Replicant workshop
Webmeetiting I 18.03.2021

Energy planning and energy transition

PROSPECT2030 | PP7 - EEE Güssing| Manfred Hotwagner

AGENDA

Replicant workshop: Energy planning and energy transition 18.03.2021

14:00-14:05	Welcome	Silvio De Nigris (Piemonte) – Project Leader Żaneta Latarowska (MAE) – WPT3 Coordinator
14:05-:14:45	Energy planning and energy transition.	Manfred Hotwagner (EEE Güssing)
14:45 - 15:00	Scenarios of the Italian energy system towards progressive de-carbonization	Matteo Giacomo Prina (EURAC)
15:00-15:15	Sustainable Energy Action Plan development	Stefan Drexlmaier (Energiewende)
15:15-15:30	Energy and climate policy plans for 2050 at local level	Valeria Szabo (LENERG)
15:30- 15:45	Come Easy project	Mariadonata Bancher (CasaClima)
15:45-16:00	Q&A	All participants

PROSPECT 2030 – the project

Framework conditions

Exploring the new territory - Ecosystems

Getting structured – Broccoli romanesco

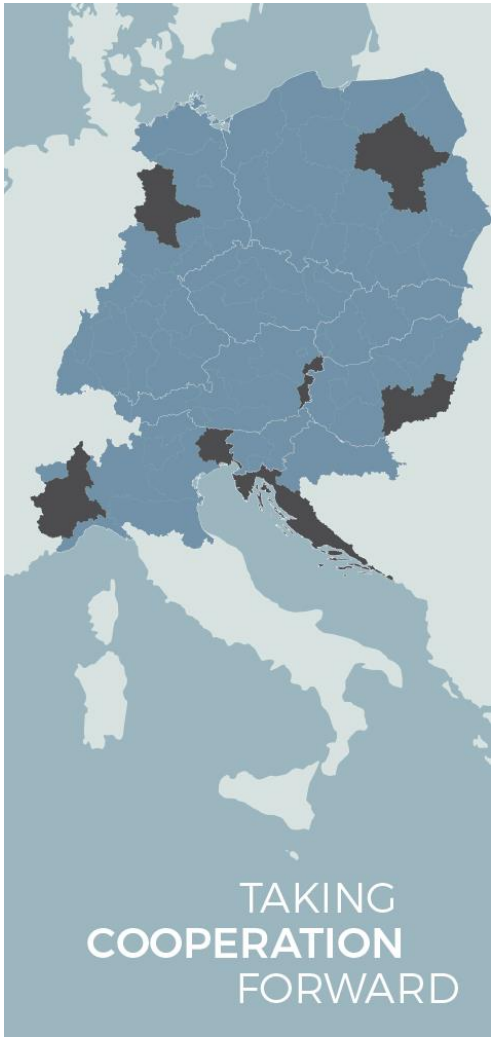
The approach – structured decentralisation

Transition planning –

Action as the moving force for, vehicles on the pathway

The final question -

PROSPECT 2030



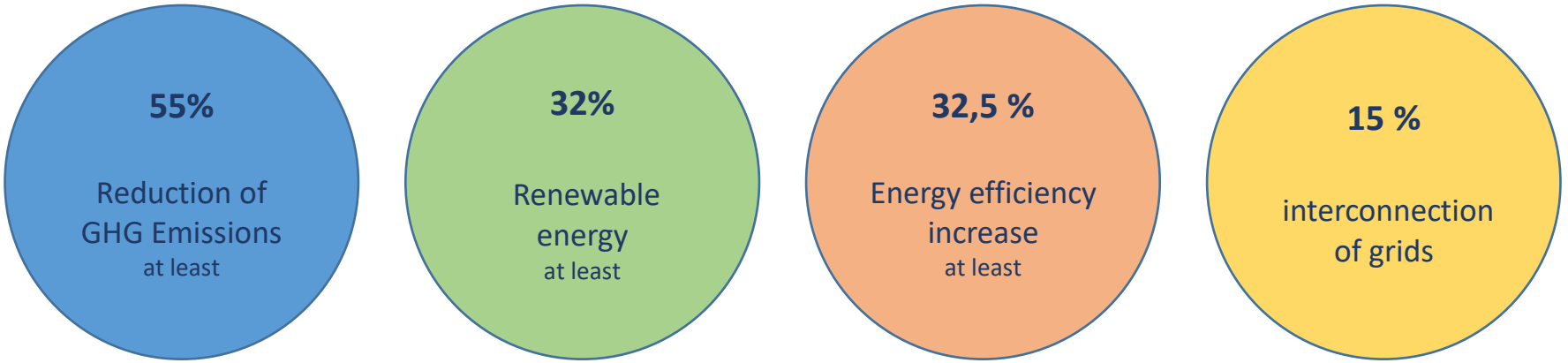
1. Draft 7 Sustainable Energy Action Plans for Central European Regions
2. Assess the ongoing use of public funds by each involved region and develop startegies for their improvement in the future
3. Develop training and mutual learning activities in the involved Regions and in central Europe

FRAMEWORK CONDITIONS

European framework: European Green Deal

FRAMEWORK CONDITIONS

European framework: the 2030 targets



ENTERING NEW TERRITORY

The challenge of planning
the transition of our energy systems
towards a low-carbon economy
through a regional approach

ENTERING NEW TERRITORY

Interreg CENTRAL EUROPE
European Union European Regional Development Fund
PROSPECT2030

Energy planning within the transition towards a low carbon economy coimprises…

Circular and biobased economy
Characterized by cascadic use of raw materials and predominantly end-of-lifecycle energy use

Transformation of the power system
to one dominated by renewable energy supply and flexibility in generation, distribution and consumption

Digitalisation
as the central chainlink of almost all activities and a new consumption sector

Smart technology, policy frameworks and market instruments.

Electrification of end-use sectors
to achieve deep decarbonisation

Energy efficiency measures
To achieve the required carbon reductions

ENTERING NEW TERRITORY

Two core aspects of Energy transition: SHIFT AND CHANGE

Still more than 2/3 of the Union´s final energy demand is based on coal, oil and gas

Shifting from direct combustion of fossils to:

- Grid bound thermal supply (CHP processes, waste incineration, end of life-cycle biomass, geothermy, excess heat)
- Combustion of biomass (primary, secondary)
- Ambient heat (solar and heat pump)
- Electricity (transport)
- Alternative fuels (biomethane, bioliquids, hydrogen)

Results in a decrease of primary energy input and carbon emissions, but inevitably in an increase of electricity demand, requiring an increase of generation

Shifting electricity generation towards utilization of renewable sources, like:

- Photovoltaic generation
- Wind turbines
- Hydroenergy
- Geothermy
- Tide, wave, ocean

Results in a decrease of primary energy input and carbon emissions

ENTERING NEW TERRITORY

Two core aspects of Energy transition: SHIFT AND CHANGE

Changing the demand structure of consumption by:

- Reducing heat demand of buildings through thermal retrofaction and NZEB standards
- Restricting motorised individual mobility and promoting public transport
- Equipment and process efficiency
- Increasing efficiency in lighting systems

Results in a decrease of primary energy input and carbon emissions

Changing the demand structure by emerging new components:

- Digitalisation
- Electrification of end-use sectors

Results in an increase of electricity demand

Summa summarum: Shift and change lead to a decrease of primary energy input and carbon emission and to the predominance of electric energy

ENTERING NEW TERRITORY

Energy development planning

Is characterized by optimizing the **ecosystem** along sectoral axes for more sustainability through efficiency increase in consumption and renewable supply.

Sectoral strategies are linked to overall development goals and carry interaction potential

Is an open target process: impacts are conditional on efforts

Scenarios are developed according to framework potential

Good benchmarks available – acceptance manageable

Occuring conflicts between technology and environment protection

Digitalisation is a technical aspect

Spatial planning is a limiting and helpful condition

Energy transition planning

Is characterized by transforming/shifting an **ecosystem** to a state of sustainability through integration of information technology, connecting demand- and supply-structures for more efficiency, flexibility and maximum renewable supply.

Cross-sectoral interaction strategies are derived from overall development goals

Is a closed target process: efforts need to be designed for achieving the expected impacts

Framework needs to be developed according to target scenarios

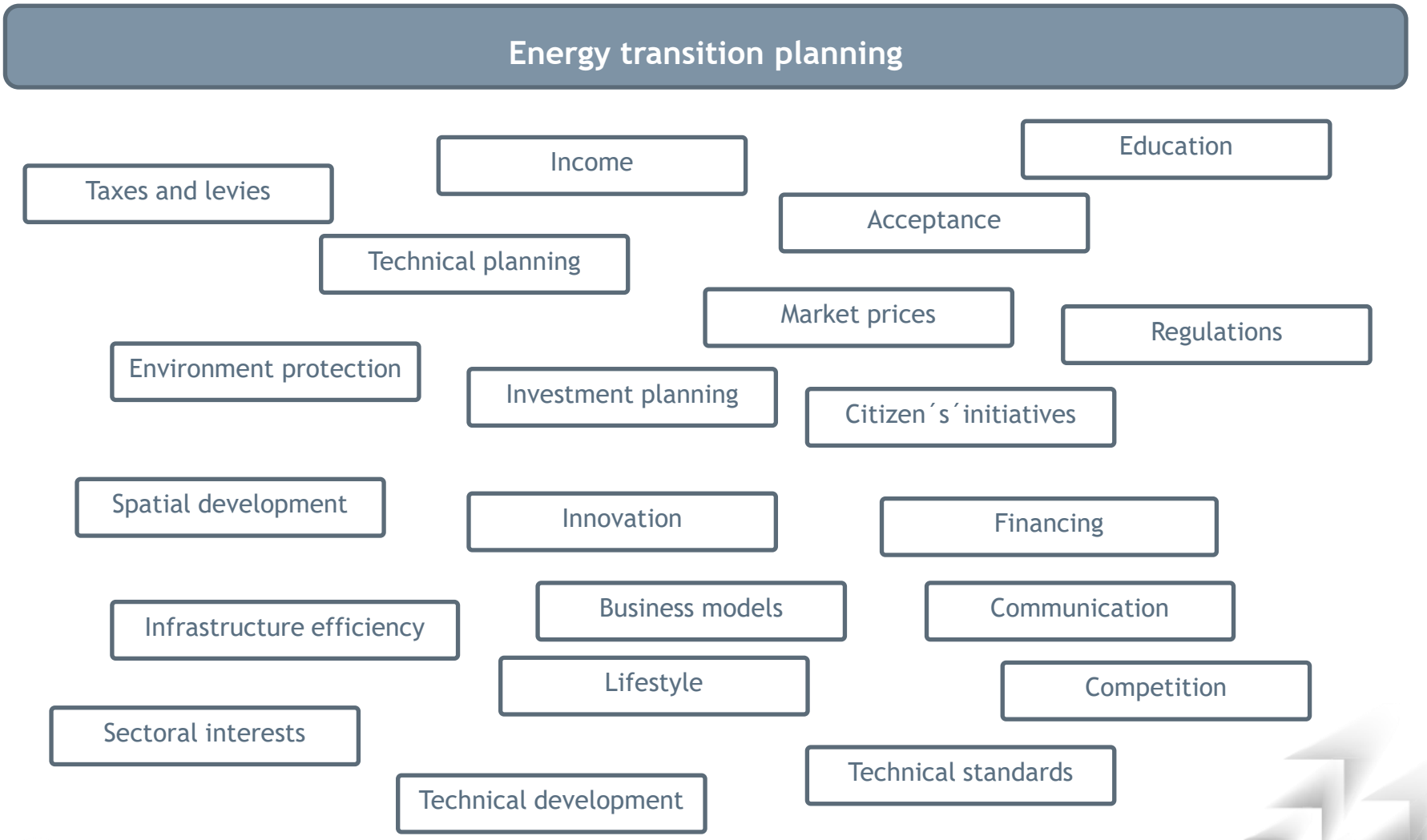
Almost no benchmarks – acceptance is a challenge

Pre-programmed conflicts between technology and environment protection

Digitalisation is a central all-linking aspect

Profound spatial planning is a conditio-sine-qua-non

ENTERING NEW TERRITORY



ENTERING NEW TERRITORY

Take a look at nature - first capture and then copy it!

Viktor Schauberger (1885-1958)

Austrian pioneer in unconventional, but successful forestry management, agriculture and energy engineering - long ahead of his time

In the context of sustainable development, in particular sectors, the view on human activities is compared to and expressed as, the interaction of organisms in definable surroundings .

The concepts and descriptions of these interactions are based on the discipline of **bio-cybernetics** in ecology and related eco-engineering, using also related terminology.

This form of approach has already reached mainstream in:

- Information technology and digitalization (especially!)

But also, increasingly in

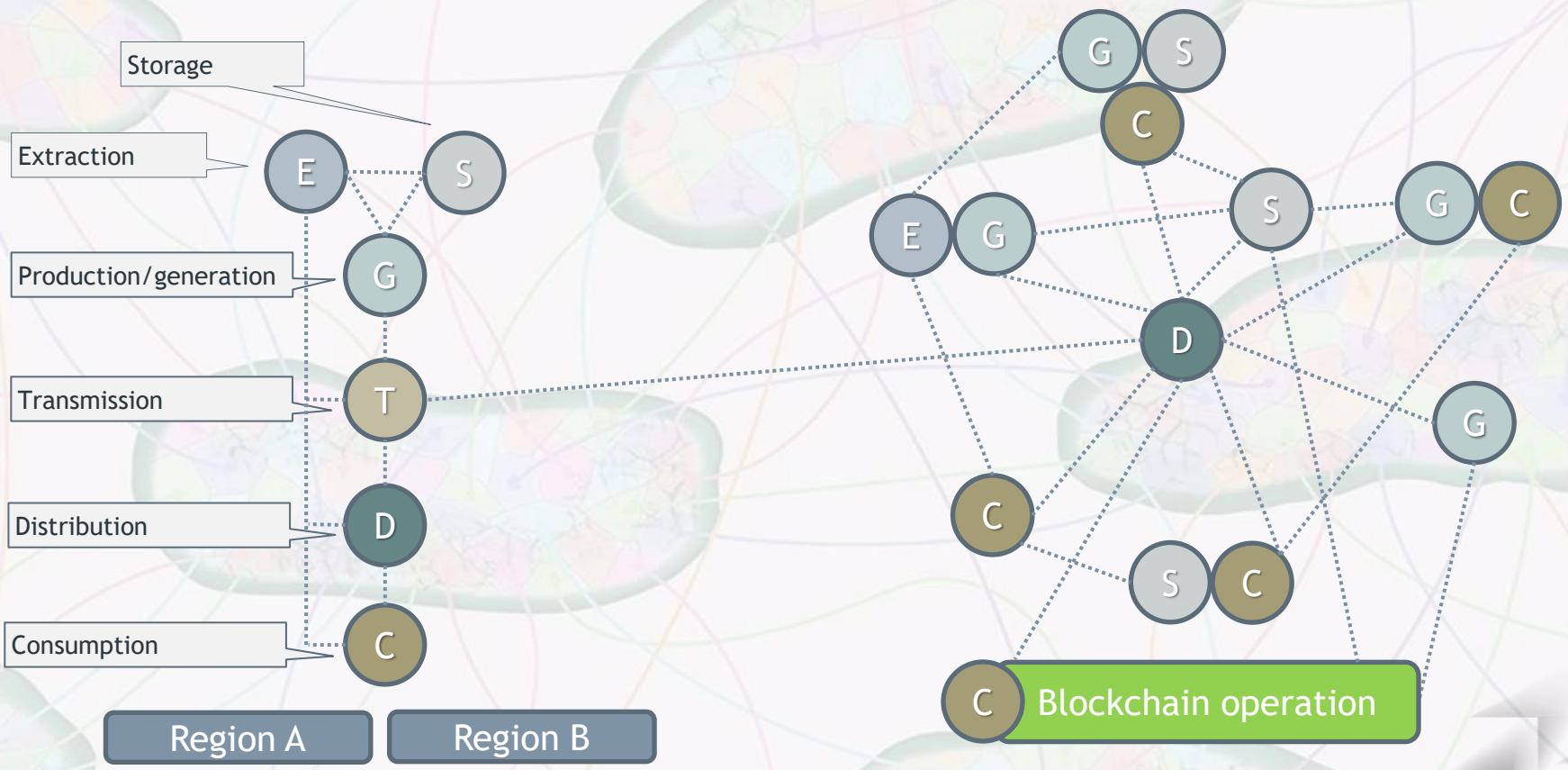
- Economics
- Spatial planning and infrastructure engineering

ENTERING NEW TERRITORY

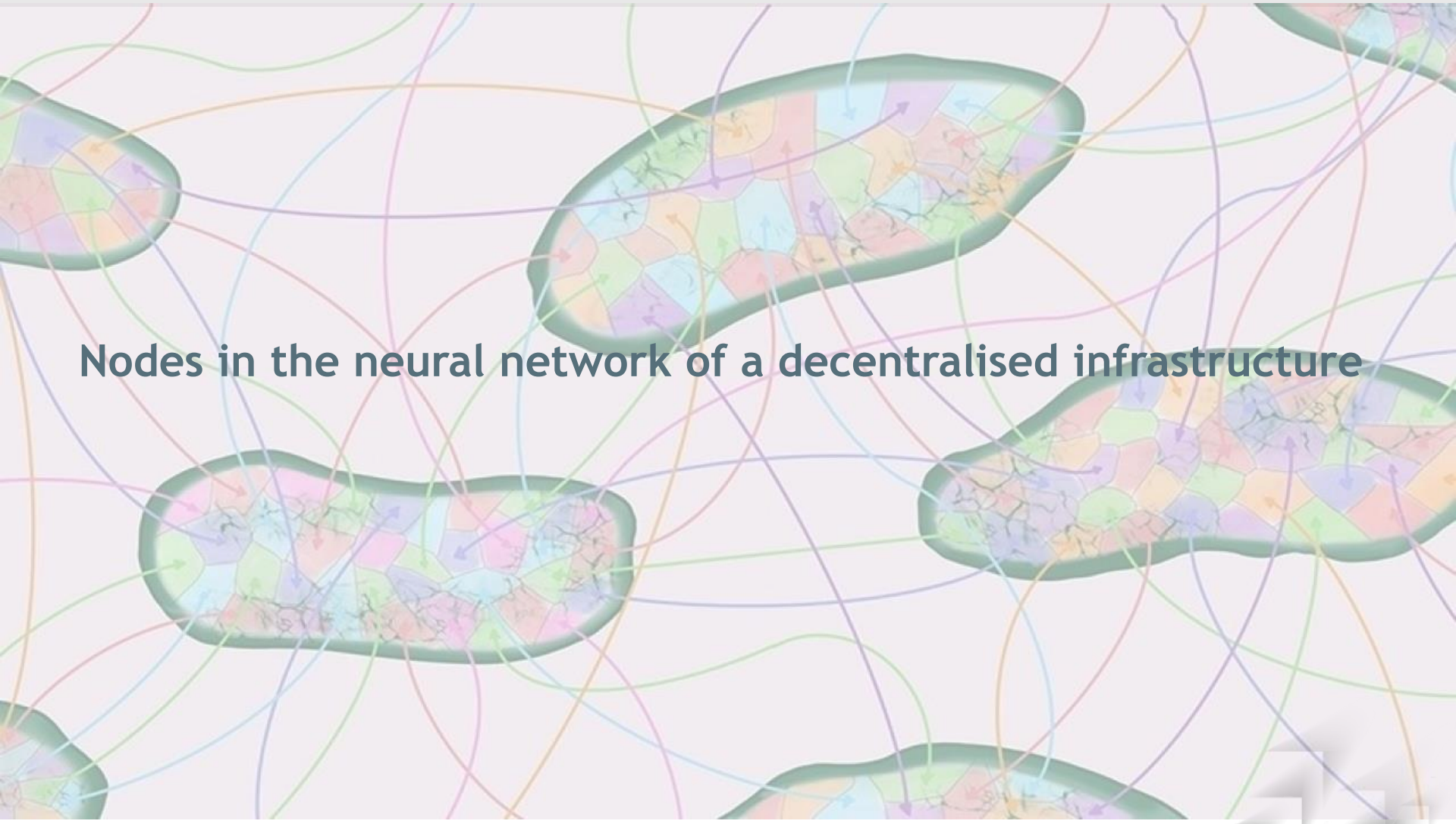
Energy-driven Systems
predominately based on combustion

transforming into

Energy- and data-driven (Eco)Systems
with decreasing combustion and
an increasing share of electricity



GETTING STRUCTURED



Nodes in the neural network of a decentralised infrastructure

GETTING STRUCTURED

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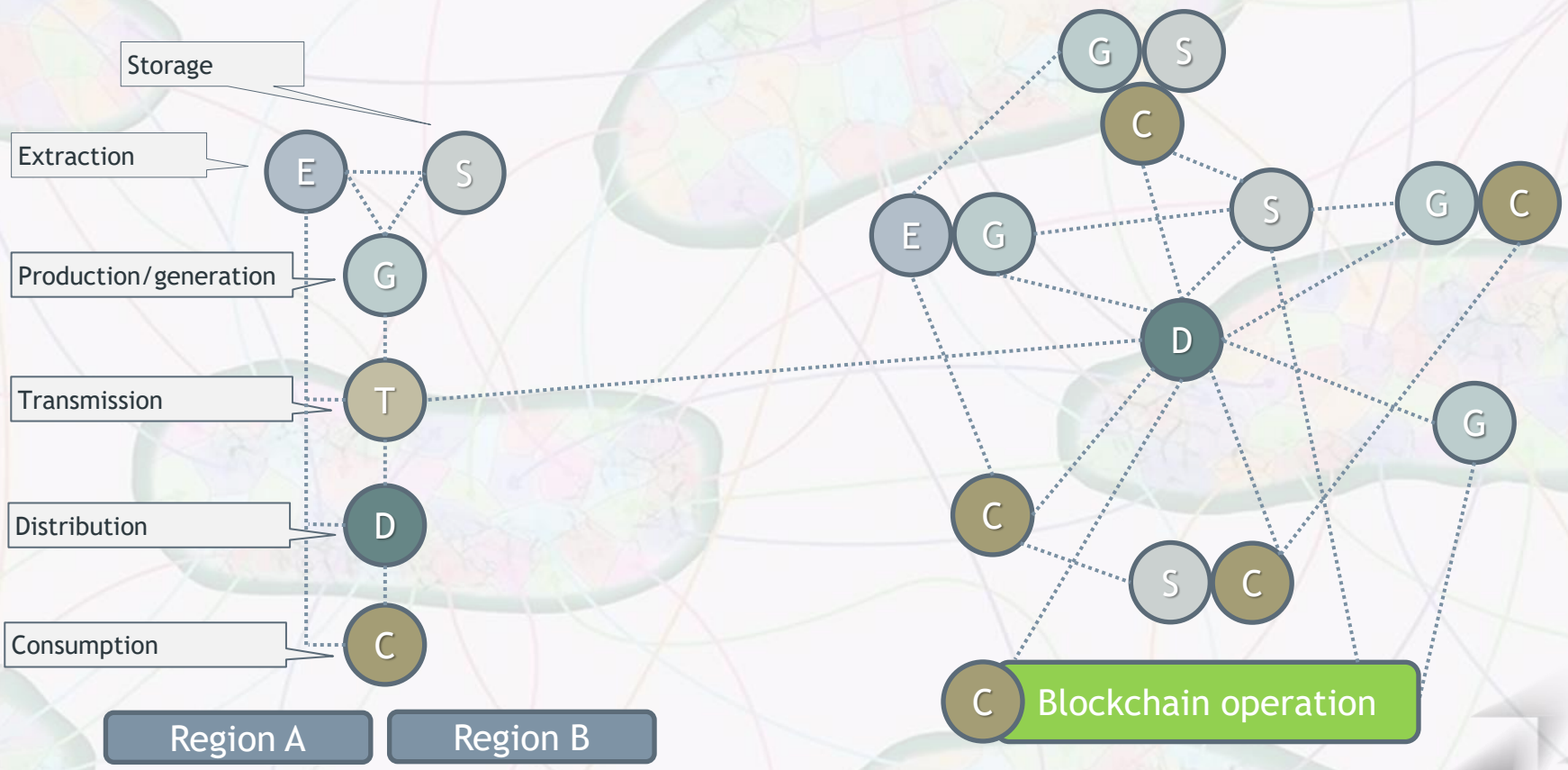
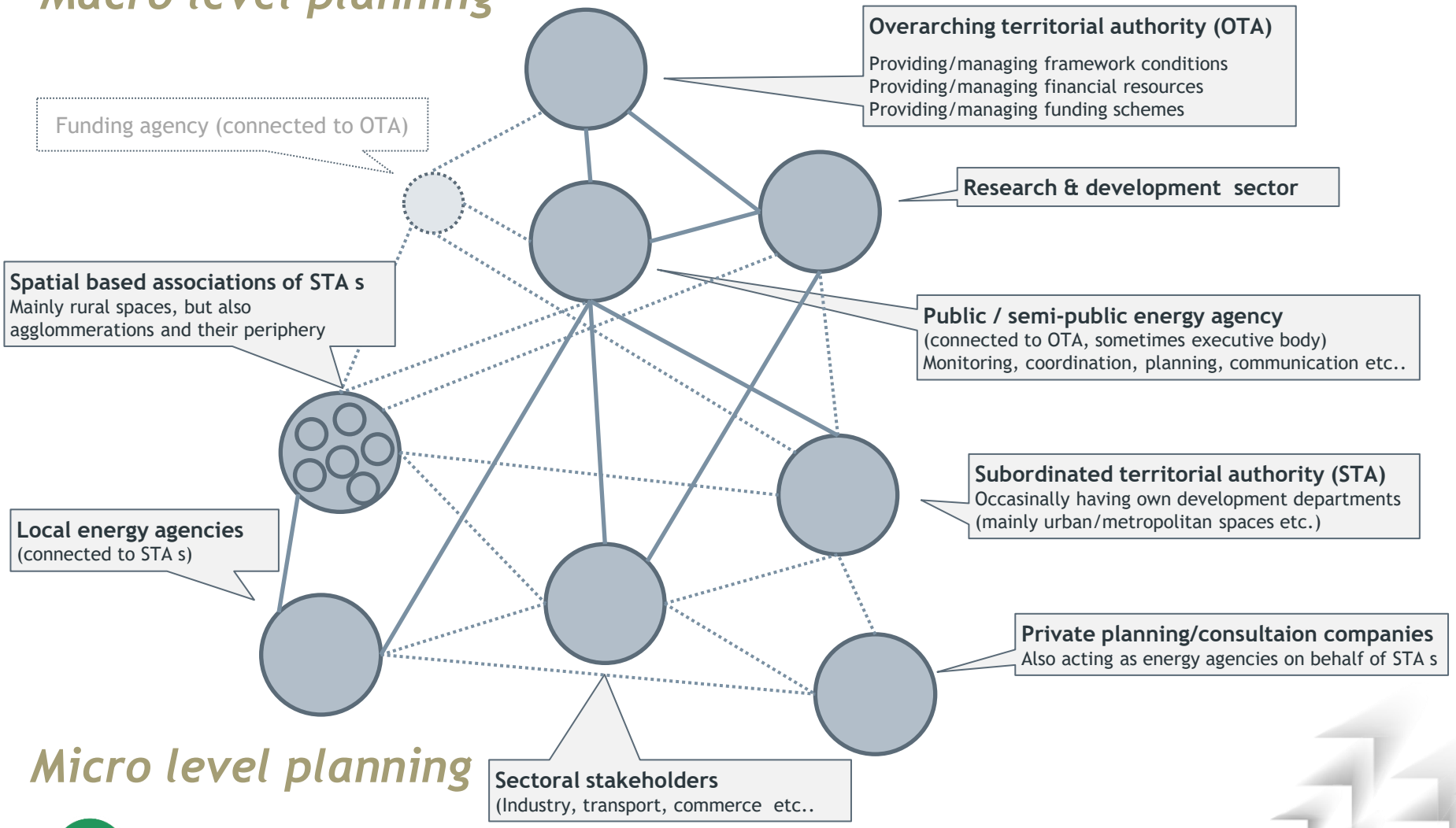


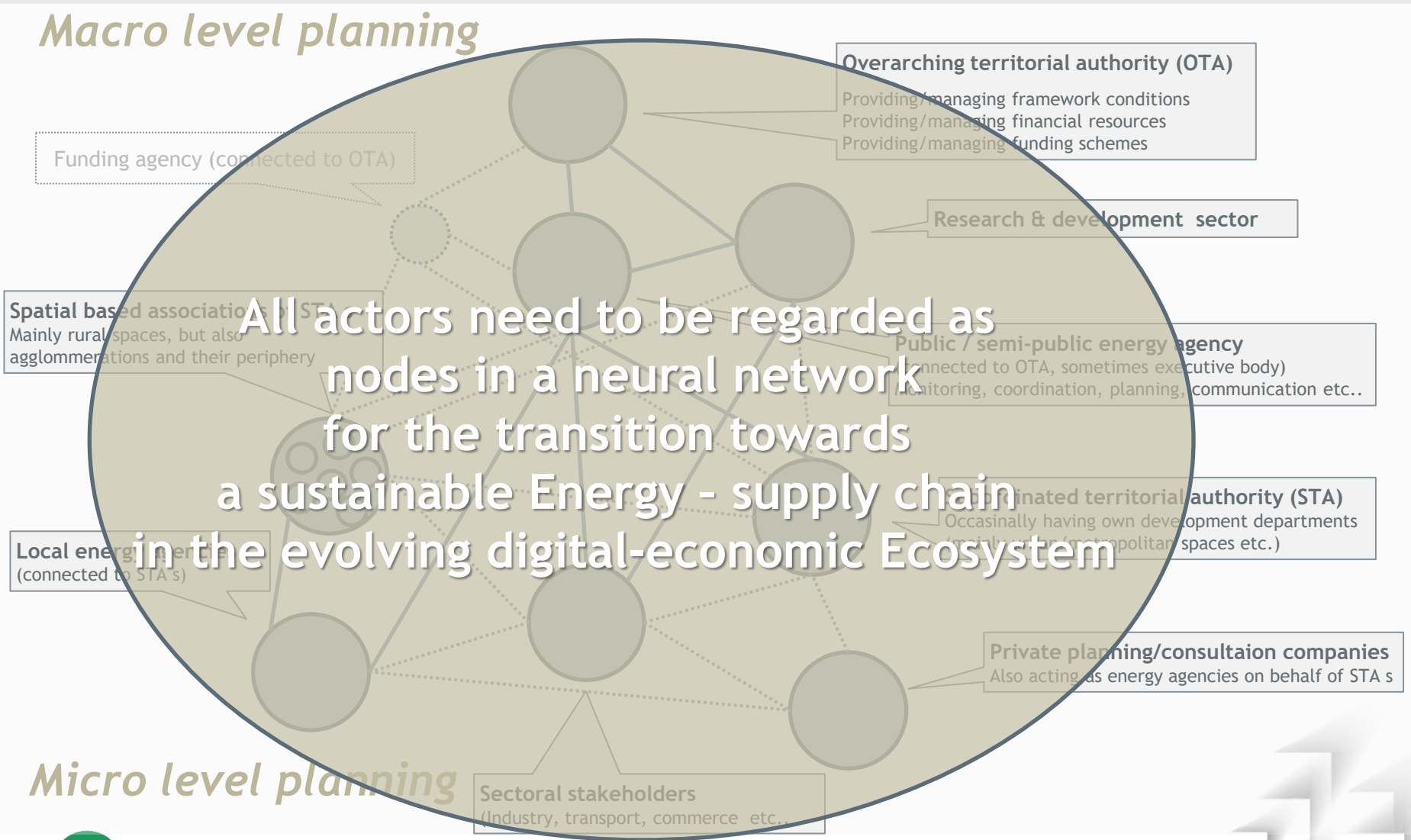
GETTING STRUCTURED

Macro level planning



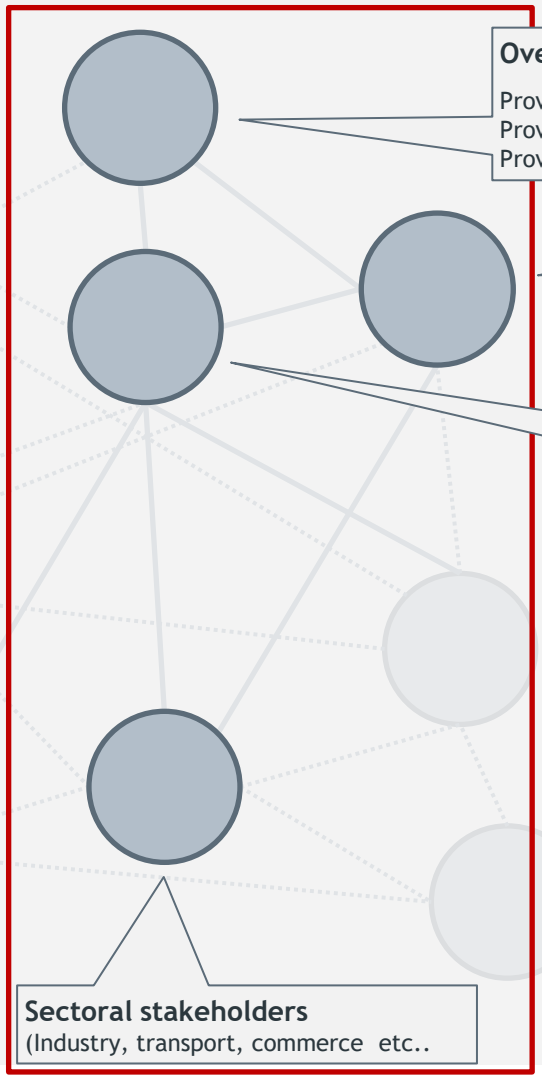
Micro level planning

GETTING STRUCTURED



GETTING STRUCTURED

Macro level planning



Overarching territorial authority (OTA)
Providing/managing framework conditions
Providing/managing financial resources
Providing/managing funding schemes

Research & development sector

Public / semi-public energy agency
(connected to OTA, sometimes executive body)
Monitoring, coordination, planning, communication etc..

Sectoral stakeholders
(Industry, transport, commerce etc..

Functional approach:

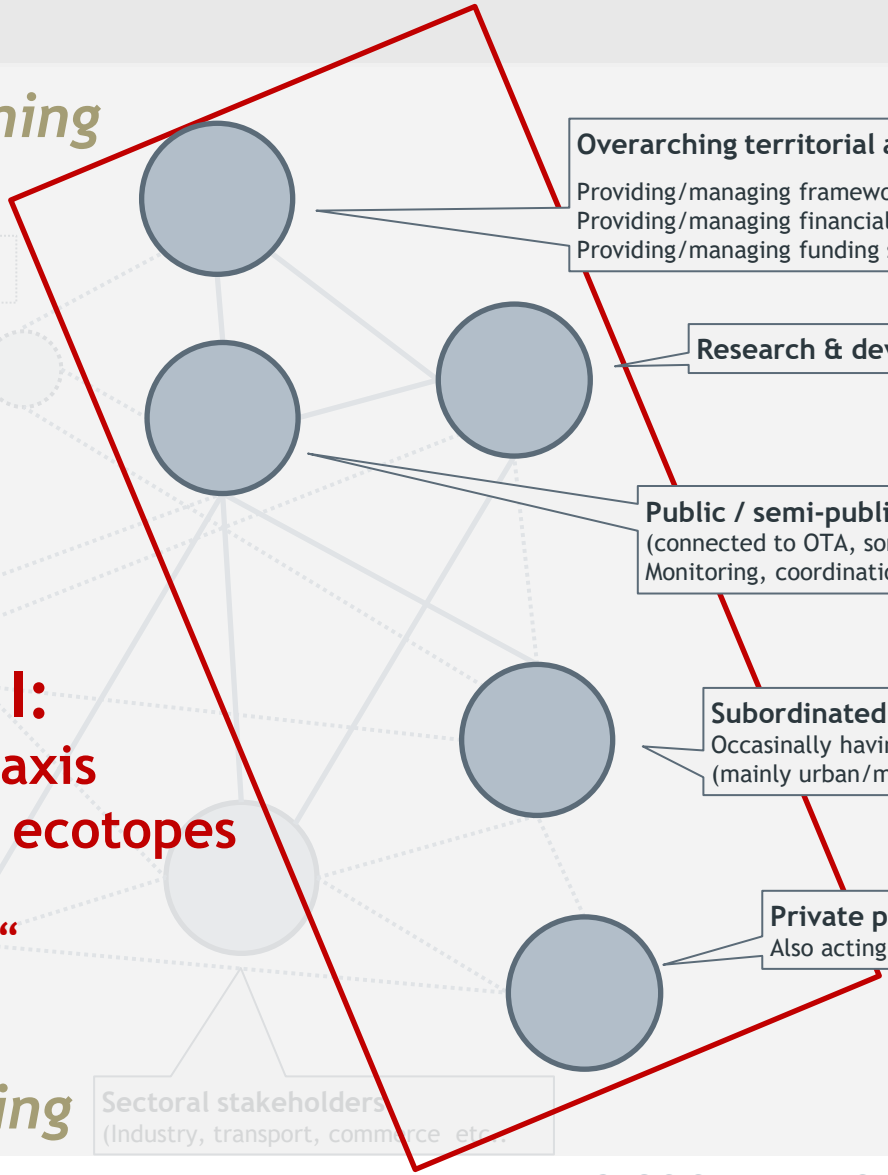
Sectoral development axis
Chainlinks of Ecocenosis

„Green business“
„Green finance“
„Green mobility“
„Green buildings“

Micro level planning

GETTING STRUCTURED

Macro level planning



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Public / semi-public energy agency
(connected to OTA, sometimes executive body)
Monitoring, coordination, planning, communication etc..

Subordinated territorial authority (STA)
Occasionally having own development departments
(mainly urban/metropolitan spaces etc.)

Private planning/consultaion companies
Also acting as energy agencies on behalf of STA s

Funding agency (connected to OTA)

Spatial based associations of STA s
Mainly rural spaces, but also agglommerations and their periphery

Local energy agencies
(connected to STA s)

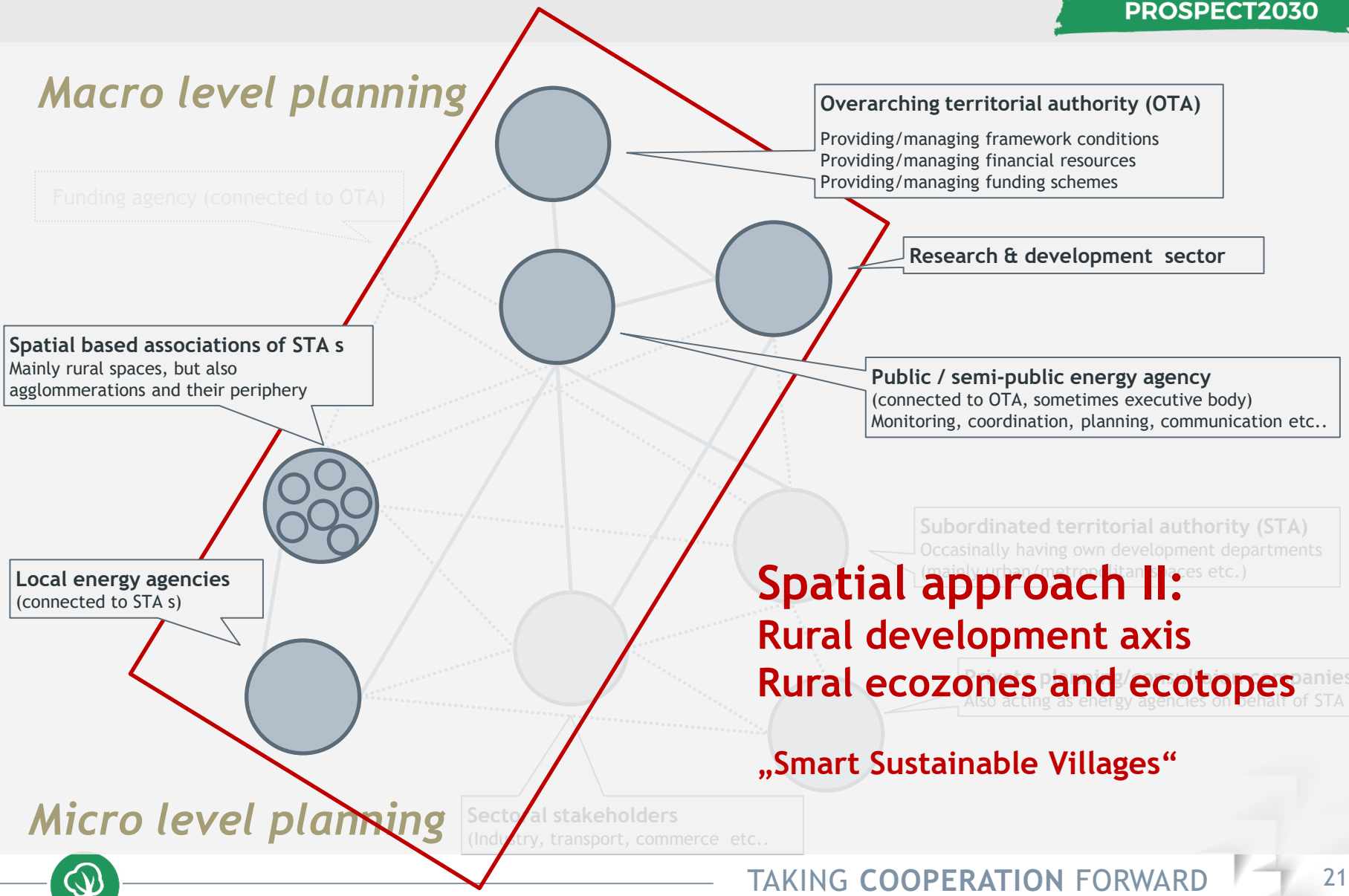
Sectoral stakeholders
(Industry, transport, commerce etc.)

Spatial approach I:
Urban development axis
Urban Ecozones and ecotopes

„Smart Sustainable Cities“

Micro level planning

GETTING STRUCTURED



GETTING STRUCTURED

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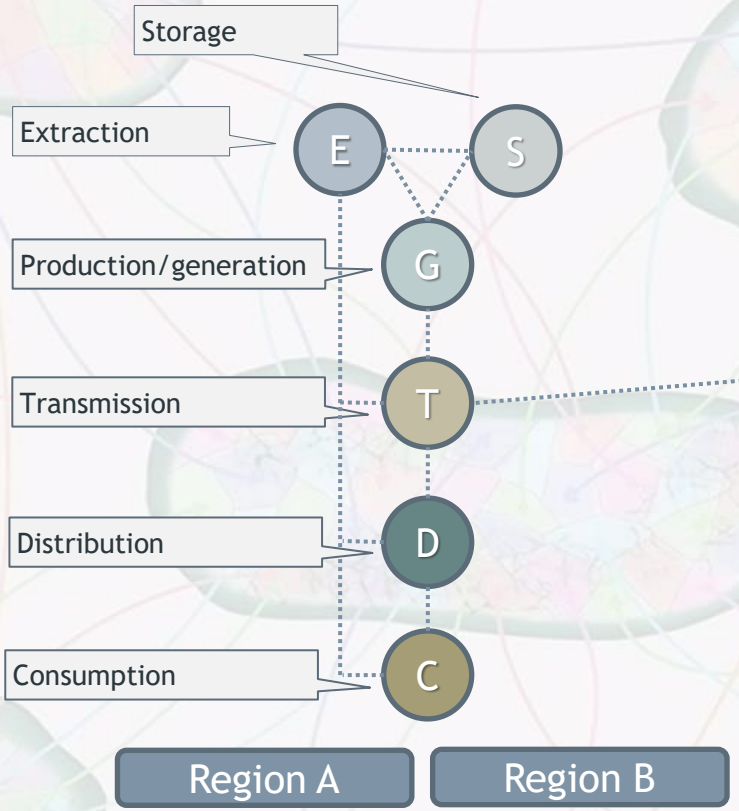
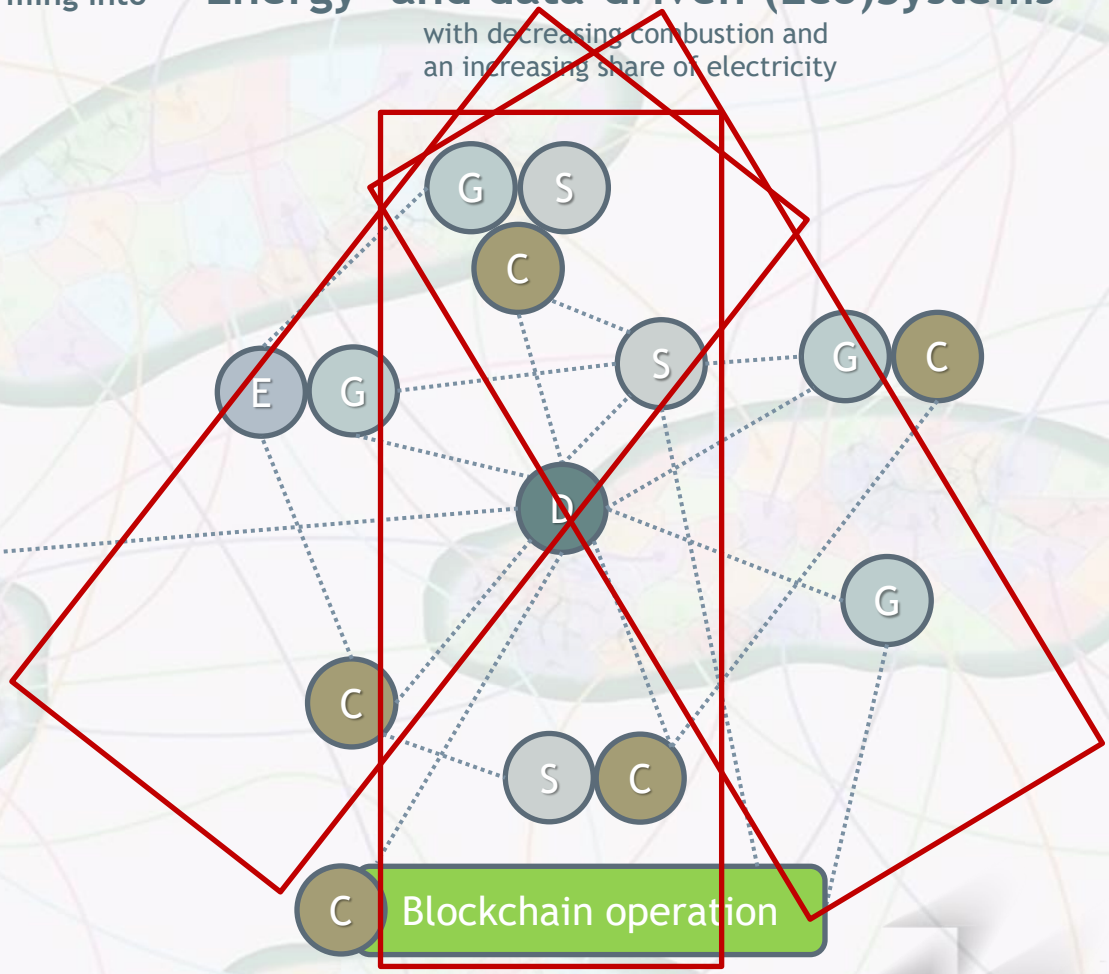




CHALLENGE

Energy transition means also a transition in planning approaches:

Scalability is one of the core questions for synchronizing activities on differing levels

Broccoli var. romanesco

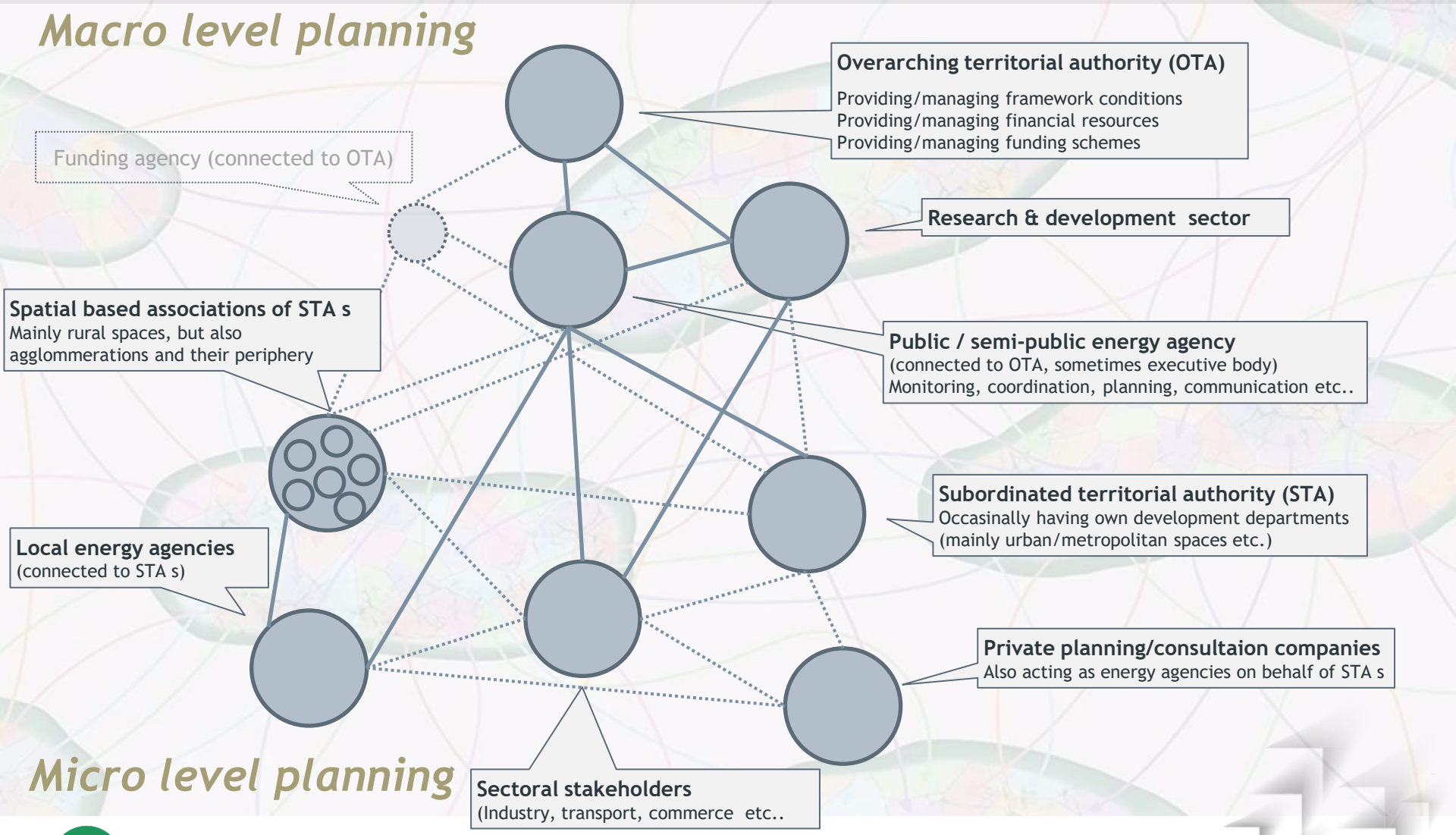
Self-similar structures in varying sizes - making up the whole system - connected to a common stem. One principle on many levels

THE APPROACH

How to …

Action planning

THE APPROACH



THE APPROACH

- All instances and nodes in the system are connected through moving forces:
    - Information
    - Finances
    - Level in the hierarchy of governance
    - Power of stakeholders, interest groups and affected communities
- and are equipped with specific instruments to carry out actions under exertion of efforts, in order to achieve desired impacts:
- Respective commitments are layed down in ACTION PLANS

THE APPROACH

- An action plan is – commonly - a policy instrument, which
    - contains the problem description and the need for action,
    - defines the goals to be achieved,
    - sets priorities and
    - bundles existing or new measures to achieve these goals.
- An action plan is developed in a participatory manner and with the involvement of also non-state actors.
- By adopting an action plan, the actors publicly express their political will to implement the adopted measures within a certain period of time

So far, nothing new. We have NECPs, SEAPs - regional and local….

ACTION PLAN - TYPES AND LEVELS

Two different types of action plans - both are action plans

Macro - level

Top down

Public (national, regional) authorities
and related
Public energy agencies

Action = providing and/or managing funding programs & investment strategies, promoting overall development, removing barriers, assigning targets and beneficiary groups

Pro-active :

Developing framework conditions and instruments for action (policy, promotion, funding schemes...)

Bottom up

Local energy agencies and
Private planning / consultation companies
on behalf of:

- Local authorities or associations thereof
- Local or regional sectoral stakeholders
- Local or regional representatives of interest
- Local or regional business associations

Action = identifying potentials and targets in place according to existing programs and strategies, implementing specific measures

Re-active :

Using framework conditions and instruments for action (agreements, contracts...)

Micro - level

ACTION PLAN - TYPES AND LEVELS

Public policy instrument

Used as a public policy instrument by an overarching territorial authority, an action plan focusses on providing an effective supportive framework and appropriate instruments for goal achievement.

Planning instrument

Used as a planning instrument by (e.g. voluntarily self-organized associations of) subordinated territorial authorities (e.g. municipalities, micro-regions) it focusses on the use of the given framework and instruments in the most effective way to achieve maximum benefit by putting goals into practice

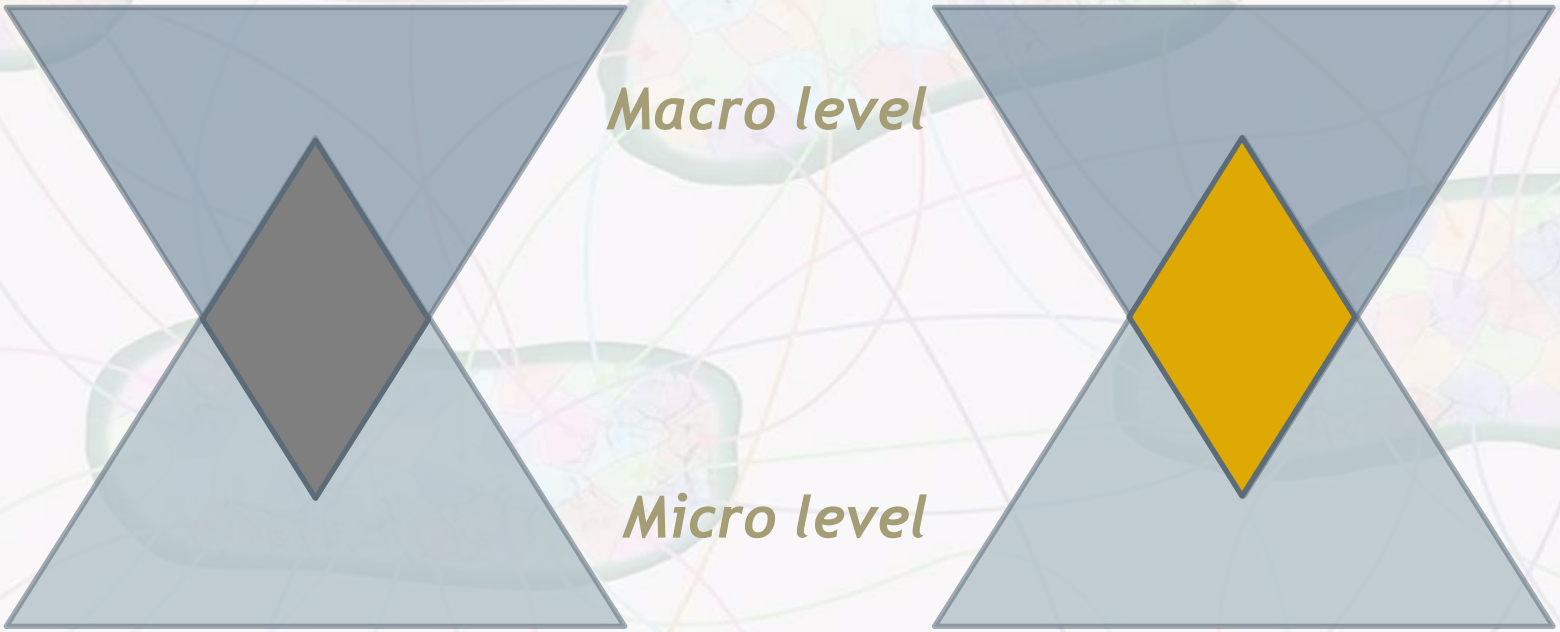
ACTION PLANNING - CHALLENGE

Worst case: counteractive

Not recognizing the needs
e.g. „urban thinking“ in mobility

Best case: synactive

Setting up functional frameworks instead of sectoral ones
e.g. incentivizing multi-component system solutions



Not recognizing the purpose
e.g. focussing on technical solutions, blind benchmarking

Exploiting most promising local potentials for sustainable development
e.g. multi-player energy communities

ACTION PLANNING - CHALLENGE

Regional energy planning is also rooted in an effective interplay of 3 governance principles for decentralisation:

Authority (security)

Defining framework, providing strategies and programs on development and funding, removing barriers, monitoring and supervising overall development

Subsidiarity (efficiency)

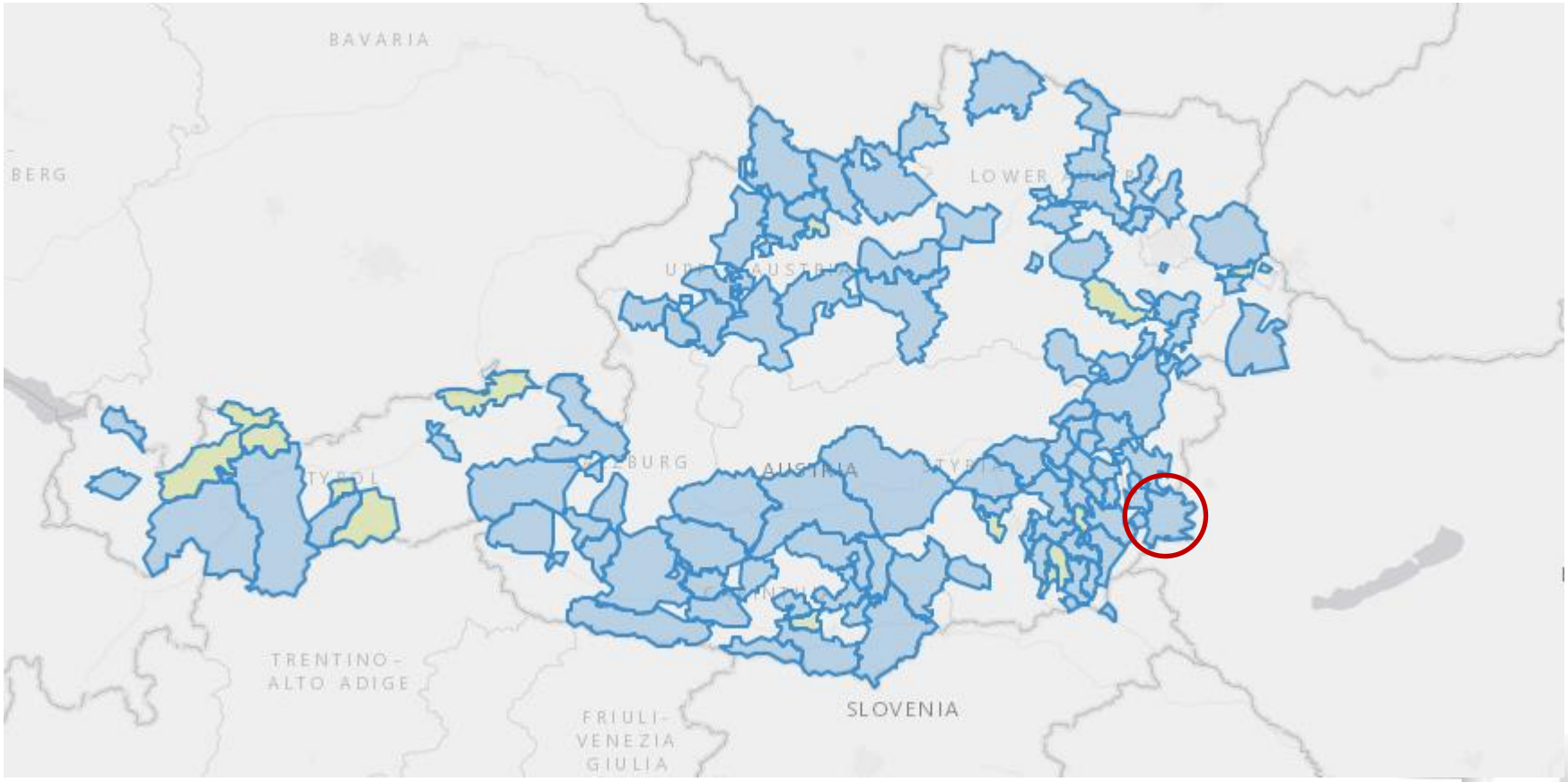
Everything that can be carried out on a subordinated level should also be managed/executed there. Subsidiary bodies can be appointed agencies or existing bodies of public administration (one-stop-shops)

Autonomy (acceptance)

Members of the organisational unit are having the possibility to choose their individual pathway for target achievement (limited by overall framework) and are also fully accountable for the appropriate execution of decisions.

ACTION PLANNING - CHALLENGE

Decentralised planning example: Climate- and Energy Model Regions



Decentralised planning example: Climate- and Energy Model Regions (KEMs)

Authority (security)

European and national framework are providing planning and investment security as well as steering funding

Subsidiarity (efficiency)

National climate and energy fund is managing body
Assigned by legal regulation, it is the only instrument of the federal government that can access all funding instruments and thus offers an enormous additional benefit for funding recipients.
Comprehensive projects that include research, demonstration and investment can thus have a rapid impact on the market

Autonomy (acceptance)

A climate and energy model region is made up of an association of at least 2 municipalities. All members are publicly expressing their will to implement measures.
As a chainlink between the municipalities association the managing body, a KEM manager is installed, managing the implementation of measures, providing services to population and communicating achieved results as well as reporting progress.

Activities are based on continuous interaction with stakeholders

Acting on local level and responding to local needs, KEMs are an important component in energy transition

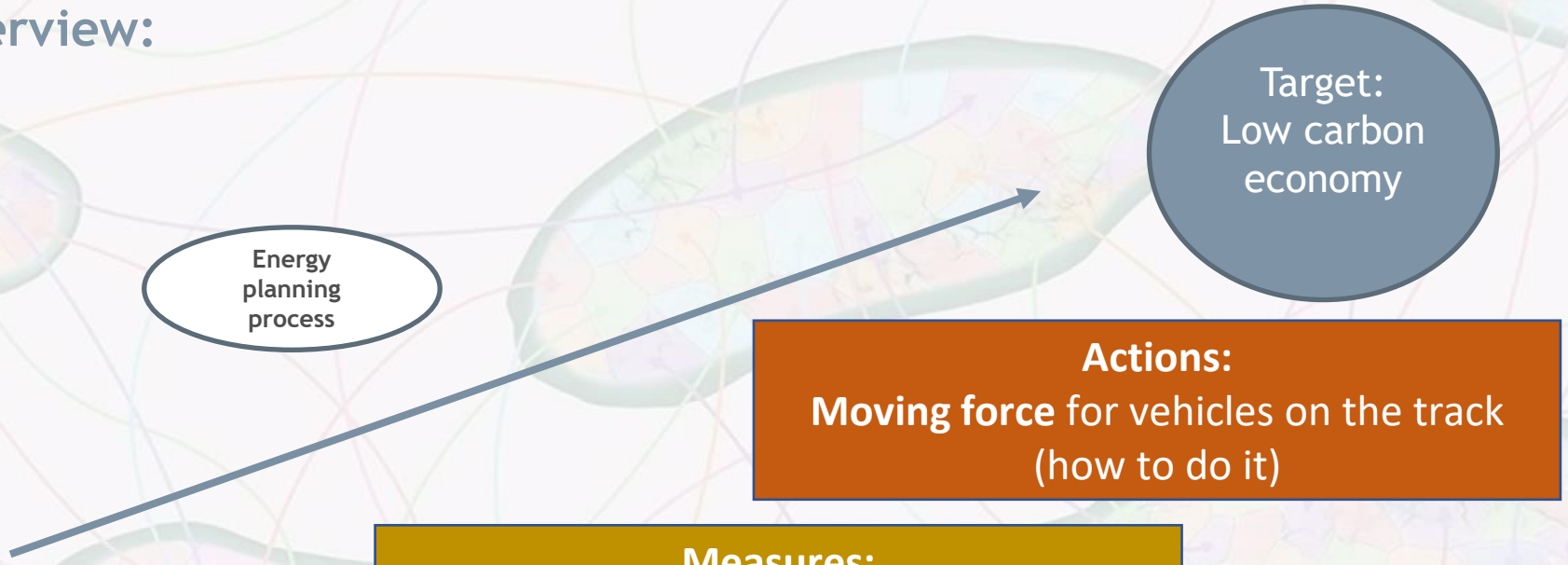
THE APPROACH

How to …

Transition planning

TRANSITION PLANNING

Overview:



Actions:
Moving force for vehicles on the track (how to do it)

Measures:
Vehicles for reaching the target state on the chosen track (what to do)

Priority:
Chosen trail towards the target state at the starting point (transition pathway)

Baseline

TRANSITION PLANNING

Priorities:

- are a commitment to defined pathways (e.g. increase in renewable energy generation) to reach the target of a low-carbon-economy.
- They are set in a participatory manner and involve decission makers and stakeholders from as much sectors as possible.
- They are expressed publicly as the binding (political) will to implement within a timeframe

Measures:

- Are implemented structures (- not necessarilly technical), resulting in changes of energy- and/or emission- performance and improved adaptation.
- Each measure is linked to challenges, and its effect can be estimated in calculable units or in relation of impact to effort

Actions:

are the use of e.g. planning, financial, organisational, business, communication etc. instruments („mechanisms“) to put measures into practice (e.g. contracts, benchmarks, consulting service establishment etc) – Energy planning – for benchmark and evaluation - is comparable only on action level

TRANSITION PLANNING

Actions:
Standardising the action development process

Implementation of measures requires the implementation and application of instruments

Actions are the appropriate use of instruments to achieve the greatest possible benefit (impact) with the least possible effort.

Planning instruments:
Development concepts, land use plans, infrastructure priority assignements, detection and documentation of structures etc.

Policy instruments:
Awareness building, education, public awards, administrative agreements, use pricing, regulatory advantages and restrictions etc.

Financial instruments:
Investment subsidies, supported loans, tax reliefs, variable tariffs, feed in tariffs, crowdfunding, private-public partnerships etc.

Organisational instruments:
Associations, communities, form of companies, agreements, board of stakeholders, public participation models etc.

Business instruments:

Technical instruments:

Etc. pp.

TRANSITION PLANNING

Actions:

Transition planning requires a basic approach, common to all participating bodies

Instruments are ubiquitous in all planning-ecosystems and actions are only limited to the instruments´design and the regulatory framework.

- Nevertheless, instruments can be bundled for actions and
- Actions can be bundled to implement various measures
- Measures can be bundled in order to fulfil the priorities´goals

In this way, a standardized approach, focussing on actions and instruments allows scalability, evaluabilty and comparabilty of energy planning

- Across types of measures,
- Across level and size of regions (macro-micro)
- Across types of priorities (sectoral, spatial, technical, goverenance etc.)
- Across levels of governance

TRANSITION PLANNING

Actions:

How to detect instruments, define actions and estimate impact and effort

Adapting the SWOT as a dynamic planning tool:weighting internal and external factors influencing measure implementation

SWOT	Description of factors	Weight	
Strengths	# Experience in a series of relevant pilot projects, some of them in cooperation with the local DSO # Regional stakeholders are familiar with the topic	1- high	Impact
Weaknesses	# Low interest of most municipalities to support initiative by providing test sites. Reason: financial situation of municipalities do not allow big investments in demonstration sites # Residents are sceptic as long as there is no "critical mass" of implementation with positive reporting reached	2 - medium	Effort
Opportunities	# Pilot projects in many other regions. # Possibilities for experience exchange and benchmarking with other initiatives. # EU has set regular framework conditions which also touch on this topic # National incentive programs are promoting the issue; it fulfils the targets of the national climate-and energy-strategy 2030	1- high	Impact
Threats	high operating costs. cannot ensure the operation of the plants beyond the project duration. Thus less will to implement	2 - medium	Effort

Actions:

How to, define actions, detect instruments and estimate impact and effort

The first result is a „picture“ of the readiness of the region for a measure (or vice versa).
Actions for the measure are defined under the perspective to:

- Achieve the highest synergies with internal and external supporting factors
- Limit counterdirected impacts of internal and external obstructive factors

… and chose the most effective instruments to use.

So far, nothing new. It is a SWOT as carried out in any planning case

It is still a **static** SWOT, if applied to a single measure

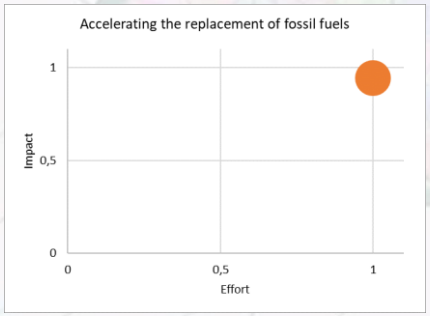
Actions:

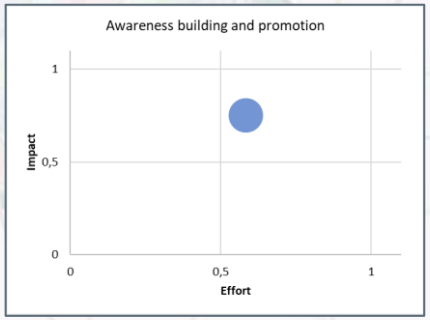
How to detect instruments, define actions and estimate impact and effort

Bundling the weighted SWOTs of measures within the respective priority leads, as a second result to:

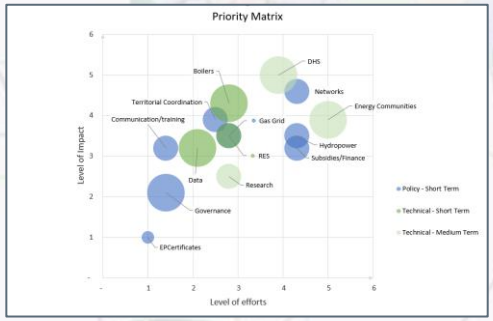
- an Impact/Effort matrix, which can be visualised in a diagram, useful for ex-ante evaluation and stakeholder communication:

Individually for each priority





or synoptic for the whole planning



ENERGY PLANNING - CHALLENGE

Actions:

How to evaluate scenarios, adopt benchmarks and generate insights

The third result, achievable from bundling weighted SWOTs, roots in the re-introduction of the effectiveness of measures and instruments into the SWOT-matrix, which makes the SWOT a dynamic one.

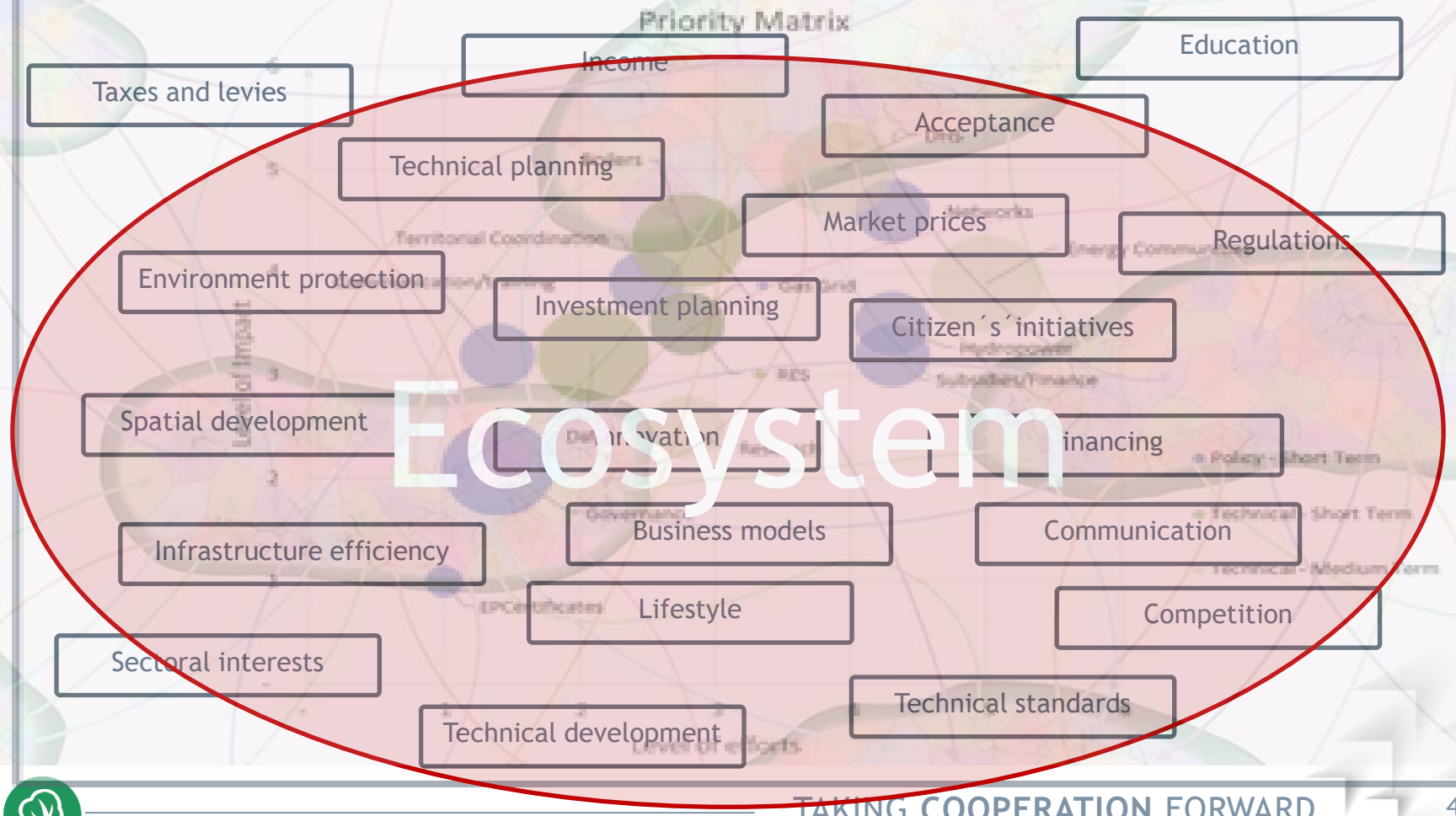
Benchmarking: appropriate for priorities on standard level. Experiences of other applicants (efforts, impacts, actions) can be compared with the region´s internal and external factors.

Monitoring: introducing interim results from measure implementation may help to evaluate wether the priority is on track or needs additional action. In this case, changes of internal and external factors as well as their weights are considered

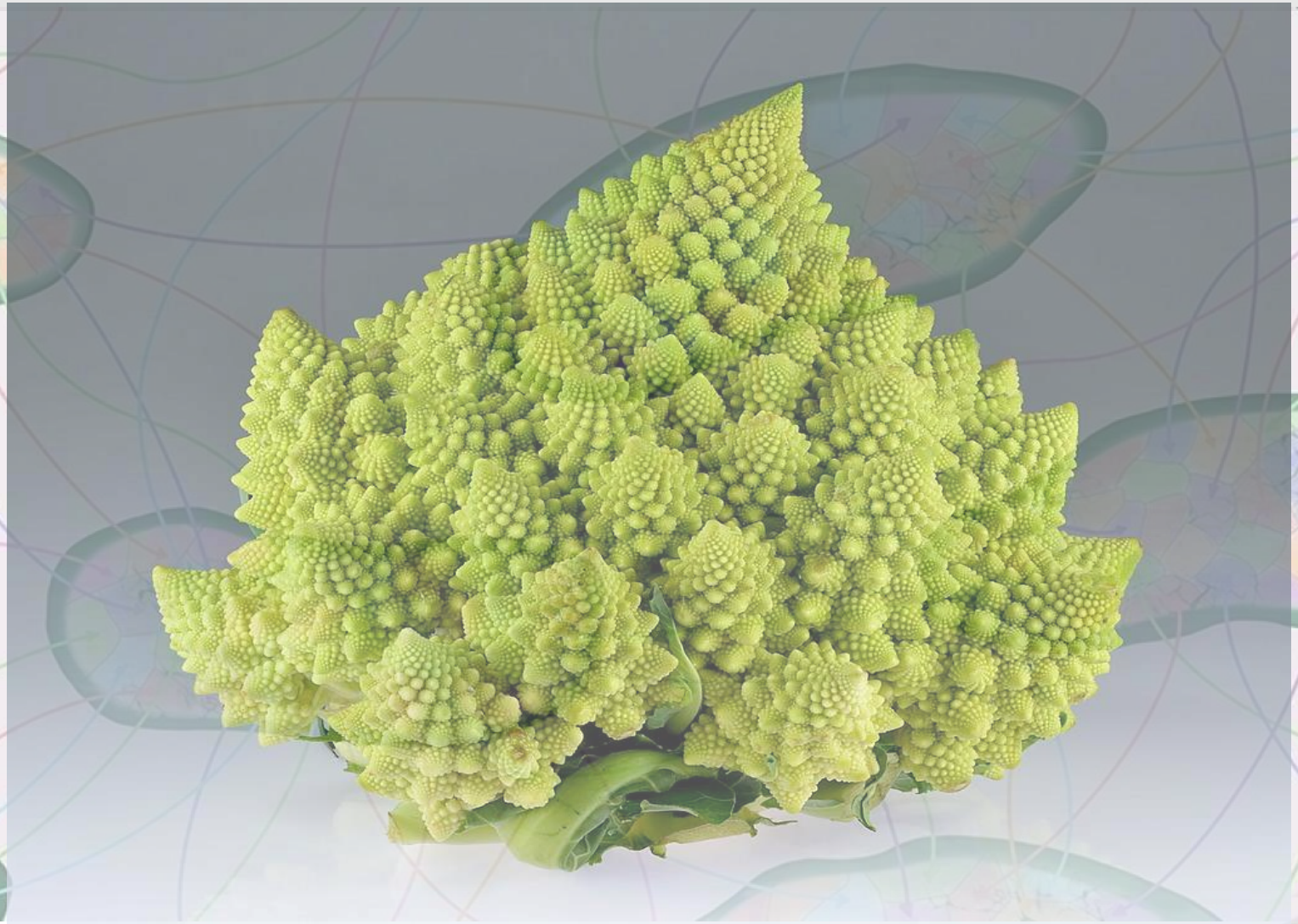
Scenario evaluation: measures, scheduled to be implemented within a defined timeframe, are often scattered across different priorities. Arranged along the time axis they are intended to bring forth results within the given timeframe. Related actions, introduced into the dynamic SWOT can reveil synergetic or obstructive tendencies.

Impact - Effort modelling for energy-ecosystems can cover all possible elements of transition planning

Destiiling the process down to the main connecting elements- thus scalable and connectible to all levels



COMPARABLE STRUCTURES CONNECTING DIFFERING LEVELS. SIMILAR IN FUNCTION, BUT NOT THE SAME IN DETAIL, MAKING UP THE WHOLE



THE FINAL QUESTION

Are targets for transition realistic ?

THE FINAL QUESTION

Interreg CENTRAL EUROPE
European Union European Regional Development Fund
PROSPECT2030

Spring 2020 introduced the unestimable - here´s Schroedinger´s Cat!

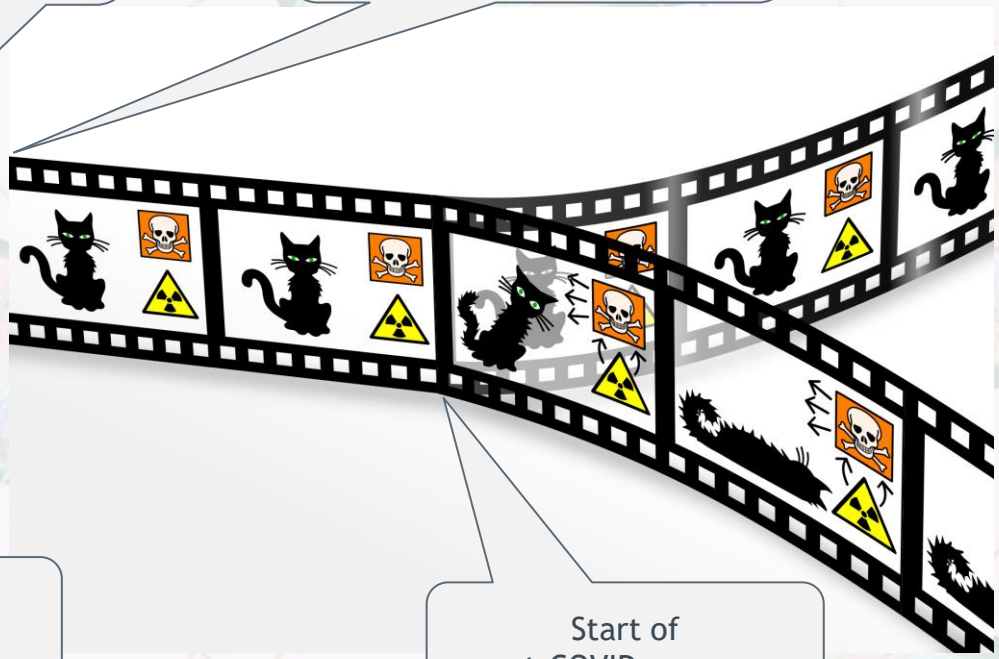
THE FINAL QUESTION

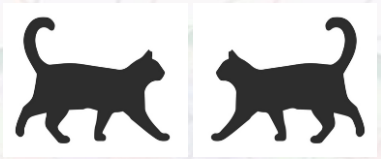
Spring 2020 introduced the unestimable - here´s Schroedinger´s Cat!

The „old energy system“ as we know it
Cat is on the way to meet friends in the new system

Cat fell into the box

„New energy system“ in place, working and accepted
Cat enjoys meeting friends





Pre-COVID economy

Start of post-COVID economy

THANK YOU FOR YOUR ATTENTION

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