



Knowledge network for **S**ystem **I**nnovations
and transitions (www.ksinetwork.nl)

the role of interdisciplinary science in the transition to a low carbon society

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transition



Transition

fundamental change of structure, culture and practices in societal (sub)system

- **structure:** physical infrastructure, economic infrastructure (market, consumption, production), institutions (rules, regulations, collective actors)
- **culture:** collective set of values, norms, perspective (shared orientation), paradigm (defining problems and solutions)
- **practices:** routines, behaviour, ways of handling, implementation at the individual level

incumbent structure, culture and practices need to be broken down and new (sustainable) ones need to be built up



Historical transition patterns

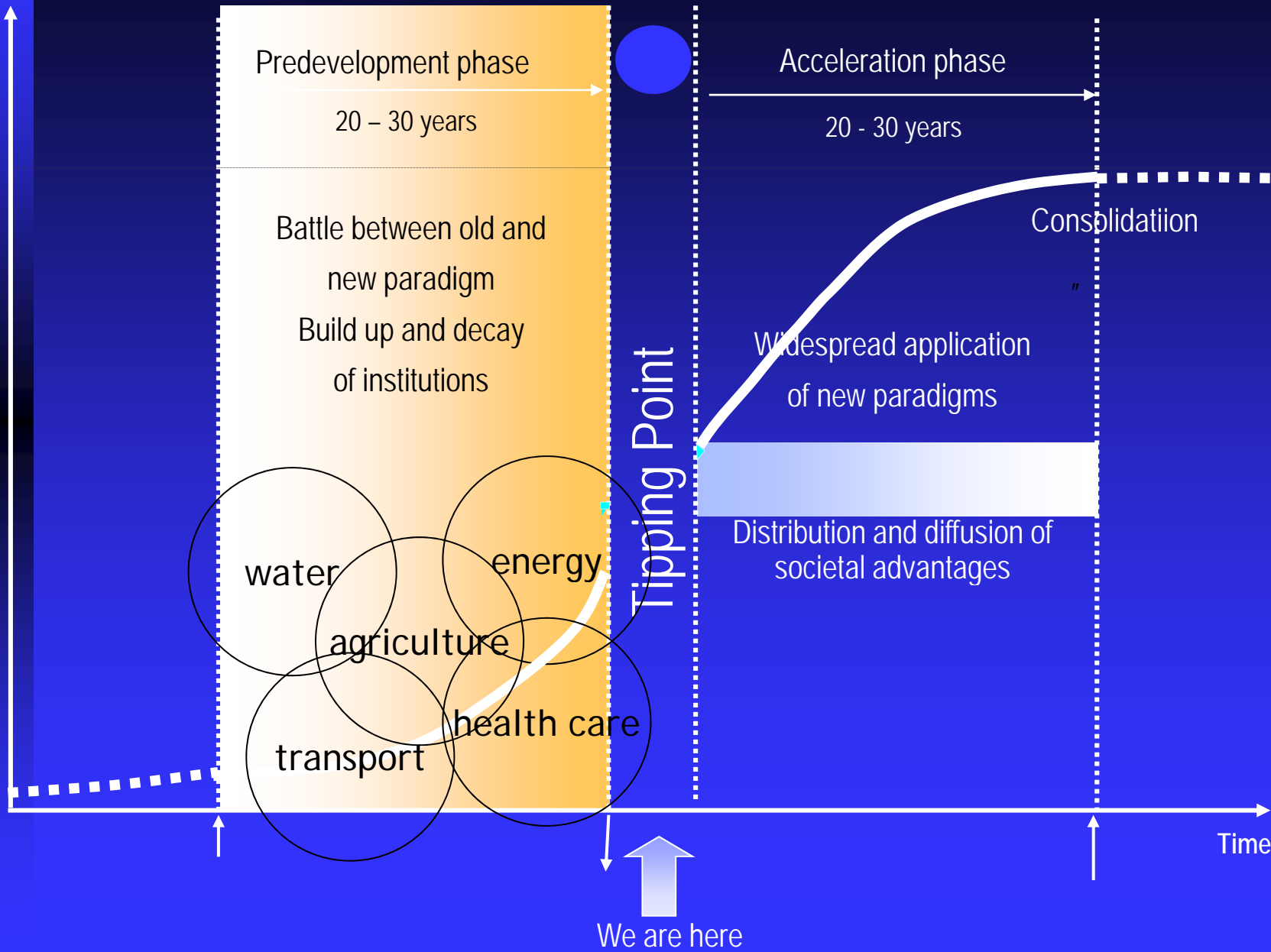
- non-linear shift that takes decades (1-2 generations)
- relatively long periods of equilibrium, order and stability are alternated with relatively short, shock wise periods of disorder, instability and chaos: punctuated equilibria
- cyclical patterns of transformative change with an increasing level of complexity

co-evolution, emergence, self-organisation

Breakthrough to sustainable society



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Crises

around a tipping point there are multiple crises

crises are manifestations of a systems change

crises are windows of opportunity

current crises represent systems crisis



Dynamics of transformative change

regime: dominant structure, culture and practices with power at systems level

niche: upcoming, diverging structure, culture and practices at lower scale level

niches *emerge* and *cluster* and form a niche-regime that might take over the incumbent regime. The regime will try to defend its existing power and will try to eliminate or assimilate niche-regime

transition = regime-shift = shift in power



Global Power Battle

Obama

“ The country that will dominate the field of sustainable energy will be the country that will dominate the world economy and America must be that country ”



Regime strategy of last decades

aimed at slowing down the transition

- denial of the climate problem
- global climate coalition
- carbon emission trading system (ETS)
- biofuels
- geo-engineering

incremental change, while we need radical change



Three key transition patterns

bottom-up

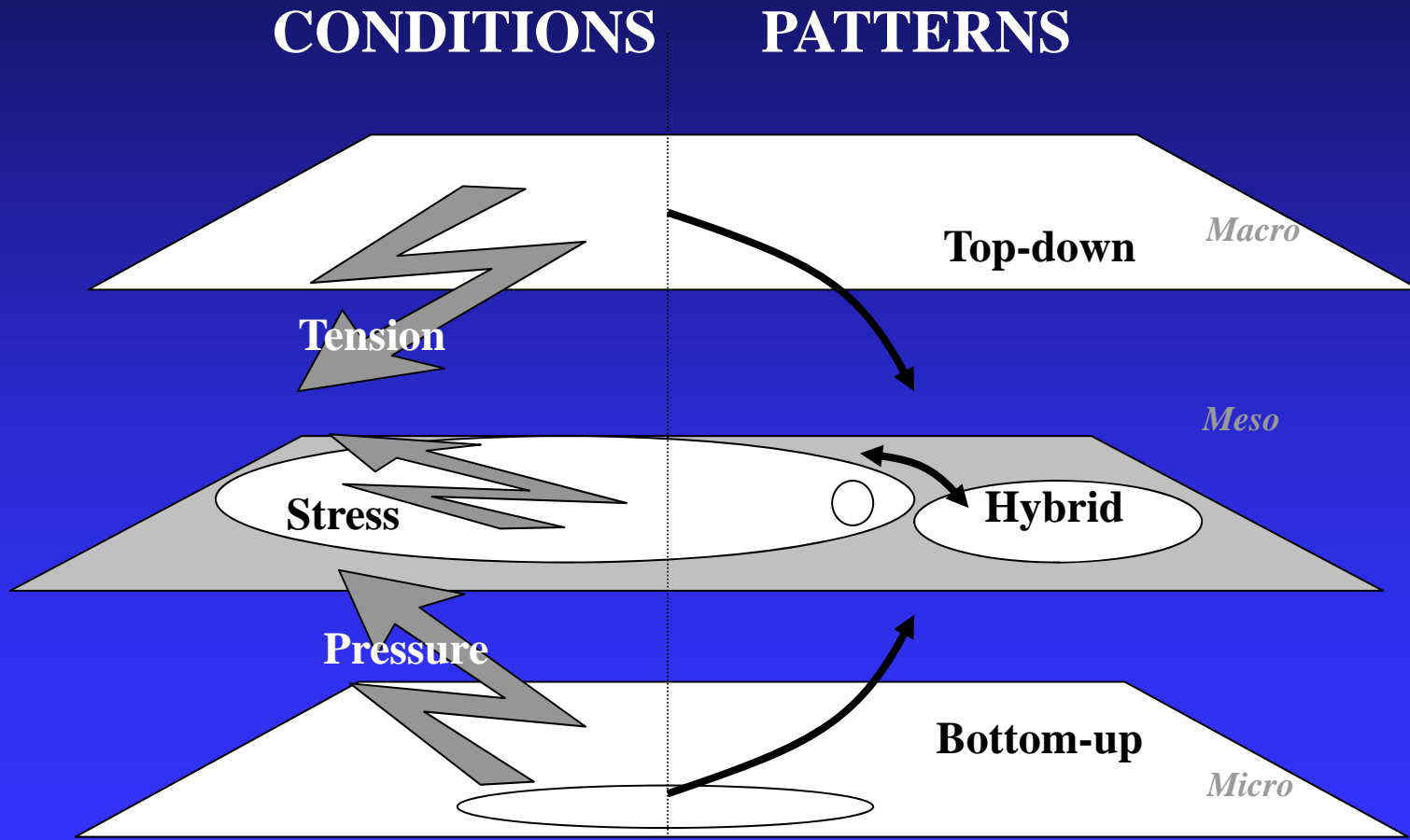
(i) *bottom-up pattern*: niches emerge, cluster and form a niche-regime that ultimately takes over the regime, forming a new regime

top-down

(ii) *top-down pattern*: a massive, fast change in the landscape leads to big pressure on the regime, resulting in a regime-change

hybrid

(iii) *hybrid pattern*: niches emerge and form a niche-regime within the incumbent regime that gradually co-evolve into a new regime



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sustainable low carbon society



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Sustainable low-carbon economy

clean and safe

circular

green resources

biobased economy

water, energy, climate, space

clean tech



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Sustainable low-carbon economy

a profound change in our
production and consumption pattern

we don't realize how radical that change is

revolution: new era with new values

transition = evolutionary revolution



Lessons from historical transitions

- institutional innovation is a key determinant
- social-cultural factors as important as technology
- few people can make a difference
- innovation space for frontrunners is crucial
- most widely recognized patterns: hybrid and bottom-up
- leadership is crucial



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Lessons from historical transitions

it is not all about technology, stupid!

major barriers for social transitions are
institutional, organizations and behavioural

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transition governance



Possible forms of governance

top-down

planned change: forcing, centralistic

bottom-up

emergent change: spontaneous, decentralistic

mixture

quasi-planned and emergent: anticipate and adapt

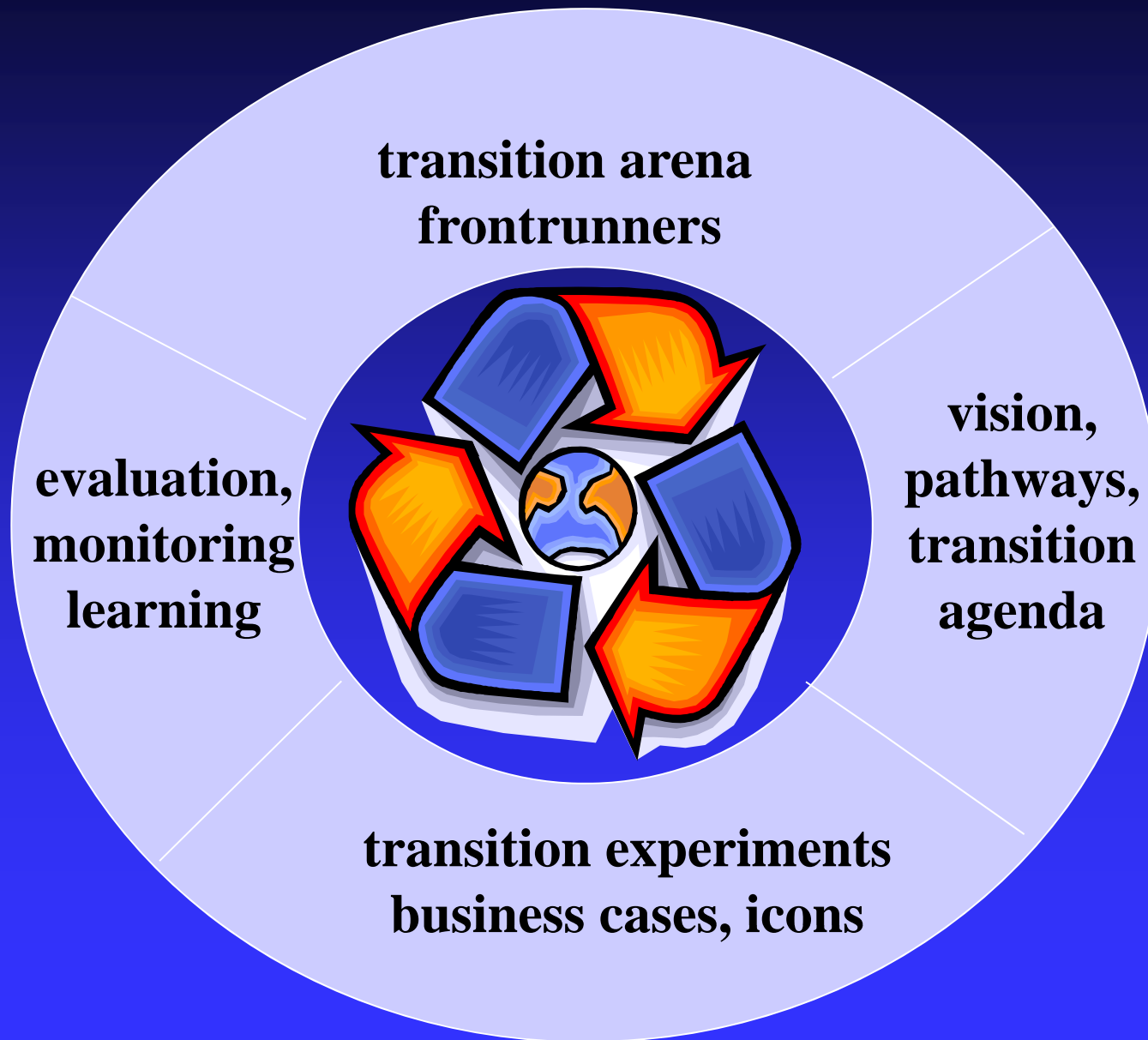


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Transition governance

- develop a radical long-term vision, goals and pathways
- create breakthrough experiments with frontrunners
- develop innovation networks around frontrunners
- scale up successful experiments
- build on a social movement to pressure the regime

Transition approach





Transition approach

principles

- put energy in frontrunners and not in the pack
- bring frontrunners together in protected spaces
- develop a long-term agenda, incl. vision + pathways
- start with portfolio of transition experiments
- create new coalitions around pathways & experiments

searching, learning, experimenting

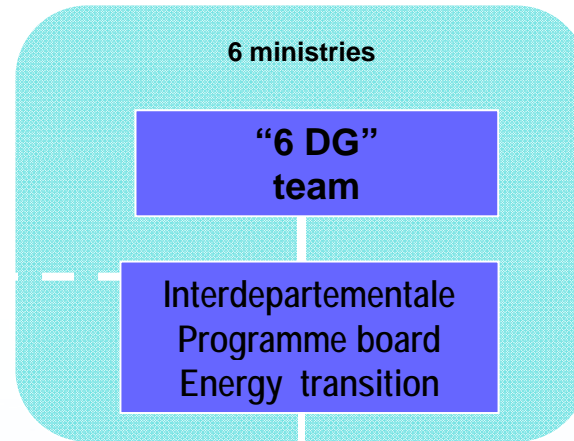
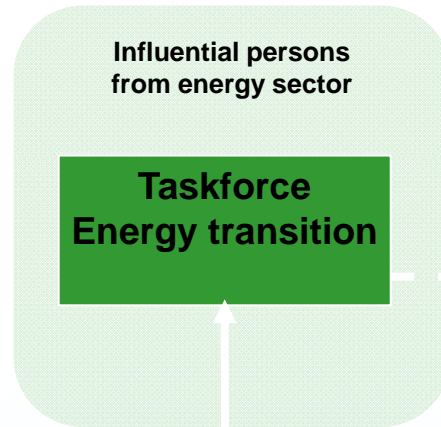


Energy transition

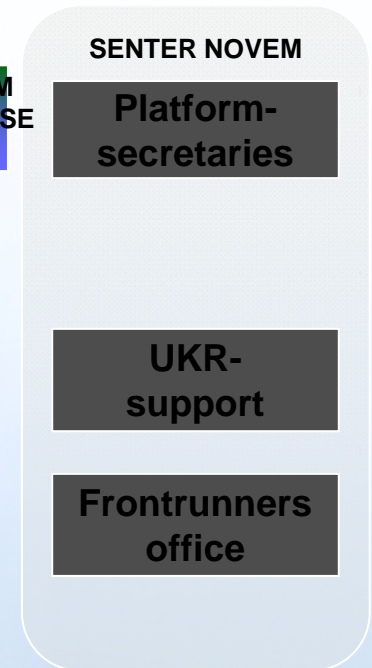
- in 2001 initiated by the ministry of Economic Affairs (EZ)
- started with a niche (small group of frontrunners within EZ) evolved into a movement with companies, NGOs, knowledge institutions and individuals
- vision has been developed [‘where do we want to go?’]
- 7 main themes chosen [platforms or arenas]
- 35 transition paths formulated [‘how to go there from here?’]
- 500 transition experiments set up [‘how to implement paths?’]

Energy transition

1
Long-term vision



7
Transition themes



35
Transition-pathways



500
Transition experiments

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new networks for transition to low-carbon society



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Demand

transition to low-carbon economy is most urgent matter

need for more knowledge on sustainability transitions

gap between policy arena, researchers and society

how to bridge the gap?



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Supply

transition science and sustainability science are still niches

these niches are vulnerable and poorly organized

are not rooted in our academic institutional structures

still miss an overarching unifying paradigm



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New Networks

new networks are needed to bridge the science-policy gap

inter- and transdisciplinary

organized in bottom-up manner

supported for at least a decade

building up a niche-regime



New types of research(er)

researchers play different roles in different contexts

change agent, co-producer, reflexive observer, analyst

co-production is of crucial importance

co-production between policy agents and research agents

explorative interdisciplinary research

searching, learning, experimenting



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Conclusions

profound lack of knowledge on transition
to low-carbon society

new networks are needed to bridge gap
between demand and supply

we need various kinds of researchers in various roles



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Conclusions

so it is not about us informing governments
on the necessary sustainability transition

but we, together, co-produce knowledge and
transition agenda for the sustainability transition