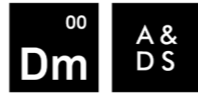


Making a future of Scotland



Dark Matter Labs
Architecture and Design Scotland





Making a future of Scotland

DRAFT 10/06/2022

Introduction

This open-end exploration work includes our initial findings, thinking and directions. It's a work in progress and is not intended as an "solution"; rather, it is an attempt to openly share a process of thinking and working out loud; inviting others to build upon. The motivation is to open up inclusive discussion instead of offering answers.

The ambition is grasping the complexity and the entanglement of the context. As data and information constantly change and evolve, as well as new understandings and findings emerge, this piece of work can only work as a constant "work in progress", adding new knowledge to it.

The complexity of the global context is impossible to grasp, but the motivation of this provocation is to open the platform for exploration, systematisation and innovation based on it.

Making a Future of Scotland is an open invitation for you to participate, to have conversations, experiment and share different ideas of the future. Its content will continue to be iterated and improved based on conversations and feedback in an ever-changing context.

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The context

Current systems are proving limited – many global problems such as pandemics, climate change, growing inequality and rising precarity, inadequate proxies for societal wellbeing and prosperity, colonization and increasing concentration of power cannot be solved with the current means.

The current environmental and social crisis is a consequence of a society based on fossil fuels and agriculture, on which many other layers have been built, such as linear material flow, social inequality, deforestation etc. Individuals, collectives and communities that work within society confront many, multi-layered entangled challenges on a daily basis. They are accustomed to working around legal, structural and financial limitations, operating in the face of constant obstruction. Our current high consumption, high inequality, high technological distraction and low levels of direct human connection are a direct product of the carbon pulse.

Strategic future goals and milestones on different scales, from planetary, governmental, city, to the neighborhood scale, such as UN Goals, Horizon 2050, Net Zero cities, Livable city, Healthy city, Safe city etc. all have shared set of interrelated future goals and commitments.

Going forward a lifestyle adapted to alternative and lower energy use, localisation in energy, resources and material flows, more interpersonal engagements, care and cooperation, more in sync with natural flows. Humans are incredibly adaptive when challenged, and the right circumstances our behaviors and cultural norms can change rapidly.

We need to rethink our social, governmental, economic, legal, cultural, value, educational, and technological systems. We can't do that looking only through the lens of planning, economy, technology or social science. They are merely tools that has to be used in the right way, of a holistic systems lens approach. Also, the history, indigenous cultures, other species hold thousands of successful arrangements we can learn from.



Iceberg model of underlying causes of current social and environmental crisis

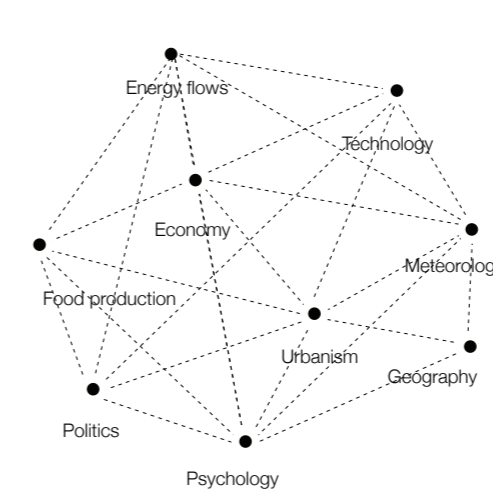
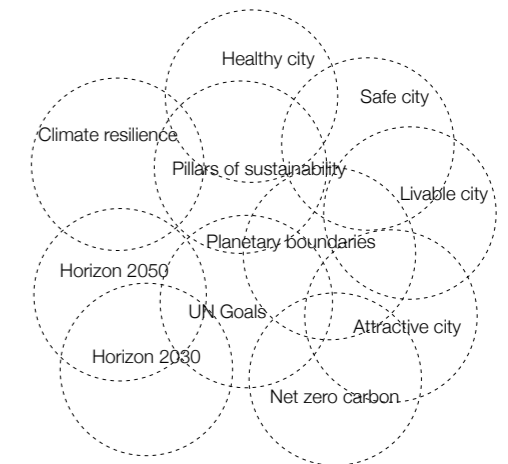


Diagram of interdependence of urbanism and other disciplines



Future goals and Sustainability indicators

We are seeing a fundamental shift
in our relation to energy, material
economy, water, food system, and
human development, that will recast
the economic geography of Scotland

We're intentionally not envisioning the future, what we are developing instead is new mechanisms and new institutional frameworks for future vision to be discovered.

To enable
change without
controlling it,
we need new
means of
recoding our
futures

Drivers of change

There is a fundamental shift in approach to:

How we produce

- Reimagining Energy and Resources balance and flow
- Reimagining materiality of the built environment
- Reimagining Labour, Intellect and Automation
- ...

How we use

- Reimagining Space allocation
- Reimagining Resources allocation
- Reimagining Decision Making
- ...

How we value

- Reimagining Quality of Space
- Reimagining the Potential of Density
- Reimagining Financing and Spatial Economy
- ...

Drivers of change:

How we produce

From linear
and violent to
circular and
lightweight
production



Reimagining Energy and Resources Flow

- From linear to circular Resources and Energy flow
- From global to local Resources and Energy flow
- A zero carbon energy, food, production, building and other sectors
- Material registries and sinking funds addressing longitudinal waste
- New emerging materials
- Reimagining circular industrial frameworks
- Reimagining benefiting from the agglomeration effect



Reimagining Materiality of Built environment

- Towards lightweight built environments
- Circular built environment material flow
- Material registries and restoration sinking funds
- Typologies of architecture beyond the standard paradigm (e.g. home, office hospitality etc.) towards hybrid typologies
- Reimagining the fundamental typologies of architecture (e.g. buildings as spaces for production, consumption, leisure; distributed digital manufacturing removing the need for "industrial-only" zoning areas)



Reimagining Labour, Intellect and Automation

- Reimagining automated work in the future of new energy sourcing
- Reimagining education, intellect and innovation

Drivers of change:

How we use

From top-down planning to a democratic use of space and resources



Reimagining Space Allocation

- Social smart permissioning as opposed to centralised permissioning
- Reimagining dynamic allocation of public spaces
- New mechanisms for dynamic use of spaces as opposed to planned use
- From top down planning to a democratic use of space



Reimagining Resources Allocation

- Outcome based permission of use (regenerative use of resources, energy, assets etc.)
- Reimagining density and the its impact and integrated effects
- Reimagining the value of agglomeration effect



Reimagining Decision Making

- Reimagining generating methods of mutual accountability
- Reimagining warranties
- Reimagining frameworks for an open decision making
- Social smart decision making as opposed to centralised

Drivers of change:

How we value

From economic to integral valuing of space



Reimagining Quality of Space

- Acknowledging the violence of current urban planning (noise pollution, air pollution, light pollution, inequality, generated waste, carbon emissions generated etc.)
- Reimagining built environment from programmatically driven to landscape driven
- Reimagining environmental quality metrics (air, sound, light, noise, microbiome standards)
- Reimagining environmental quality regulations



Reimagining the Potential of Density

- Reimagining integrated effects of density
- Reimagining metrics of built environments
- Reimagining metrics of density from only human to integral



Reimagining Financing and Spatial Economy

- Reimagining spatial economy
- Financing of built environment from architecture as product to an entangled fair service
- Reimagining Investing for an Integral approach
- Reimagining government as a lead market maker
- Reimagining economic geography of Scotland as a whole
- Reimagining economic global chain to a local circular system
- Reimagining benefiting from the agglomeration effect

What are the mechanisms and key control points we can shift to enable the transition ?

A need for new mechanisms

We are seeing a fundamental shift in our relation to energy, material economy, ecological services, work and the frames of human development. These foundational shifts are going to recast the economic geography of Scotland; to transform our cities, towns and villages and their structural economic geography, built environment and landscape.

An alternative to current disaster capitalism response mechanisms is creating new capacities for democratic transitions and democratic distributed response capacities of society.

The volatility and uncertainty generated by these structural shifts makes it impossible to predict, and to control these levels of transitions. What it actually requires is new response mechanisms and a transition in our regulators

for place. Our current control points of density, permissions, material and energy flows, waste generated etc. need to shift in order to reframe our capacities for solutions to emerge.

We're defining the mechanisms, the capacities, and the material vision of our city is left open for every location to interpret it in response to their location.

So, our work is not about envisioning a future of Scotland, we are intentionally not creating vision models. What we're changing is the capacity for the system to respond to these fundamental shifts.

We're not offering solutions, what we are building instead is new mechanisms and the new institutional frameworks for future to be discovered.

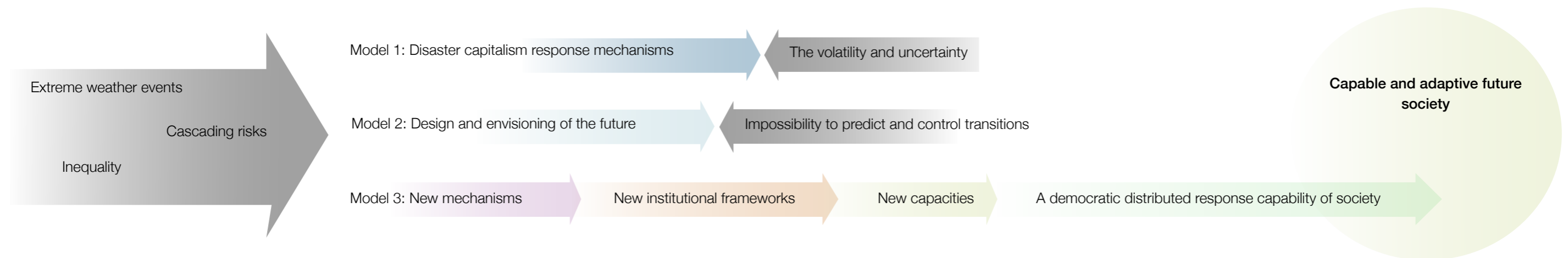


Diagram: Comparisson of different models of responding to the current societal and clinmate crisis, and approaching future development

By shifting the key control points, we shift the outcomes of studies, management of processes and opportunities for innovations.



Mechanism 1: Accommodating uncertainty

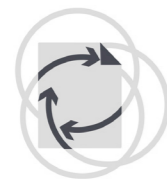
Current top-down, centralised planning prescribes space and resource allocation, and in some cases, even pre-judging civic engagement, yet space is one of our most valuable resources. We need emergent instruments for our civic realm to democratically self-govern and self-organise, and allow for a dynamic, democratic civic engagement.

Case Study: Permissioning City

What if instead of applying for permissions from the local authority, we allocate uses to spaces in the city through a digital platform powered by citizen engagement?

Can spaces in the city become more flexible and intense hosts to urban and economic activity, through a permissioning system that can allocate space to dynamic, time-based uses, while informed by their potential externalities and automating compliance?

Can a public space host a pop-up restaurant at noon, and a music performance in the evening, with noise level monitored by sensors, all the while gathering data to guide decision-making for permits in the future?



Mechanism 2: Real-time feedback on environmental impact

Environmental regulations are still reliant on labour-intensive, spot inspection procedures for enforcing compliance. With the extensive coverage of communications infrastructure, low-cost sensors, and data processing capability, using real-time data becomes a feasible alternative regulatory mechanism, for anything from air, noise, light, heat, and water pollution, and more.

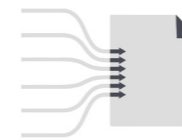
Live data provides a feedback mechanism that serves as a foundation for strategies to avoid, mitigate and compensate for these externalities, and strengthen accountability for impacts that are often pushed to the commons and public liability-holders.

Case Study: Peer-to-Peer Planning

Instead of the impact of a building only being assessed solely on the planning authority's judgment before it is approved and built, what if the impact of a building is measured throughout its lifetime, through sensors, remote sensing, and other data sources?

Instead of planning permission being a centralised decision, can it be granted via a contract with all impacted neighbours to allow for more direct, transparent negotiation and dispute resolution based on the measured impacts across a development's lifetime?

Can non-human and natural actors, such as local trees, rivers, meadows and highways networks also take part in this multi-agent negotiation, based on sensor data and an AI decision-model?



Mechanism 3: A total cost view on built environment

The built environment today is an ecological consumer rather than ecologically regenerative; a source of waste during its entire life cycle, and a source of greenhouse emissions as a result of the globalised supply chain on which it's based.

We need a sustainable and integrated supply chain; new mechanisms accounting for whole-life cycle outcomes and benchmarks that prioritise materials that are biodegradable, bio-based, reused, and recycled, and manufacturing and assembly that is local, distributed, and digital.

Such instruments can be in the form of whole-system accounting for buildings, long-term automated modelling and monitoring of embodied energy, embodied and emitted carbon, and building and component performance.

This data infrastructure serves as a platform to develop feedback mechanisms and performance-linked design practices and contracting, recognising the importance of entangled deep relationships between the building, its materials, its residents, the climate, nature and the civic ecosystem.

Case study: Comfort contracts

The current life cycle of buildings involves passing responsibility and risk downstream, from architect/designer, to contractor, to inhabitant, to deconstructor.

Under a whole-system view of a building, what if the creators and operators of buildings are not only contractually responsible for delivering the built artefact, but the lifetime performance of a building as well, such as its internal comfort, and its end-of-use liabilities, such as its reuse, recycling costs? How might that realign incentives to design for better energy performance that moves beyond the bare minimum required by regulation?

How might being liable for end-of-life costs incentivise design for disassembly and reuse, and maximise value recovery through deconstruction and secondary materials markets?



Mechanism 4: An integrated metric of good

Current reductionist and siloed metrics of value often lead to perverse incentives that fuel the climate crisis: there is an urgent need to shift towards whole-system, integrated, metrics of good.

With ecosystem health as a priority, our built environments need to become one with natural ecosystems and co-exist with surrounding biodiversity, and serve as infrastructures that enhance, rather than diminish, human wellbeing.

New mechanisms that frame recognitions of positive spillover values, co-benefits and their role in mitigating the uncrystallised liabilities, for example, integration and measurement of spillover effects from surrounding civic ecosystems (green transport, walkable distance to public school, library, a park) to the valuation of a built asset.

Case study: Landscape scale business model

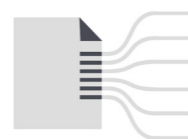
What if, instead of a current disaster capitalism response mechanism, we created new capacities for democratic transitions and democratic distributed response capacities of nature and society? What if instead of investing into remedial infrastructures for climate adaptation, we invest into regenerative urban forests and other civically-driven climate transitions?

Liability holders covering for the cascading risks of underperforming housing and infrastructures are many: local authority, energy utilities, water utilities, health services, social care services, flood authority, housing benefits and tax relief departments,

departments for transport and roads, etc.

What if the investors (pension funds, impact investors, foundations, grant capital) and liability holders invested in nature based assets and mental wealth assets instead.

These new system-based financing models effect real change through gifting models that build an environment of emerging and growing civic and spatial assets, generating long-term ripples of beneficial economic effects, with positive investment returns that are aligned with positive societal returns.



Mechanism 5: Longitudinal control of externalities

Current production and building processes have been organised around global material flows, economic growth and efficiency, ignoring the integrated ecological cost of it.

New models need to include accounting for environmental costs, developing processes with the longitudinal control of all the externalities and effects those processes have on environment and health.

Practical methods of controlling it such as Life cycle assessment of materials used, environmental impact of different processes, material passports, material balance sheets, digital sinking funds to cover recycling and waste costs.

Changing the material registries and sinking funds will change the way we build our buildings, designing them as a landscape rather than programmatic entities.

Case Study: Material Registries

An office block is reaching the end of its useful life. What if, instead of being demolished and the rubble being sent to landfill, it has a material registry, a database containing the specifications of all its components, and their performance and maintenance history over its lifetime?

A deconstruction specialist may use this information to reuse as much as possible of its materials, with more certainty over its condition and value in secondary uses.

Materials that cannot be reused could be recycled to maximise their circularity and minimise their environmental impact, with the process funded by a sinking fund set aside over the building's lifetime for its end-of-life costs, maximising the circularity potential of our buildings' material flows.



Mechanism 6: Open decision accountability

Decisions over the built environment, when centralised, rely on the decision-making body such as the local authority to have robust enough mechanisms for transparency and accountability. Current mechanisms for transparency are still labour-intensive, such as filing FOI requests and deep research, or concentrate powers to demand accountability on a few representative actors.

In a decentralised decision-making process, how can we reimagine new ways of generating mutual accountability?

Open decision-making and deliberation platforms can pioneer new methods of consensus-building and expressions of preference that move beyond momentary, simple majorities, while technological infrastructures such as distributed ledger-based decision records can decentralise the responsibility for transparency. How can new contractual mechanisms such as reimagined warranties also form the basis of many-to-many accountability networks?

Case Study: Neighbourhood-drive climate transitions

What if climate transition projects, from housing energy efficiency retrofit to public realm upgrades, are commissioned street-by-street by the communities that live on them? How can we devise bottom-up ways for communities to have sense-making, decision-making, organising, and financing capability over their neighbourhood's climate transition? Can we use games to create a collective intuition over making cost-benefit choices, and help a community understand which outcomes to prioritise and their decisions' opportunity costs?

Can we use digital decision-making platforms with built-in governance mechanisms that allow the right balance between direct engagement and dynamic delegation to equitably share the cost of participation, while providing an open, transparent record of decisions and their rationale?



Mechanism 7: Building as self-sovereign entity

The way we currently fund, design, and develop new homes is deeply unsustainable: economically extractive, unaffordable, waste intensive, and short-lived in quality. The building sector sits at the heart of the multiple crises we are currently facing, and requires a systems solution to address them.

A house today is a capital intensive, short-term investment, a product that creates

debt dependency of its users, and an entity that depends on civic goods rather than co-regenerates.

When our buildings are re-coded to become self-sovereign legal entities, traditional power relationships that derive from ownership and its associated rights of extraction and use can be re imagined beyond individual interests. When an asset is held in trust as common responsibility, cohabitation with nature and integrating with civic infrastructures becomes central to the mandate of long-term stewardship.

Case Study: the Free House

What if a house can own itself? Can the ownership of affordable housing, as a public good, be held in a community-governed trust? Instead of a landlord-tenant relationship, can a resident of a self-sovereign house enter into a stewardship contract with the house for its long term care and custodianship, in exchange for affordable housing costs, instead of rent?

The cost of housing would fund the financing costs of the perpetual bond that pays for the house's construction and land acquisition, and would diminish over time due to inflation: can the Free House be the start of an alternative non-private, non-public, but common housing market?

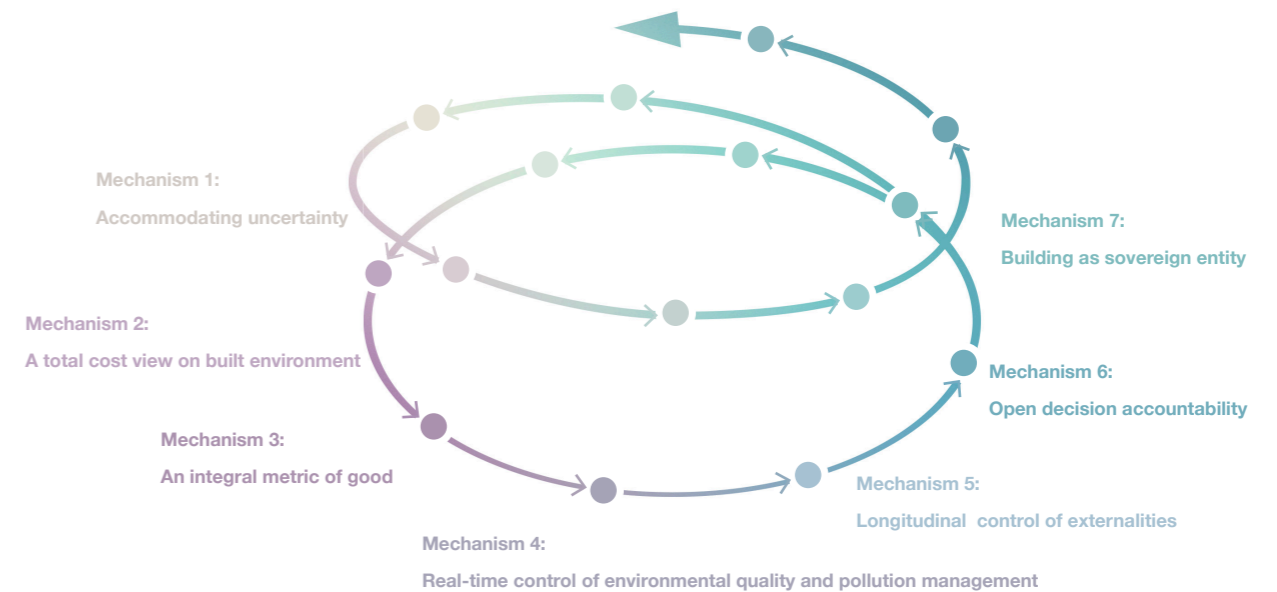


Diagram: The first set of mechanisms generate new capacities and new emerging mechanisms towards a capable and adaptive future society

The goal is to build new capacity
for a societal renaissance



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