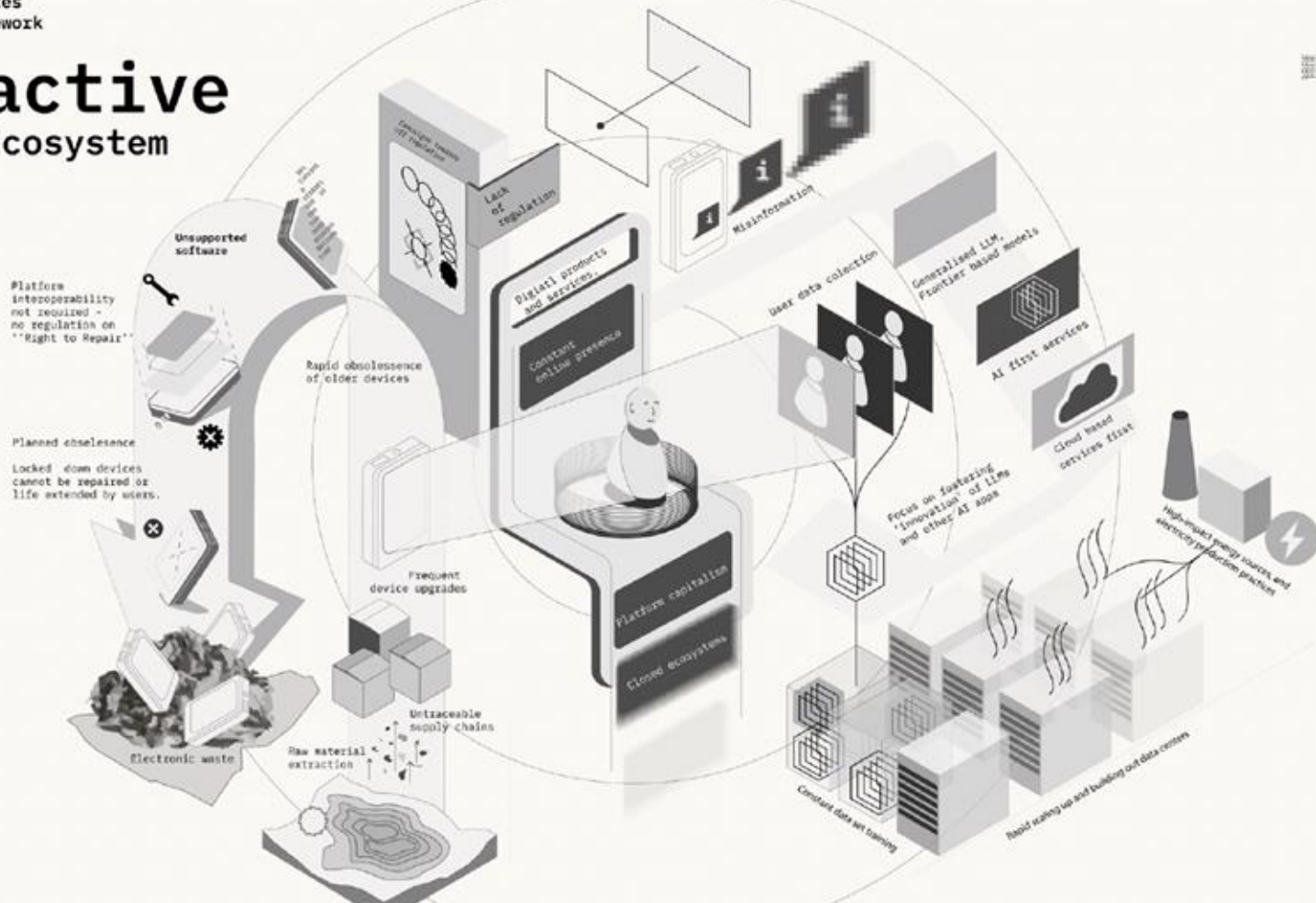


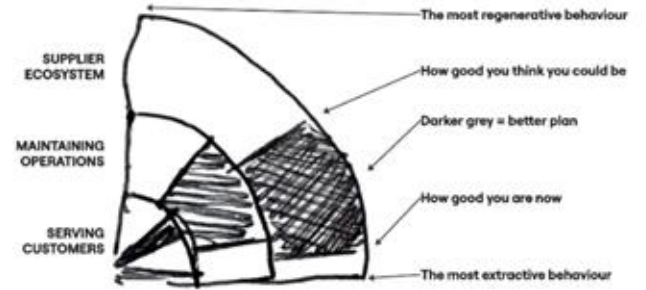
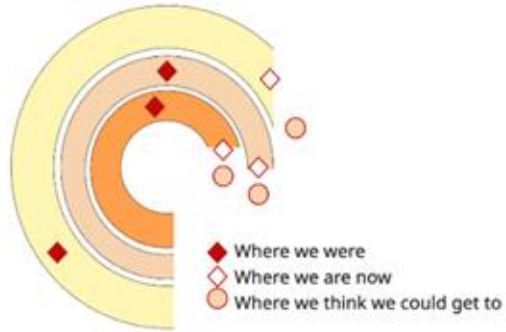
Illustration by Maria Lohmeyer (2020)

# Transition-Oriented Design Futuring



# Extractive Digital Ecosystem





*Figure 15. AI/Digital NetZero+ Visualisation Widget development sketches (Simon Gough 2025).*

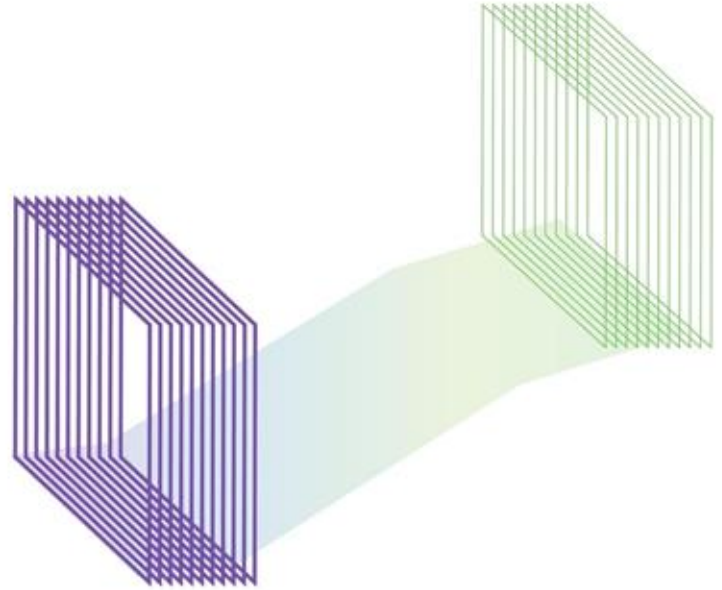
The Data Place created a self-assessment AI/digital widget to display a company's impact.

# Reflections & AI Futures

# Reflections & Insights

Participants described their limited agency in decarbonising digital infrastructure and resource intensive industrial systems.

Ultimately decarbonisation in the sector will rely on “fundamental changes in how we assess, communicate and govern the environmental impacts of AI, along with improved transparency from industry and developers” (Falk, et al. 2025, p.18).

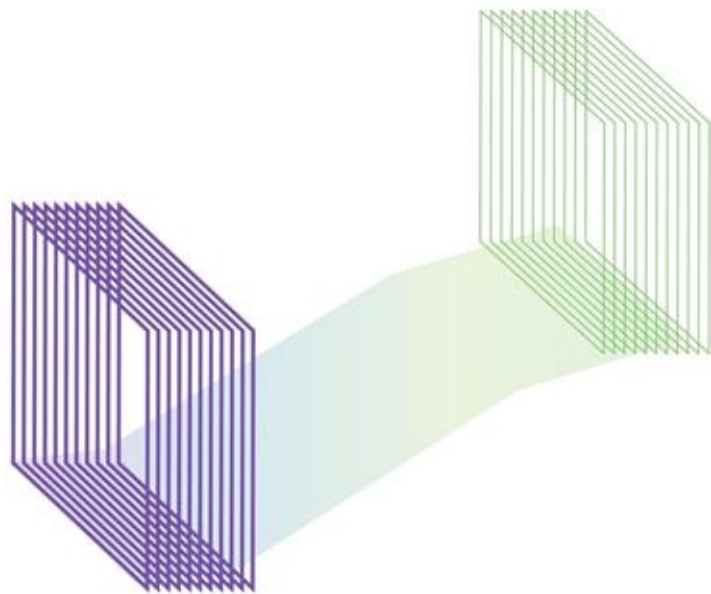


# Reflections & Insights

We found examples of institutions that claim to support climate responses while building high emission AI infrastructure.

In the UK, growth in the AI & digital sector makes it difficult to see how we will meet the legal requirements of the Climate Change Act and the Environment Act.

The British Academy warns that the “UK governance is creaking under the complexity of the net zero agenda, creating frictions that slow down delivery” (Kolu & Richards, 2025).

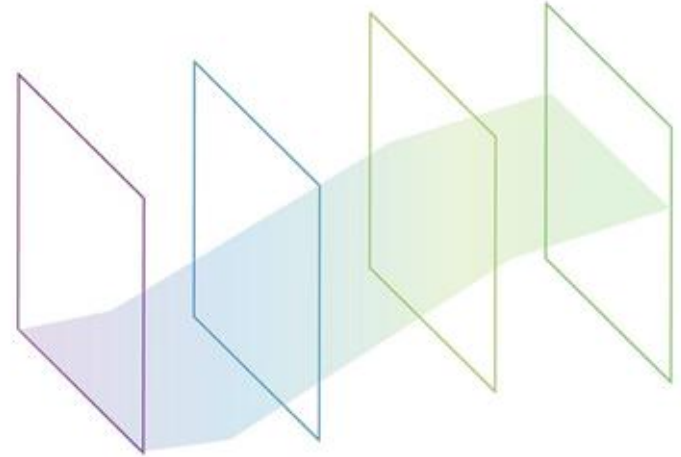


# Conclusion

Digital ecosystems impact and will be impacted by the climate and ecological emergencies in ways that remain under-investigated.

Transition Templates asks helps participants to explore questions around the amount of computing the world needs, in terms of sufficiency within ecological boundaries.

We explore digital futures alongside options for ways of living within planetary boundaries.





Transition Templates AI & Digital by Darren Raven 2025

Any credible net zero pathway for AI and digital systems would need to reckon with the sector's wider political economy. We are far from any such policy landscape.

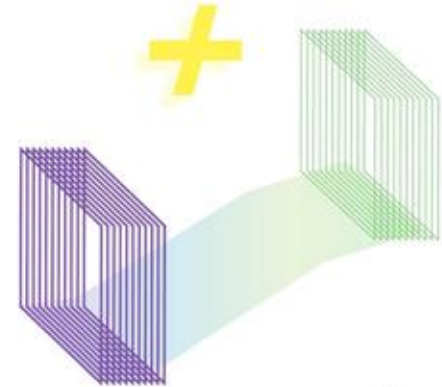
AI expansion is proceeding amid extensive tech corporate influence over climate accounting, renewed investment in gas infrastructure, and poorly evidenced claims about AI-enabled mitigation.

Furthermore, growth in data centres centre emissions is undermining energy transitions in other sectors.

# TRANSITION TEMPLATES AI & DIGITAL: PATHWAYS TO NET ZERO+

## Transition Templates Toolkit

Pathway to Net Zero



[www.eco-labs.co](http://www.eco-labs.co)

