LUCID: Laboratory for Urban Collective Intelligence Design

Climate-wise Briefing: Part A

V 2: 21-01-22

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Links & sources:

- Climate-wise toolkit – www.manchester.ac.uk/synergistics/climate-wise-mapping-the-frontiers/
- Climate-wise program - www.manchester.ac.uk/synergistics/climate-wise/
- Post-COP26 workshops - www.manchester.ac.uk/synergistics/foresight-climate-futures/
- Synergistic toolkit - www.manchester.ac.uk/synergistics
- Interactive Collaboratorium - ***Laboratory for collective intelligence***
- Source text - ***Deeper-City: Collective-Intelligence-and-the-Pathways-from-Smart-to-Wise***

1) OVERVIEW

One overall message from the COP26 - climate policy would be great if it worked – but often it doesn't. There's a growing gap between high-minded net-zero targets and realities on the ground. Both climate technical models and the labyrinthine negotiations it seems, have problems with the deeper complexities of power and inequality.

This ***Climate-wise*** program aims to explore and map some of these crucial interactions of climate policy with the 'big bad real world': power games, extractive finance, corruption & elite capture, extremism & denial, resource expropriation, organizational inertia and plain dysfunctionality, to name a few. Some of these are well known – 'tragedy of the commons', 'free rider problems' etc – but the combinations are just emerging.

Then we can explore the potential for a '*collective climatic intelligence'* – the capacity for collaborative learning, thinking, innovation & co-production with all involved.

Then we might have a better chance of designing and mapping practical pathways through the labyrinth.

The ***Climate-Wise Toolkit*** was developed, first for analysis and mapping of such effects, and then for a systematic exploration of viable pathways for transformation. For the net-zero ambitions promised all round, this offers a realistic and credible way, to (a) get governments and businesses to commit, and (b) turn such promises into action.

This prototype toolkit is based on the synergistic approach and toolkit. This focuses on the ***'collective climatic intelligence'*** – the capacity for learning, innovation and collaboration between all involved – and applies it in practice. ***Climate-wise*** is currently on test and we plan to take it to the COP27.

Where to start: 'ask the wrong questions'

The starting point is a set of role-play questions – *'how to make the most money and/or power (i.e. 'maximize your advantage') out of the climate crisis?'* This is the exact opposite angle to most climate policy rhetoric, which assumes everyone wants to be on the same page. These 'wrong questions' are in 5 parts – (see below for definitions) – this is also the start of the interactive method:

1) Is '***Climate action (single issue)'*** a threat and/or opportunity (for your organization / sector / livelihood / community / lifestyle / worldview)?
2) How to make the most *money and/or power by* ***Climate action Hijack?***
3) How to make the most *money and/or power by* ***Climate action Blockage?***
4) How to make the most *money and/or power by* ***Climate action Diversion?***
5) What would it take for you to collaborate with competitors / enemies on a ***Climate-wise pathway***?

Question 5 then opens the door to a next phase (see the following Briefing 2)

2) NOTES FROM THE FRONTLINE: HOW COP26 WILL FAIL

With 25000 climate-focused people from around the world, the meeting is inspirational – but – also in some kind of bubble. Many of the climate adaptation plans, mitigation roadmaps etc, don't seem to connect with the 'big bad real world' – the labyrinth of power games, extractive finance, elite capture and corruption, psycho-social denial, and dysfunctionality of all kinds. And since November…

- *Russia masses its armies around Ukraine – Europe's gas supply is the bargaining chip*
- *USA is on the brink (some argue) of asymmetric civil war – climate denial is a fault-line*
- *UK is in a constitutional meltdown – while its energy retrofit program is hastily taken down*
- *Xi Jinping confirms Chinese climate action takes second place to economic development*

In the UNFCCC negotiating rooms the way through the labyrinth is framed as 'net-zero'. This assumes that CO2 emissions can be offset in forests, or stored underground with as yet untested technology. Is this a convenient greenwash, or a genuine solution to a global challenge?? Does it assume that forests and tribal lands are commodities for the global carbon markets?? Certainly there will be financiers and consultants preparing for a killing…

In the 100s of other parallel sessions and side events, there are noticeable gaps between the rhetoric of adaptation – inclusive, transformative, grassroots focused etc – and the reality of land, resources and power. The $100billion finance promise is still to materialize, and this is a major sticking point in the south-north dialogue. But from experience, wherever money arrives there will be well equipped and ruthless landowners, consultants, politicians and entrepreneurs, to divert and build their portfolios.

Another fault-line – ***elite capture of the climate agenda*** – easily polarized and inflamed, when presidents and royal families arrive on private jets, stay in 5* hotels and lecture the world on consuming less…

Another example on the adaptation side – the Chennai waterfronts had to be cleaned up for flood resilience and adaptation – but there were already 1000s of shack dwellers here living informally – once they were cleared away and put into resettlement colonies out of town, the land would be ripe for development as prime hotels, malls and conference centres…

And back here in the UK there are practical tasks. For the insulation / retrofit of 29 million existing homes, we had two national programs in a decade, the second even more disastrous and wasteful than the first. There are lessons here not even started, let alone learned…

Meanwhile outside the COP26 Zone there are maybe 50,000 campaigners all around the region, all campaigning for 'climate change = social change: climate change = political change etc …. We could not agree more, but this bigger agenda may take more time than we have…

So - the pages below are a start to open up this space of challenges and contradictions. It seems climate policy would be great, if it worked – but often it doesn't – so we need to understand and bring to the surface the 'big bad world' effects.

Some of this is very generalized, looking across the whole of climate policy. Some topical examples bring this to life: carbon offsetting, building retrofit, low carbon transport etc.

We use visual systems mapping as the primary tool – if we are 'rewiring' the global socio-climatic system, we need a wiring diagram – a mapping of the '*socio-climatic mindscape'*. With this we have a much better chance of designing systematically for climate action pathways which can succeed against all the challenges.

3) MAPPING THE SOCIO-CLIMATIC MINDSCAPE

Where to start

This mapping starts with a 'mindscape' of possible socio-climatic combinations (with suggested titles).

At this stage, the mapping is very generalized: each sector or problem will have specific priorities on this general mapping (see carbon offset example overleaf). First we set up 2 axes – (these could be taken as scenarios, or as general mindsets, or clusters of syndromes):

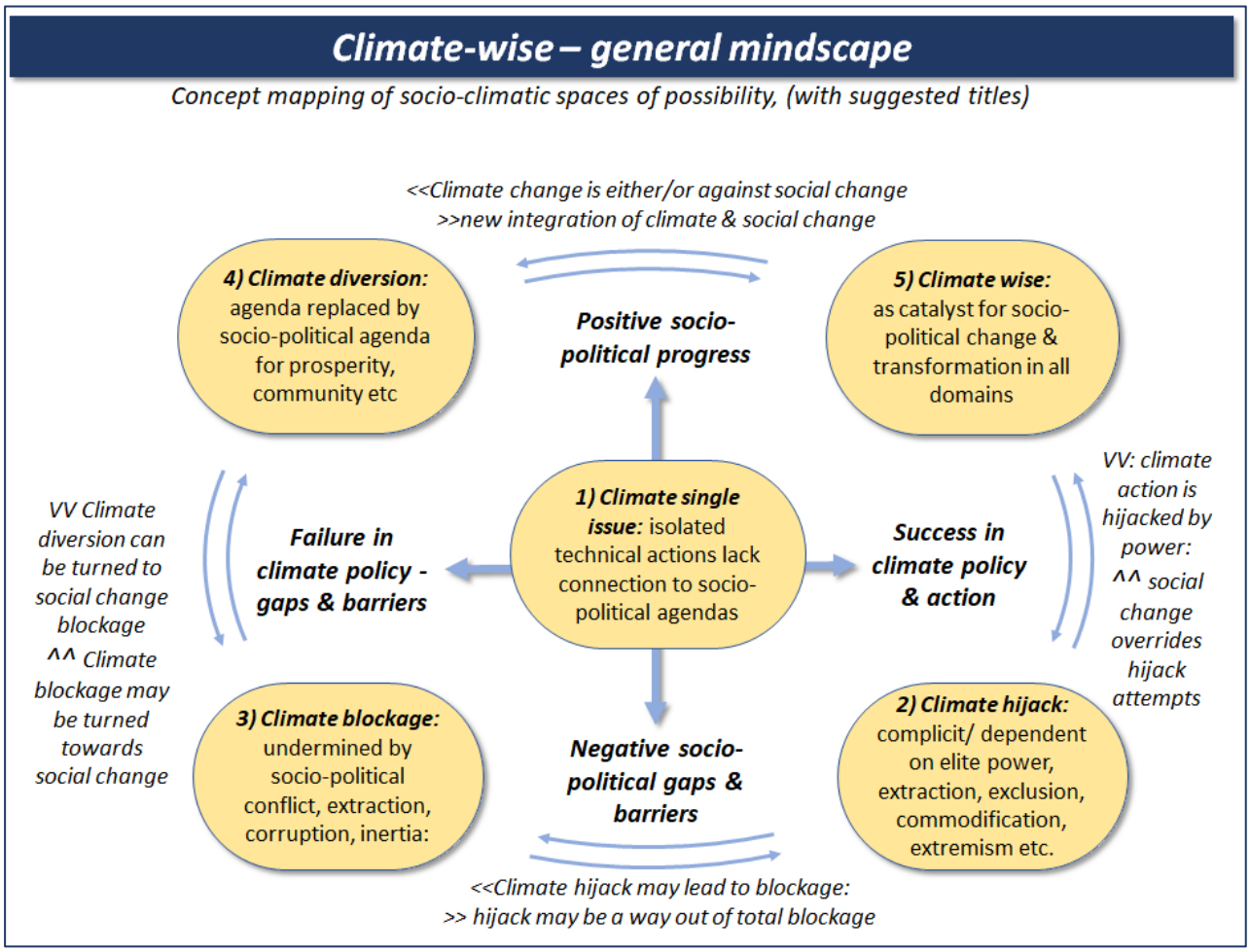
- Success in climate policy & action – versus – Failure in climate policy with gaps & barriers
- Positive socio-political progress – versus – Negative socio-political gaps & barriers

This then produces 1+4 possible combinations or corners (the first being in the centre)

1) ***Climate single issue:*** isolated technical actions lack connection to socio-political agendas
2) ***Climate hijack:*** complicit & dependent on elite power, extraction, exclusion, extremism
3) ***Climate blockage:*** undermined by socio-political conflict, extraction, corruption & general inertia
4) ***Climate diversion:*** agenda replaced by socio-political agenda, prosperity, community etc
5) ***Climate wise:*** as catalyst for socio-political change & transformation in all domains

Also there are transitional spaces of potential, between one corner and another, which can work both ways:

- Between 2&3: *Climate hijack may lead to blockage: - OR - hijack as a way out of total blockage:*
- Between 3&4: *Climate diversion can be turned to social change blockage: - OR - Climate blockage may be turned towards social change:*
- Between 3&4: *Climate change is a zero-sum versus social change: - OR – new integration of climate & social change:*
- Between 5&2: *climate action is hijacked by power: - OR – social change overrides hijack attempts*



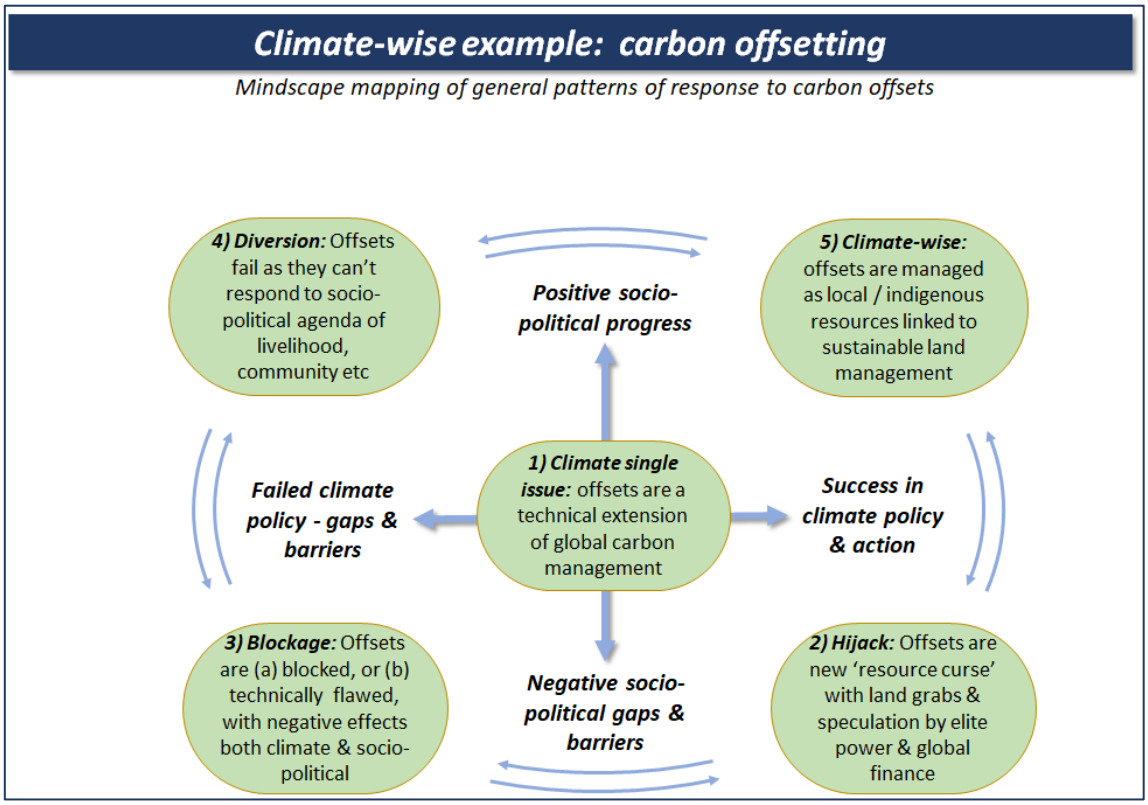
Example mindscape – Carbon Offsetting

Carbon offsetting is one of the key components of the global net-zero program. It is also notorious for double-thinking, hijack and diversion – land grabs, dubious accounting, financial speculation bubbles, false promises and scam marketing to green consumers (e.g. https://reliefweb.int/report/world/tightening-net-net-zero-climate-targets-implications-land-and-food-equity) . "many governments and corporations are hiding behind unreliable, unproven and unrealistic 'carbon removal' schemes in order to claim their 2050 climate change plans will be 'net zero'. Their sudden rush of 'net zero' promises are relying too much on vast swathes of land to plant trees in order to remove greenhouse gases from the atmosphere. At the same time, they are failing to cut emissions quickly or deeply enough to avert catastrophic climate breakdown."

Again the questions are quite direct – *how would you (as a subsistence farming village, rural landowner, green financier / automobile executive / housing developer, lower-income citizen etc) make the most of this new opportunity??*

This mindscape summarizes the possible corners, and leaves for exploration what happens next.

- ***1) Climate single issue:*** offsets are a technical extension of global carbon management
- ***2) Climate Hijack:*** Offsets are new 'resource curse' with land grabs & speculation by elite power & global finance
- ***3) Climate Blockage:*** Offsets are (a) simply blocked, or (b) technically flawed, with negative effects for both climate & socio-political change
- ***4) Climate Diversion:*** Offsets fail as they can't respond to socio-political agenda of livelihood, community etc
- ***5) Climate-wise:*** offsets are managed as local / indigenous resources linked to sustainable land management



1) 'Climate-Single Issue' – mapping the challenges

Next we can explore further in each corner with multiple domains, worldviews or value systems: social, technical, economic, political, cultural, territorial etc ('STEEPC'). Note these domains are not fixed in stone – there are many alternative versions: there are also schemes such as CLA which explore surface / underlying factors: or CAM which focuses on the 'affective' feelings of participants. Here we just take a simple flexible approach as a starting point to be followed up as needed.

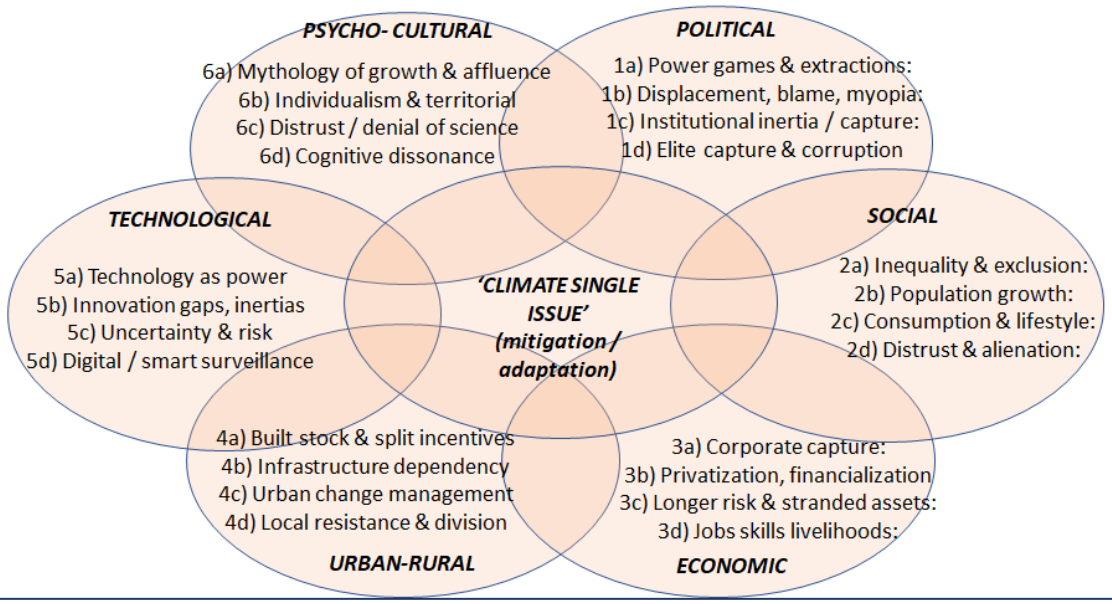
The next 5 pages set out some domain mappings, for each of the corners of the basic mindscape above.

The first Climate single-issue' is a general mapping of basic challenges, contradictions, resistances, gaps, barriers, fractures & fault-lines between conflicting domains of logic & value. Each item here is a potential challenge to the straight line approach of 'climate single issue'.

Also, an early version of this graphic was used as the source material for an onsite survey at the COP26 (results to be posted in briefing #2).

1) 'Climate-single issue' – general challenges

Mindscape mapping of basic challenges, contradictions, resistances, gaps, barriers, fractures & fault-lines, between conflicting domains of logic & value.

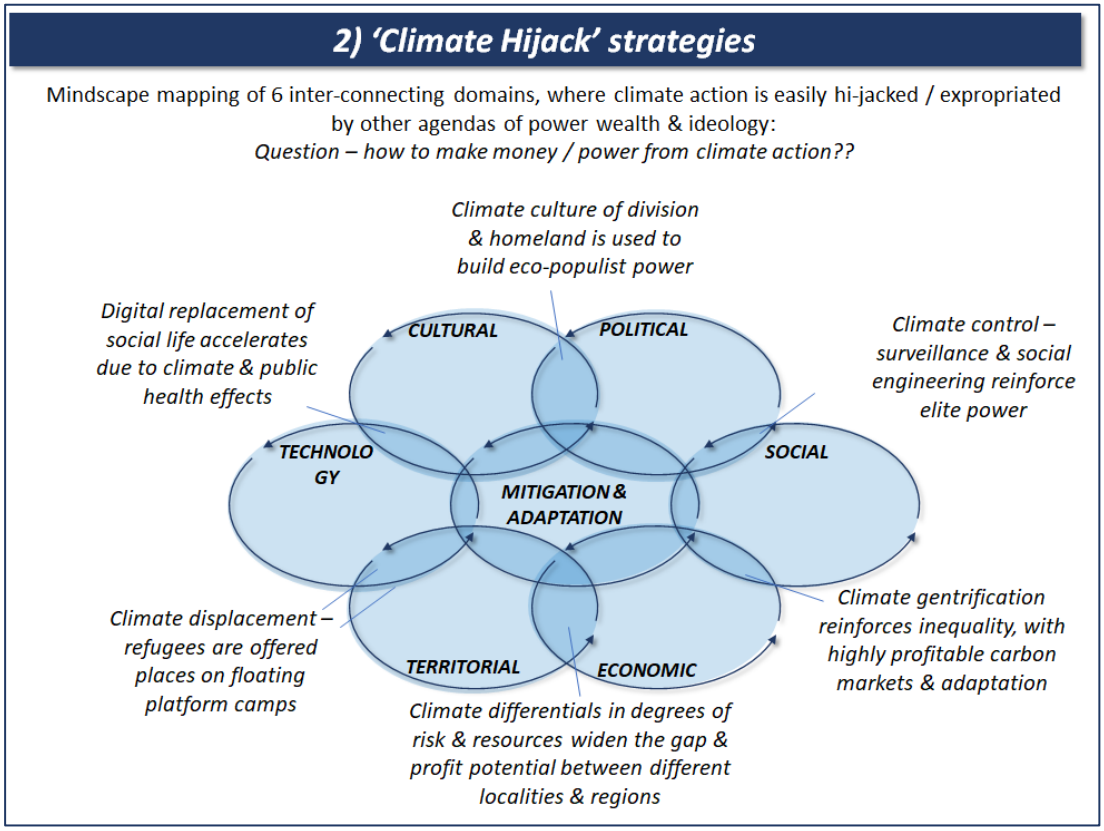


2) 'Climate Hijack' Strategy Mapping

Climate hijack: complicit & dependent on elite power, extraction, exclusion, extremism

Mindscape mapping of 6 inter-connecting domains, where climate action is easily hi-jacked / expropriated by other agendas of power wealth & ideology:

- ***Question – how to make money / power from climate action??***

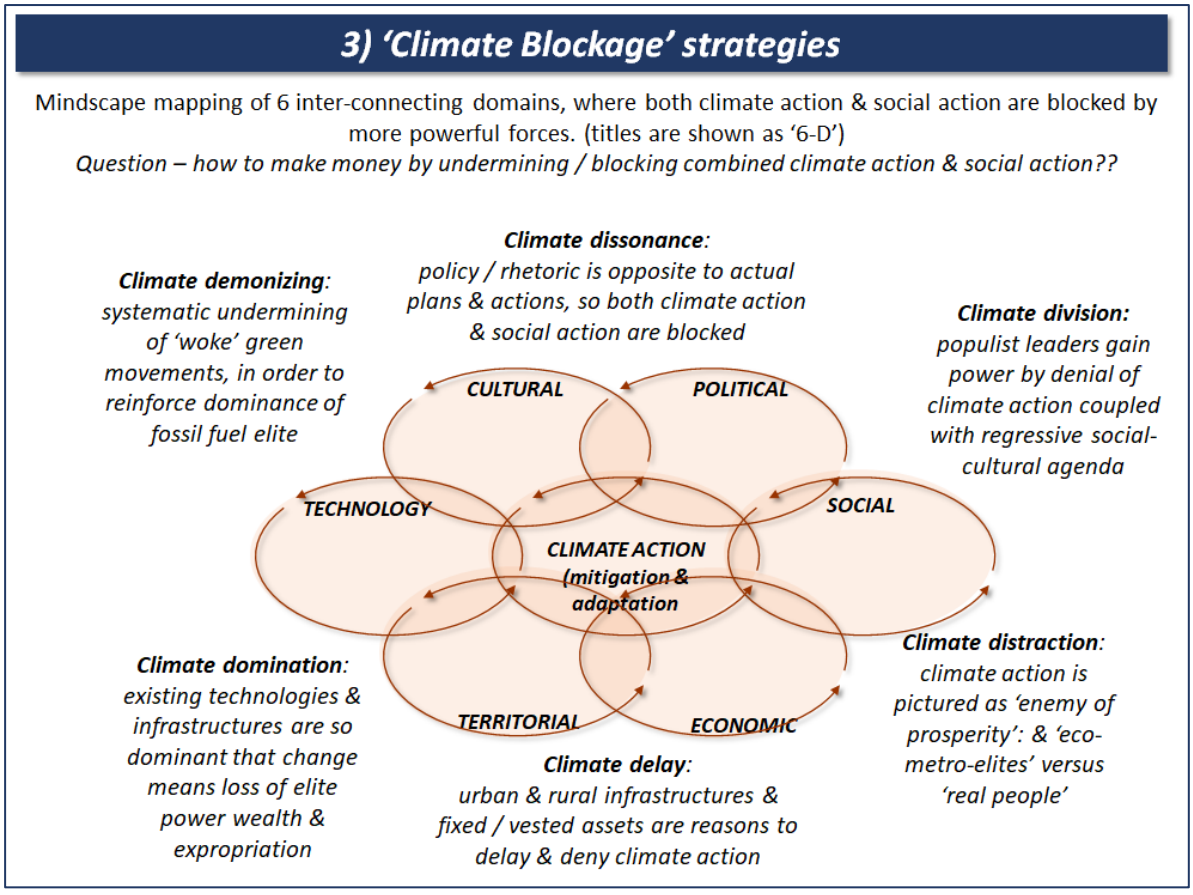


3) 'Climate Blockage' Strategy Mapping

Climate blockage: undermined by socio-political conflict, extraction, corruption & general inertia

Mindscape mapping of 6 inter-connecting domains, where both climate action & social action are blocked by more powerful forces. (titles are shown as '6-D')

- ***Question – how to make money / power by undermining / blocking climate action with social action??***

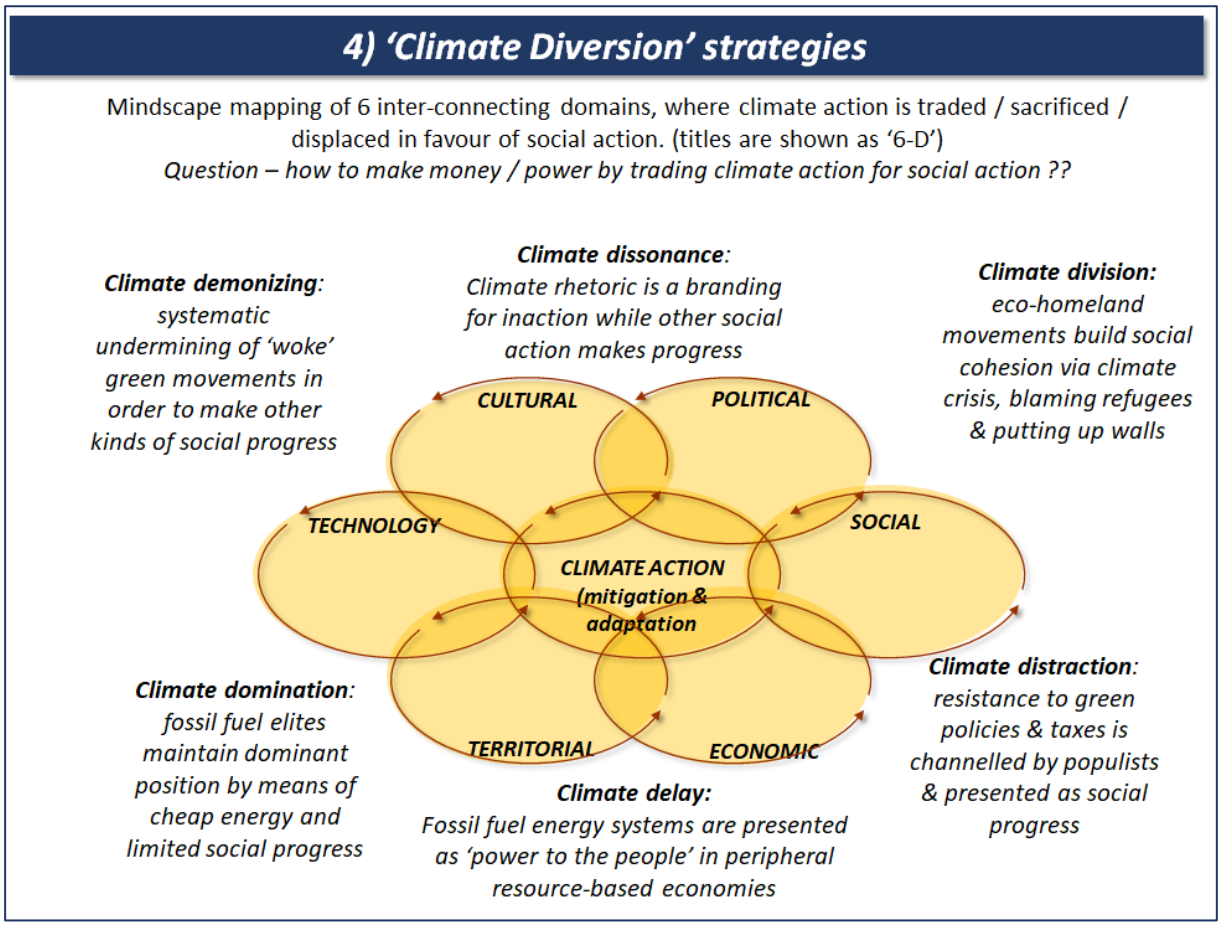


4) 'Climate Diversion' Strategy Mapping

Climate diversion: agenda replaced by socio-political agenda, prosperity, community etc

Mindscape mapping of 6 inter-connecting domains, where climate action is traded / sacrificed / displaced in favour of social action. (titles are shown as '6-D')

- ***Question – how to make money / power by trading climate action for social action ??***



5) 'Climate-Wise' Strategy Mapping

Climate wise: as catalyst for socio-political change & transformation in all domains

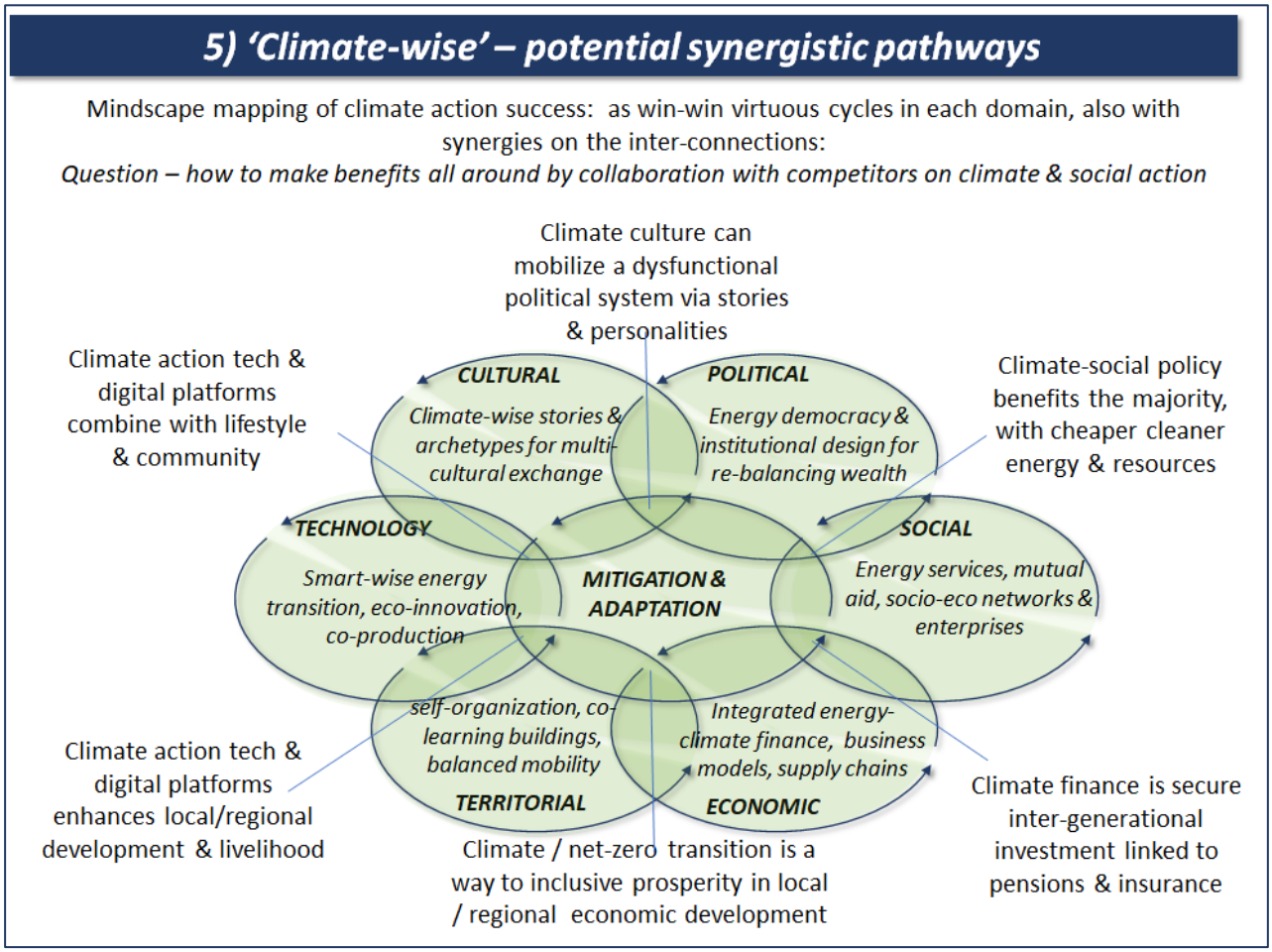
Mindscape mapping of climate action success: as win-win virtuous cycles in each domain, also with synergies on the inter-connections:

- ***Question – how to make benefits all around via collaboration with competitors on combined climate & social action***

This then provides the backdrop to the exploration of pathways in the following pages. For this we use more tools such as:

- actor mapping (stakeholders and their interactions): and
- factor mapping (value chains / metabolism / causes-effects)

Firstly we see an example (overleaf) from urban low-carbon transport policy



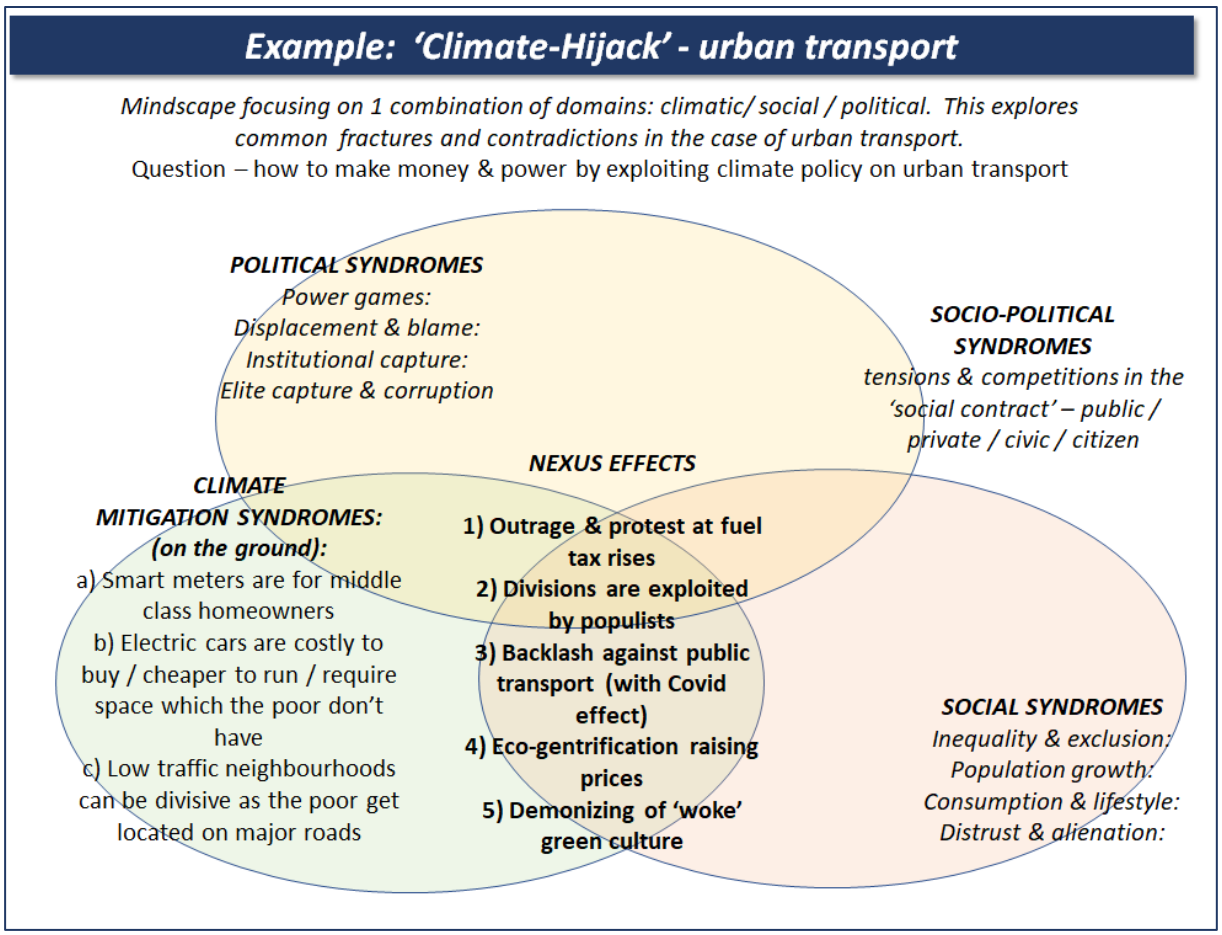
Example 'Climate Hijack': urban transport

Urban transport is a classic case, with many trade-offs / contradictions between social economic and climatic agendas. (e.g. low traffic neighbourhoods can lead to gentrification: subsidy for rail travel goes to higher income groups: EVs are exclusive of lower incomes, etc..)

This mindscape focuses on a crucial combination of domains: climatic/ social / political. This helps to explore the common fractures and contradictions in the case of urban transport.

- ***Question – how to make money & power by exploiting climate policy on urban transport***

Some of these syndromes can lead to climate hijack, some to total blockage and some to diversion.



4) CLIMATE ACTION CO-EVOLUTIONARY ANALYSIS

There are many analyses and frameworks for the socio-climatic challenge. We take one here from the McKinsey Global 'System Conditions', a very perceptive overview published for the COP21. This follows from and links with the six domains shown above (McKinsey & Co, 2021, *Solving the net-zero equation: Nine requirements for a more orderly transition.* Boston, MGI).

"Net-zero commitments are rising, but the net-zero equation is not yet solved. This can only change if nine interdependent requirements are met with singular resolve, unity, and ingenuity:

- *Physical building blocks, encompassing (1) technological innovation, (2) ability to create at-scale supply chains and support infrastructure, and (3) availability of necessary natural resources.*
- *Economic and societal adjustments, comprising (4) effective capital reallocation and financing structures, (5) management of demand shifts and near-term unit cost increases, and (6) compensating mechanisms to address socioeconomic impacts.*
- *Governance, institutions, and commitment, consisting of (7) governing standards, tracking and market mechanisms, and effective institutions, (8) commitment by, and collaboration among, public-, private-, and social-sector leaders globally; and (9) support from citizens and consumers.*

Following this via the synergistic ***Climate-wise*** approach we can explore how each of these 'system conditions' generates

- ***Common syndromes*** (as above, 'climate hijack, climate blockage, climate diversion', or some combination of such):
- ***Mode 1.0*** responses (linear, functional approaches) – with ***Mode 2.0*** responses (evolutionary, myopic, innovative competitive),
- ***Mode 3.0*** responses (co-evolutionary, integrated, collaborative-inclusive)

Similar thinking emerges in many places. One is 'planetary economics', with three economic paradigms, not unlike the synergistic scheme: a positive/behavioural economics (*Mode-I*), to evolutionary/neo-classical (*Mode-II*), and then a co-evolutionary economics (*Mode-III*) (Grubb, Hourcade & Neuhoff 2014). The point is that the climate-economics interactions can work on all three levels, and particularly that the economic dilemmas in *Mode-I* or *II* methods (such as discount rates, non-market valuations, extreme risks), can be reframed in *Mode-III* thinking as human problems with creative human responses (Scrieciu, Barker & Ackerman 2013).

Table 1: climate policy 'system conditions' & co-evolutionary analysis

Shows the 9 'system conditions' and typical common syndromes: with summary of Mode 1.0 & 2.0 responses (linear & evolutionary): compared with Mode 3.0 responses (co-evolutionary)

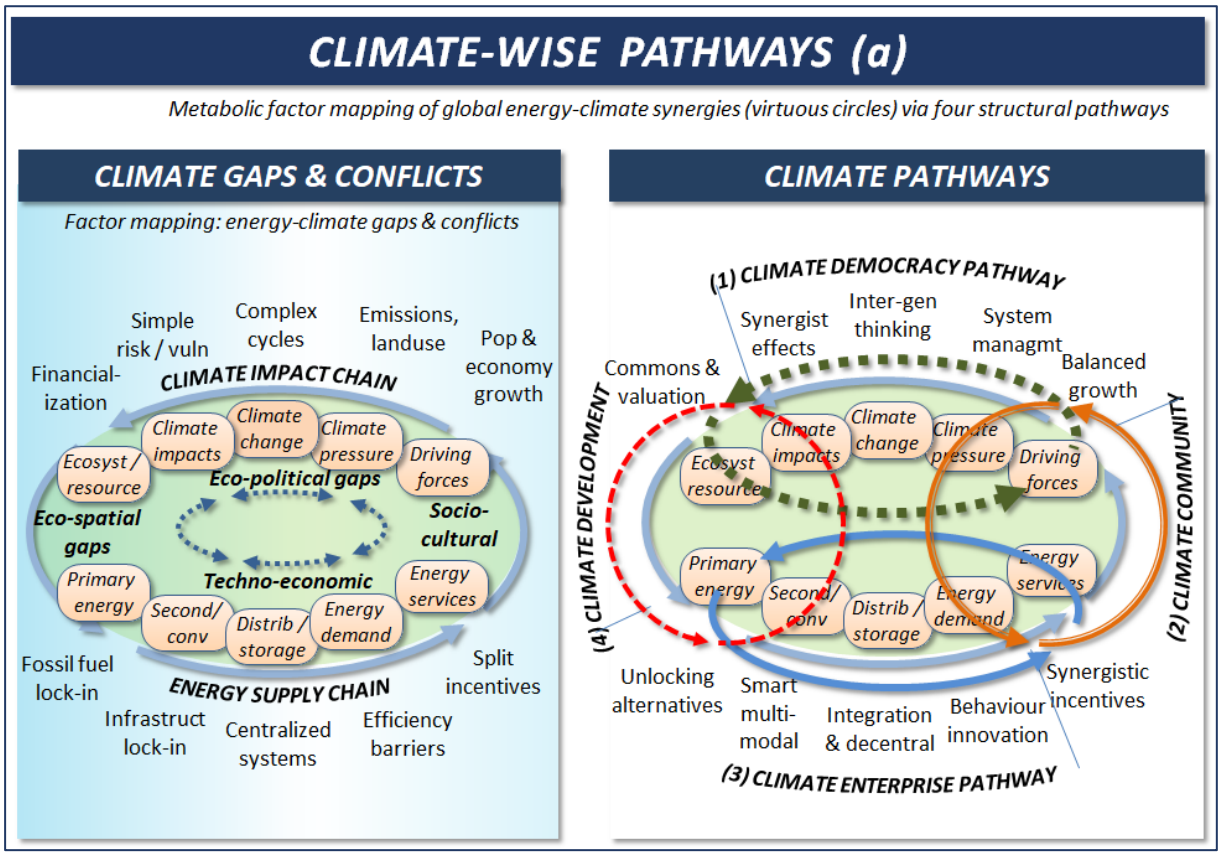
	COMMON SYNDROMES	***MODE 1.0 & 2.0***	***MODE 3.0***
Physical building blocks & resources			
(1) technological innovation	Focused on short term returns	Linear STI (science tech innovation) model	Whole system innovation
(2) ability to create at-scale supply chains & support infrastructure	Institutional inertia Hijack & expropriation	Privatized cost recovery models	Partnership & long term strategic view
(3) availability of necessary natural resources.	Property disputes & free riders Hijack & expropriation	Extractive models with some adjustment for climate factors	Inclusive participatory social contracts for common resources
Economic & societal adjustments			
(4) effective capital reallocation & financing structures,	Geo-political dependency, sunk assets, finance myopia	Extractive finance with some adjustment for climate factors	Long term democratic finance for integrated supply chains
(5) management of demand shifts & near-term cost increases	Blocked, hijacked or diverted by sectoral interests / extremism	Sectoral interests in conflict & competition, undermine integration	Strategic sector transition management (*Collective eco-economic intelligence)*
(6) compensating mechanisms to socio-economic impacts.	Blocked, hijacked or diverted by underlying hierarchy / inequality	Priority for consumer self-interest dilutes any collective action	Strategic socio-economic transition management *(Collective socio-economic intelligence)*
Governance, institutions, culture			
(7) governing standards, market mechanisms, & effective institutions	Institutional inertia & political economy tension & dysfunction	Partial policies are dysfunctional & ineffective	Building cross-sector institutional capacity, for systems of deeper complexity
(8) collaboration: public-, private-, & social-sector leaders globally	Underlying conflict, competition, dependencies	Climate policy INO vulnerable to mani-pulation & dissonance	Integrated responsive *collective socio-climatic intelligence*
(9) support from citizens & consumers	Blocked, hijacked or diverted: collective action gaps	Passive support from myopic marketing is fragile & short term	Integrated pathways include norms, culture, psychology, archetypes

5) SOCIO-CLIMATIC PATHWAY MAPPING

This section is a shorter version of the ***Climate-III*** section of [Deeper-City: Collective-Intelligence-and-the-Pathways-from-Smart-to-Wise -](#) More details are there if needed, or on the ***section download***.

Climate-wise factor mapping

We see the basic energy metabolism, as a 'factor mapping' on the left here, as a chain from primary resources, to secondary electricity, to distribution and storage, and then to energy demand and energy 'services'. The impacts then track around the cycle, with a cause-effect impact chain, following the logic of the 'DPSIR' scheme ('drivers-pressure-state-impacts-responses'). Here are the *'driving forces'* of population/economic growth, *'pressures'* from emissions, *'state'* of the climate, direct *'impacts'* of floods or droughts, and the downstream results or '*responses'* for ecosystems policies, which then might feed back to the energy resources at the start.



Managing such a cycle should be fine in principle, balancing the energy supply chain with its climate impact chain. But in practice there are gaps and barriers and syndromes everywhere. The mapping shows these clustered in the four main parts of the cycle. The *political-ecology gap syndrome* (1) starts with the 'tragedy of the commons', scaled up to where ecosystems and their services are run

by political myopia, corporate capture and social divisions.[1] Then comes a *socio-cultural gap syndrome* (2) on the energy demand chain, where social inequality, addictive consumption and industrial alienation, all contribute to climate denial and self-destruction. Also on the demand side, the urban building stock is typically messy and disorganized, with lock-ins, split incentives and resistance to change.

Third, the *techno-economic syndrome* (3) is about the energy-industrial supply chain: here are innovation hurdles, sunk assets in fossil fuels, and the destructive logic of short-term finance. Fourth, the *eco-spatial or urban-rural syndrome* (4), focuses on energy resources and ecosystems themselves, and implications for land and territorial development**.**

For each of these syndromes there are potential pathways, as shown on the right hand side. Each one depends on change in behaviour and worldview at each stage in the value chain – not from idealism but from practical strategic learning and thinking – the components of a *collective climatic intelligence*. See below for an outline of such pathways.

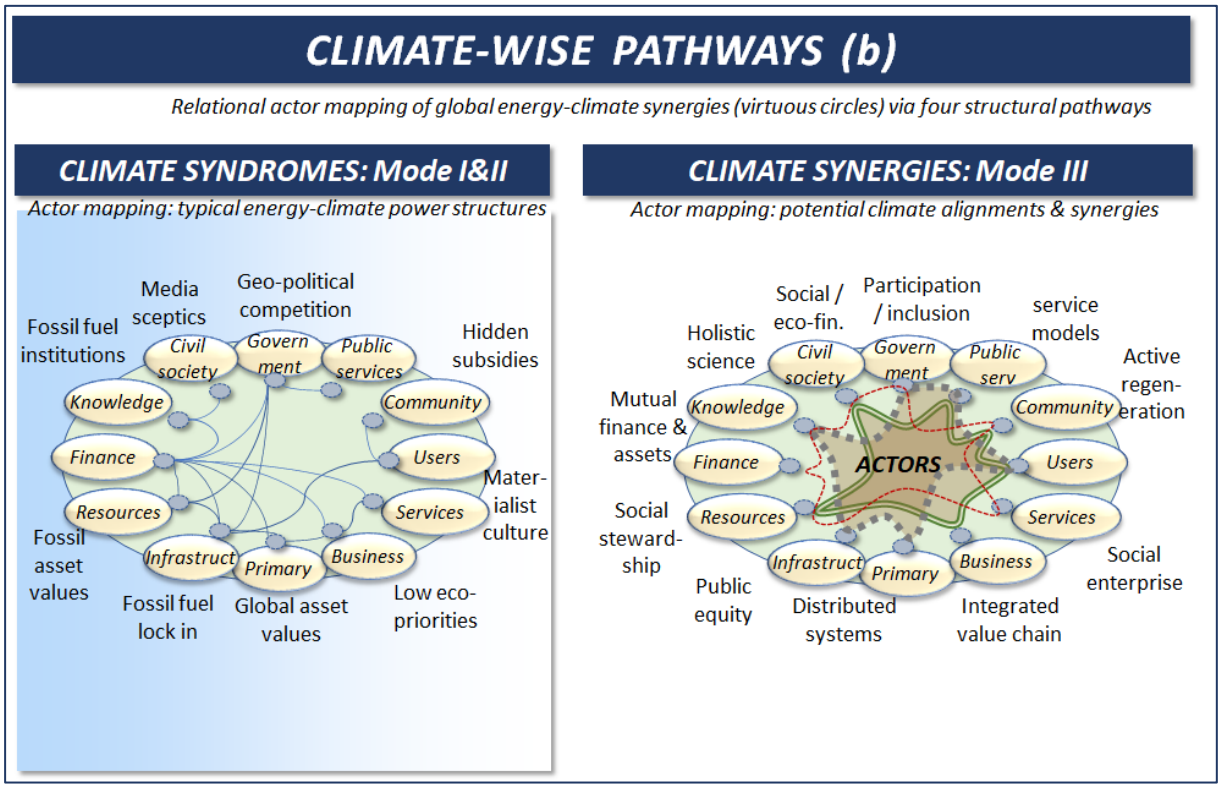
Climate wise actor mapping

The 'actor mapping' here shows on the left, typical syndromes and gaps, in the interactions of profit and power in the energy-climate system. The format shows them as if around a table, while in practice a single table at one place and time may not be achieved. (Again these mappings are shown at the most general level possible – many more detailed mappings can be done for sectors, places, communities, technologies and so on).

Generally we see a corporate business model which buys governments, drives financial speculation, grabs indigenous land, locks into fossil fuels, and funds climate scepticism and denial. Behind this is a culture and psychology of extractive industry, material consumption, myopic pollution and a 'tragedy of the commons'.

On the right we explore the possibility of synergistic pathways, in the sense they depend on synergies between multiple sets of actors / stakeholders. Different colours / lines represent different pathways (as discussed in the next section):

- ***CLIMATE DEMOCRACY:*** open participative governance for social inter-generational justice
- ***CLIMATE COMMUNITY***: social-cultural networks for reciprocity, redistribution, stewardship
- ***CLIMATE ENTERPRISE:*** socio-business long-term investment for innovation & transition.
- ***CLIMATE DEVELOPMENT:*** integrated urban, peri-urban, rural development



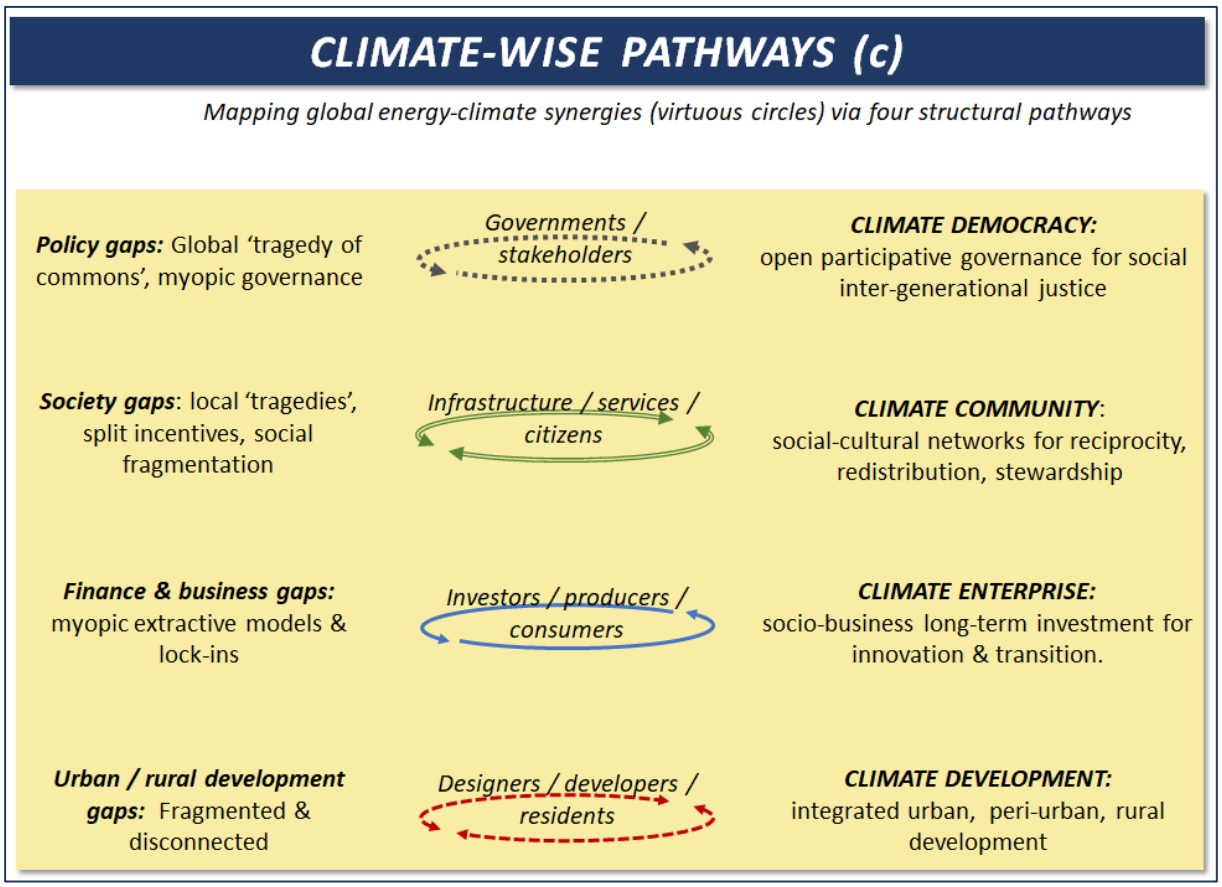
Climate-wise pathway mapping

These are the high level generalized pathways – each to be interpreted for specific examples. Each is the result of potential synergies between different sets of actors and factors -

- ***CLIMATE DEMOCRACY:*** open participative governance for social inter-generational justice
- ***CLIMATE COMMUNITY***: social-cultural networks for reciprocity, redistribution, stewardship
- ***CLIMATE ENTERPRISE:*** socio-business long-term investment for innovation & transition.
- ***CLIMATE DEVELOPMENT:*** integrated urban, peri-urban, rural development

CLIMATE DEMOCRACY PATHWAYS

With a logic of *social-political synergies,* these pathways focus upstream of the energy supply chain, and downstream of the climate impact chain. Where indigenous people are displaced by energy or mineral extraction, or where farmers lose their livelihood by flood or drought, there's an over-arching case for energy and/or climate justice, and the democratic system to underpin it. In human rights terms, every community should have a stake (economic, political, social), in 'their' resources, energy, land and livelihoods. But this raises huge questions: who is the community? Who speaks for them? And who decides what is 'theirs' in a world of conflicting claims, of migration and displacement and international trade? There are great examples of indigenous peoples facing big corporations alongside eco-activists (a very high risk profession), but there are other more tricky questions, such as indigenous communities in nature reserves, or local opposition to windfarms, or the human right to drive a car or fence private property.



The basic idea was accepted at the COP 21, of balance and reinvestment between developed and developing nations, but this is easier to say than do, and progress as yet is painfully slow. It seems that climate democracy is a process more than blueprint, which has to work by open debate and transparent accountable government. So again, we fit the climate agenda into a *deeper-wider* societal transformation: as in ***POLITICALS-III*** we look for 'co-organizations', multi-level 'co-governance', co-production in public services, and collaborative-co-creation or *'Co-opolism'*. The implications are huge: energy corporations could or should be re-mutualized, land could be resocialized as a common resource, climate refugees could sue the developed world in mass actions …

CLIMATE COMMUNITY PATHWAYS

With the 'tragedies of the commons' both local and global, with nationalist politics and toxic effects of shadow finance and dark data, all might seem impossible. But if social norms and cultural narratives can be mobilized, to steer towards mutual aid and social learning, i.e. *collective climate intelligence*, there may still be a chance. Ostrom's 'institutional design' approach aims to build or rebuild collective norms and rules, which can work well for local or maybe regional ecosystems.[2] But for the global commons we are just beginning to map possible pathways, from the 'tragedies' to the 'opportunities' of the commons. These pathways follow the potential *socio-cultural synergies*, and look for societal structures with *deeper* layers of value and logic, with *wider* communities of interest, and with *further* horizons from upstream to downstream.

Practically, there are potential value-added links between climate insurance and social insurance, or between climate damage and forward investment. This could start with the social diaspora: globalized cultures and communities are more than ever networked, and with friends or relatives in climate vulnerability, there's more reason to consider their security and prosperity. On the basis of '*six degrees of separation'*, social platforms could promote '*three degrees of connection*', and the inter-dependencies between people, countries, climate and lifestyle. Similar principles work for CSR in niche markets of organic food, clothing, sport or tourism, looking for the vital shift from eco-consumerism towards real climate investment.

CLIMATE-ENTERPRISE PATHWAYS

With a logic of *technology-economic synergies,* these energy-climate industrial value chains start with fossil fuel assets, with current proven reserves valued at $21 trillion, and a near-total lock-hold on firms, technologies, investors and governments. On the general principle of building synergies, here is a shortlist of components, with potential inter-connections and synergies all around :

- Upstream resources and financial instruments;
- Energy infrastructures and political economy models;
- Industrial production, supply chains and technologies;
- Technology innovation processes, skills, organizations ;
- Downstream markets, demand side and life-cycle effects;
- Longer-term issues of competitiveness or macro-economic balance.

To work with this level of complexity, the *climate enterprise pathway* looks for *deeper* layers of value, *wider* communities of interest and *further* upstream/downstream links. With a focus on the system learning and thinking capacity for transformation, i.e. the *collective climate intelligence*, new possibilities can emerge,

avoiding the pitfalls of emissions trading or tax/subsidy. In practical terms, social-cultural narratives can help with technology innovation barriers, crowd-platforms can help to balance market demand, digital block-chain systems can help with re-investment loops and so on.

CLIMATE DEVELOPMENTAL PATHWAYS

These value-cycles start and end in cities and city-regions as the locus of energy demand and climate vulnerability, based on the logic of *urban-social-economic synergies*. But this isn't simple: in the UK (at the time of writing), there's an austerity funding crisis, climate-sceptic media, construction skills gaps, privatized energy firms, social fragmentation and Brexit chaos, to name just a few challenges. However, it seems that cities can lead the way, as shown by the networks of C40, Carbon Neutral Cities Alliance, Global Covenant of Mayors and the 100 Resilient Cities, to name a few. In principle, action would start with 'deep retrofit' of existing buildings, technically feasible and in principle cost-effective up to 80% CO_2 reduction. In practice there are many gaps and barriers, not only for the details of landlords and tenants, but on the system level: basically, neither public or private sectors are geared up to work with complex messy systems, such as a whole urban building stock, or a local economy. The implication is that progress depends on new systems for learning and thinking, which then translate into new kinds of organizations, markets, finance or social action.

In Manchester for example, there are schemes emerging at every level, from local carbon cooperatives and demonstrations, to city-wide energy consortiums.[3] The logic of energy services or 'nega-watts', works well in larger complexes, but less in the majority of small-medium buildings with transaction costs, asymmetric information and landlord/tenant split incentives. So, there is huge potential if such gaps and market failures can be bridged. Upstream providers could inter-connect with downstream residents with integrated retrofit and micro-generation packages. Mid-stream energy distributors can benefit from the community collateral which underpins local carbon bonds and mortgages. All this could be helped by *smart-wise* energy platforms, using block-chain or similar technology. Over-arching this is the agenda for a *collective energy intelligence*, learning and thinking with all social, technical, economic, cultural and political layers.

[1] Hardin 1968

[2] Ostrom 2005

[3] www.carbon.coop, http://gmlch.ontheplatform.org.uk/