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Regions, Resources and Sustainable Development

Rational utilisation of renewable resources as chance for regions

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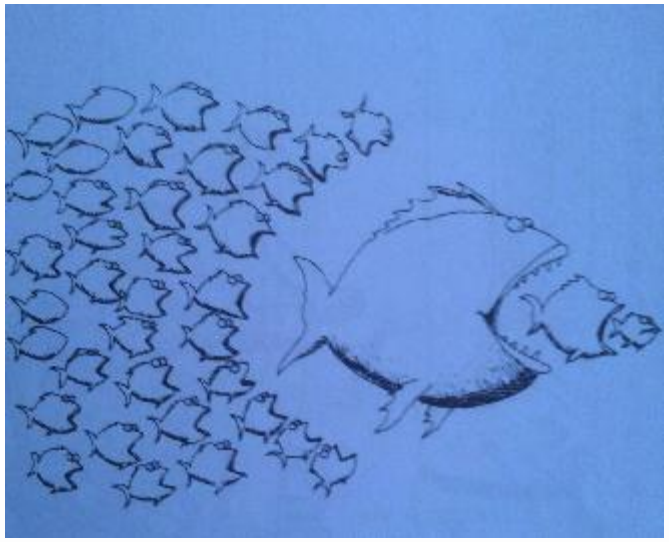
What you can expect

- Why regions?
- What resources?
- Bio-resources as a special case
- Case study

Why Regions?



Because they…

- …are the next step after „big is beautiful“
- …offer the „flip side“ of globalisation and are equally inevitable

Because they…

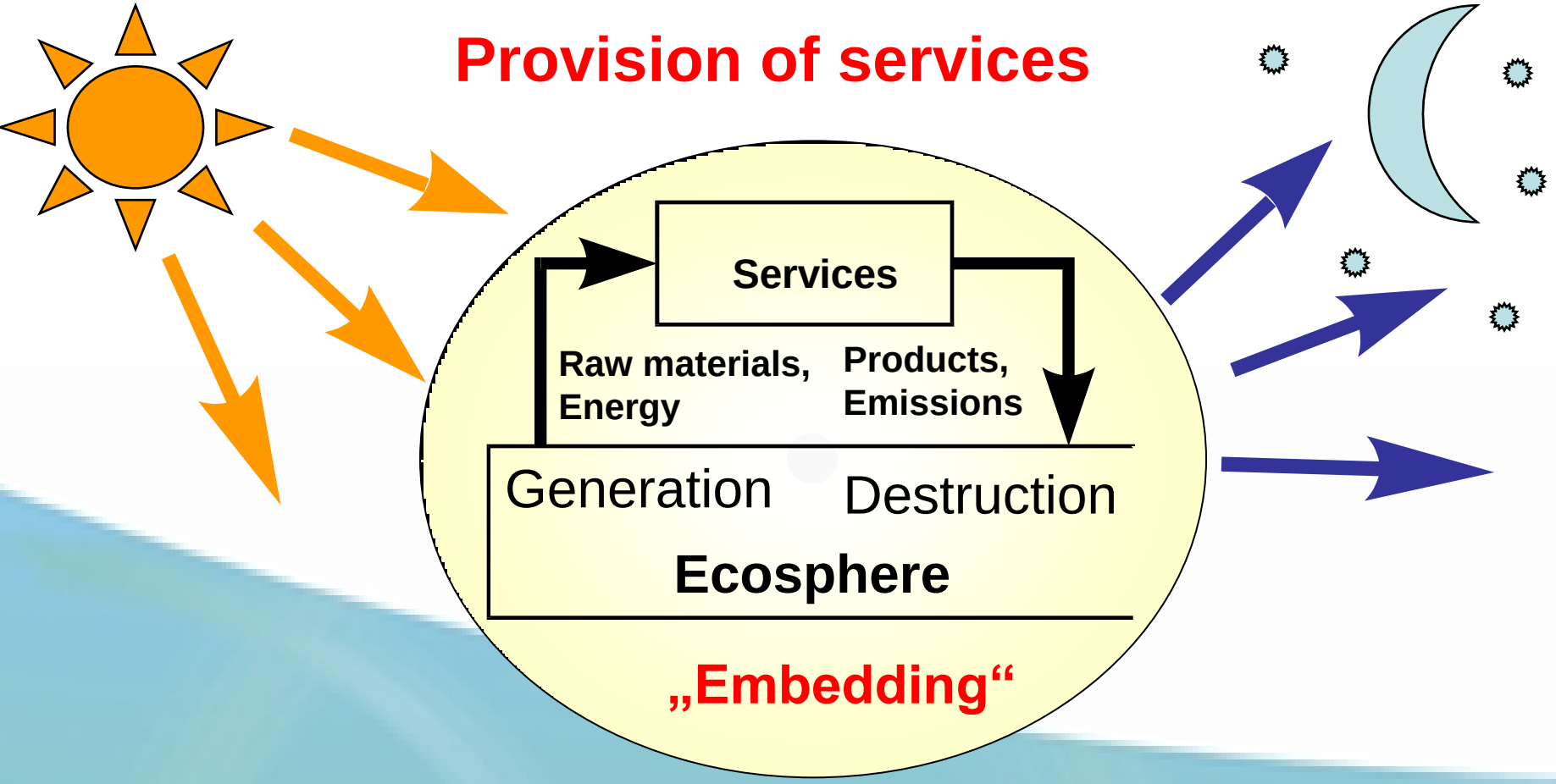
- …offer new and innovative interaction forms…
- …based on identity and common cultural and social references

Why Regions?

Because they offer short distances

Because they offer land to capture „**natural income**“

Basic Idea of living on natural income



Resource change is inevitable

No problem: we can make everything “renewable”…

Bioplastics

Textiles

Energy

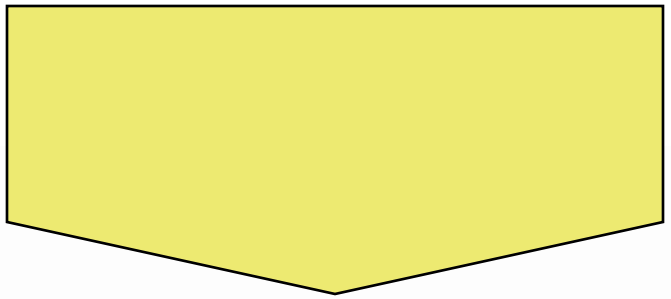
But life is complex…

...and renewables do not make it simpler!

We do not face an energy shortage!

Austrian energy demand
1.400 PJ/a

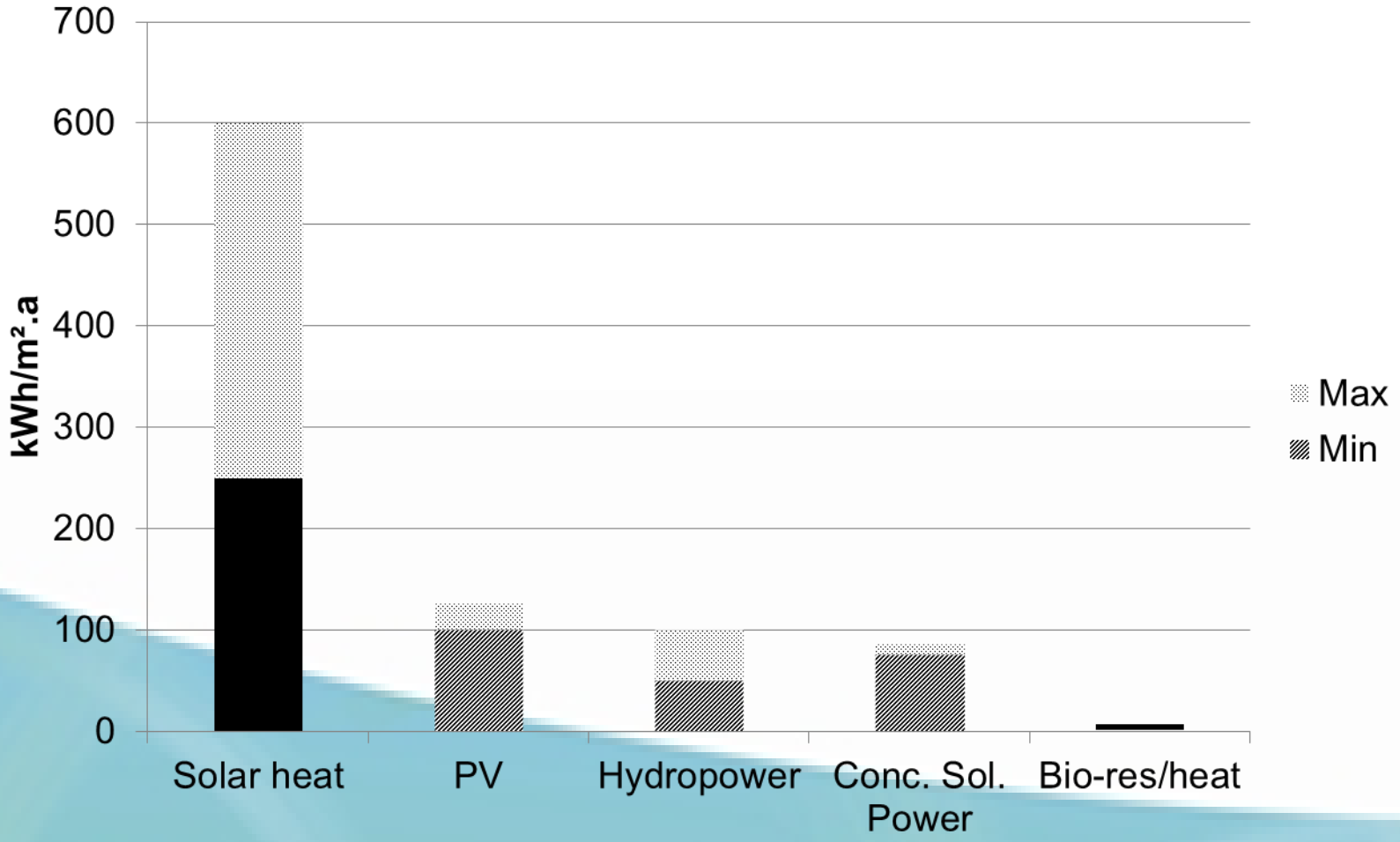
Solar radiation on Austria
343.000 PJ/a



Less than **5%** of the area suffice (with today's efficiency) to supply us with energy!

But how to harness natural income?

Renewable resources vary considerably



Understanding resources

Resources with long legs…

- Fossil resources
- High value renewable resources
- Liquid energy carriers
- Methane
- Electricity
- Base chemicals

…and with short legs

- Low grade bio-resources (Grass, …)!
- Biogenic by-products (straw, …)
- Waste (bio-gas manure,)
- Heat

Resources will shape the "economic topography"

- Resources with long legs are in global competition
- Resource with short legs provide major potential for development in the 21st century
- These resources will put the economic topography on its head!!

The change will be radical!

Understanding resources – Why bio-resources are important

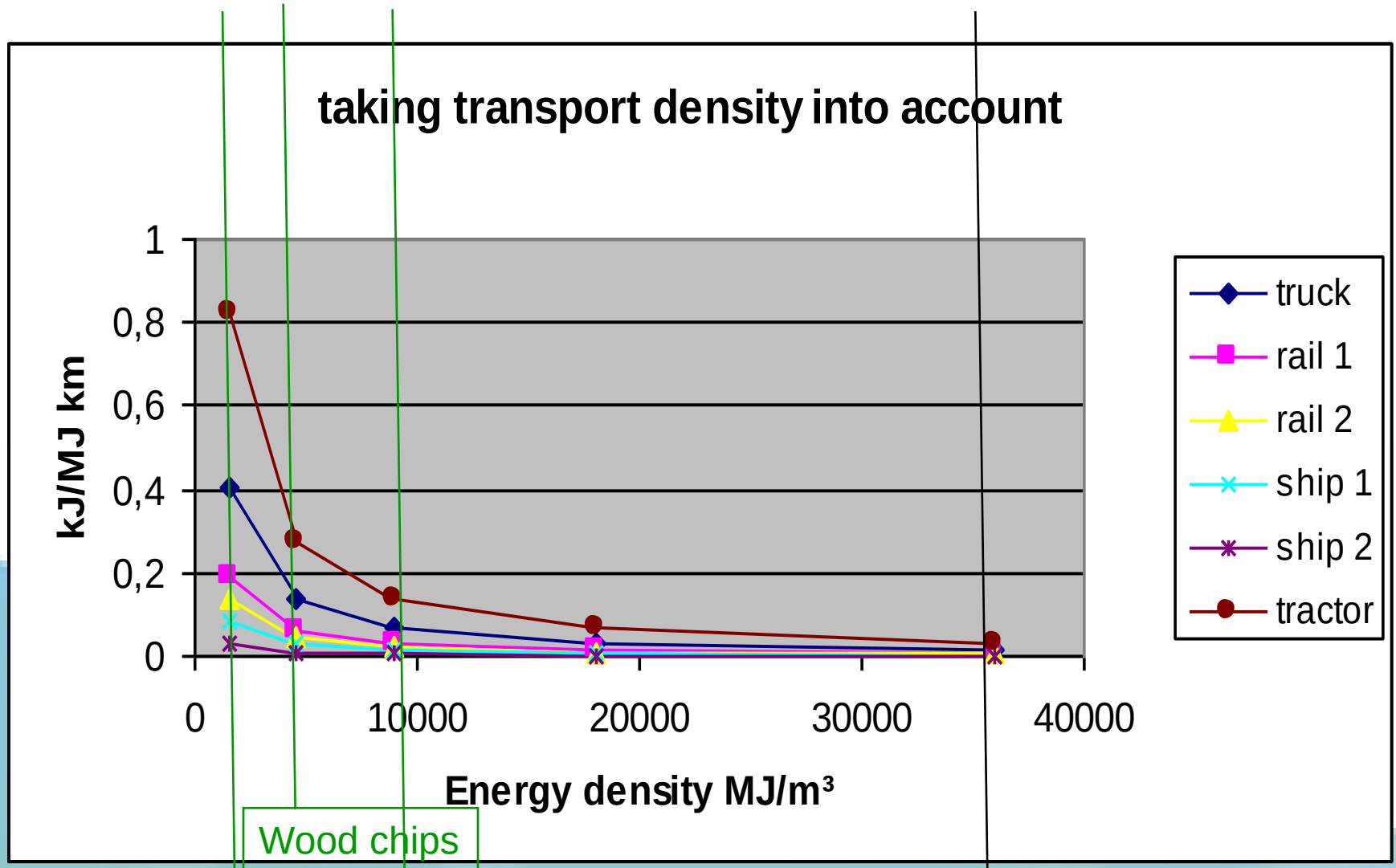
Energy only

Renewable

Renewable
AND multi-purpose

Energy AND Materials

Transport and bio-resources



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Taking transport density into consideration..

- …12 km transport with tractor of straw
- …or 40 km transport of wood chips in a truck
- …or 475 km transport of wood pellets in a train
- …or 7.800 km transport of crude oil with ship or pipe line consume 1 % of the transported energy

This provides a framework for regional resource utilisation!

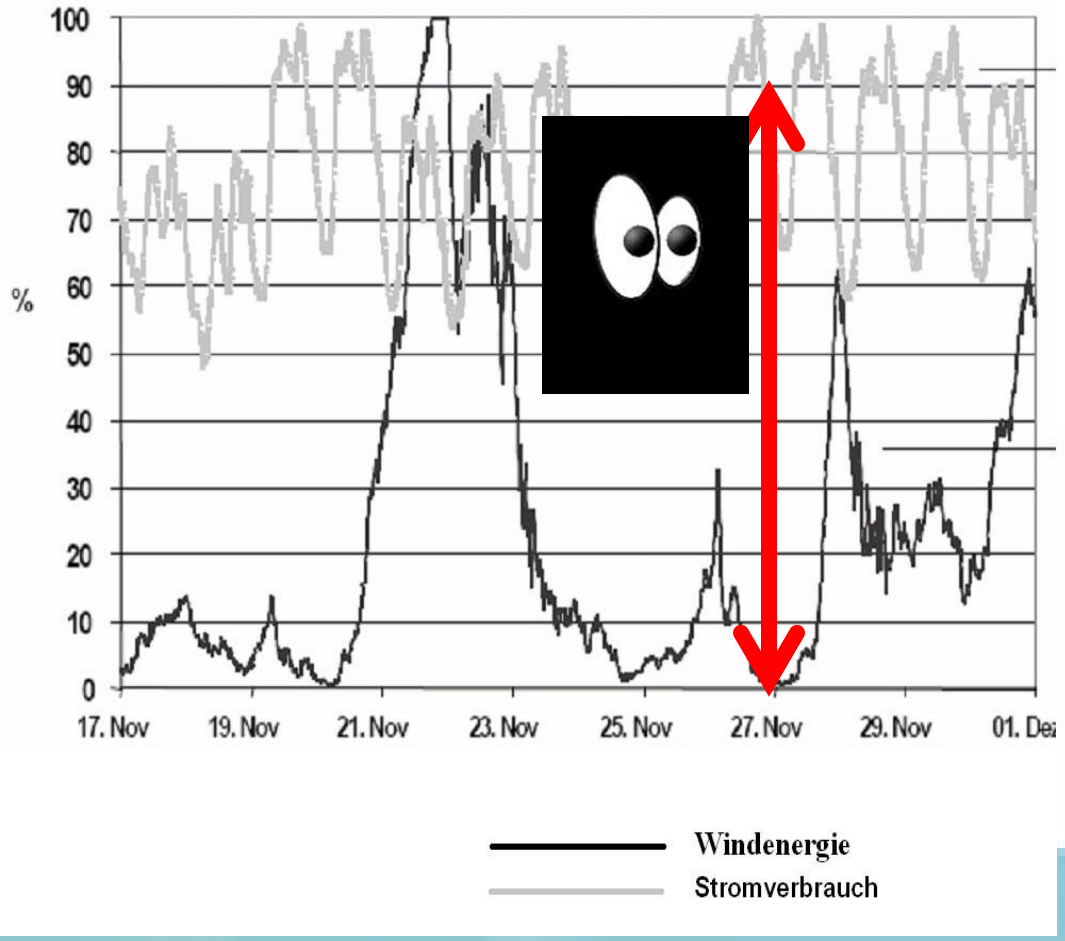
Services of bio-resources

Type of service	Service	Possible other resources
Social	Nutrition	none
	Jobs and development for rural regions	none
	Social stability for rural regions	none
Economic	Stability for energy distribution grids	Smart grids, hydro power, pumped hydro power, hydrogen, compressed air energy storage, (fossil resources)
	Transport fuel	Electricity (using battery storage), hydrogen, synthetic fuels, (fossil resources)
	High temperature industrial heat	Hydrogen, (fossil fuels)
	Feedstock for synthetic materials and plastics	(fossil resources)
	Feedstock for conventional bio-based products	None
Environmental	Reduction of greenhouse gas emissions	Wind and hydro power, solar thermal systems, photovoltaic, oceanic power, geothermal energy
	Preserving soil fertility	None
	Preserving water and nutrient cycles	None
	Preserving bio-diversity	None

Environmental services

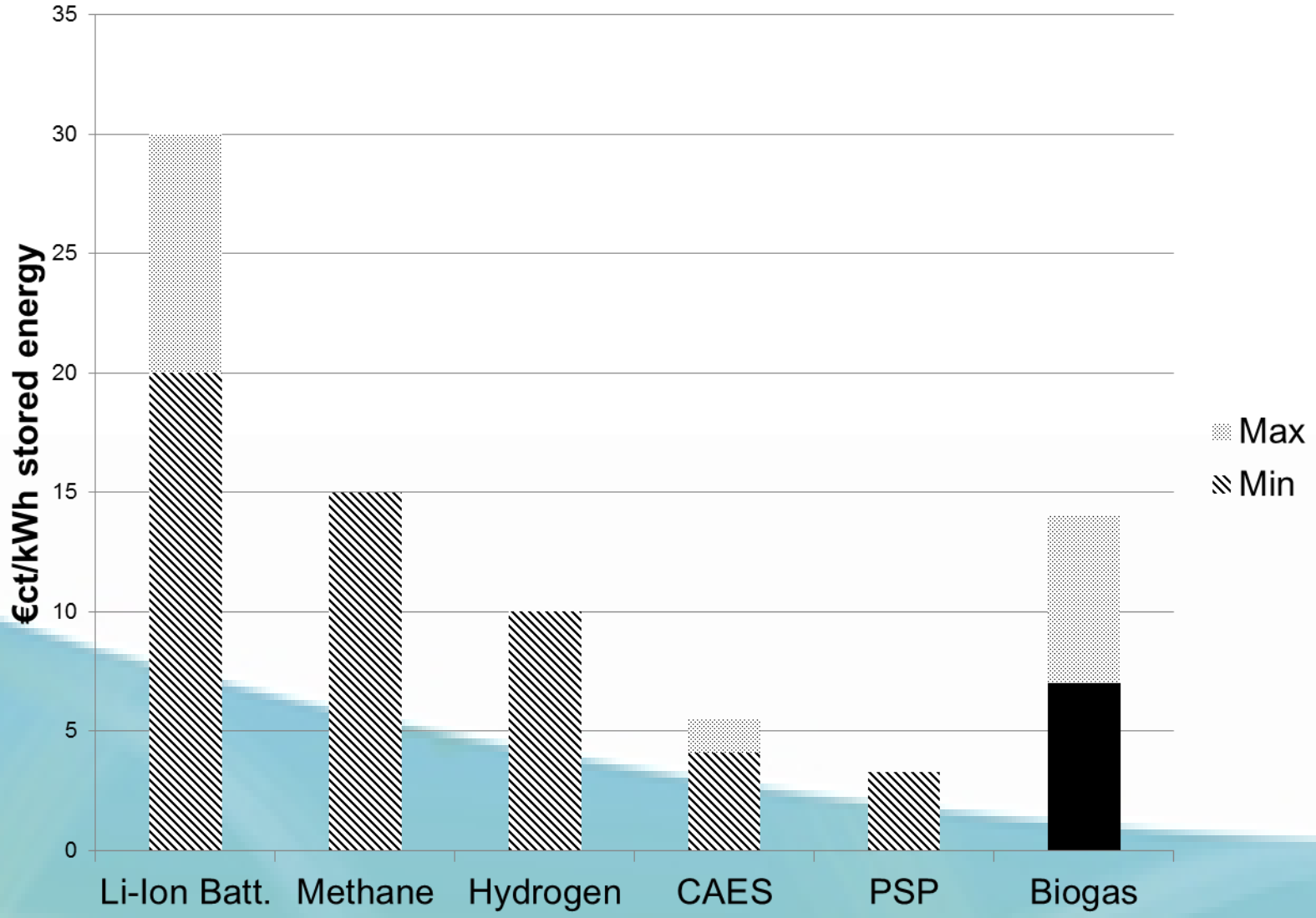
The way we structure landscape is the way we cool our planet

The real energy problem: who keeps the light on??

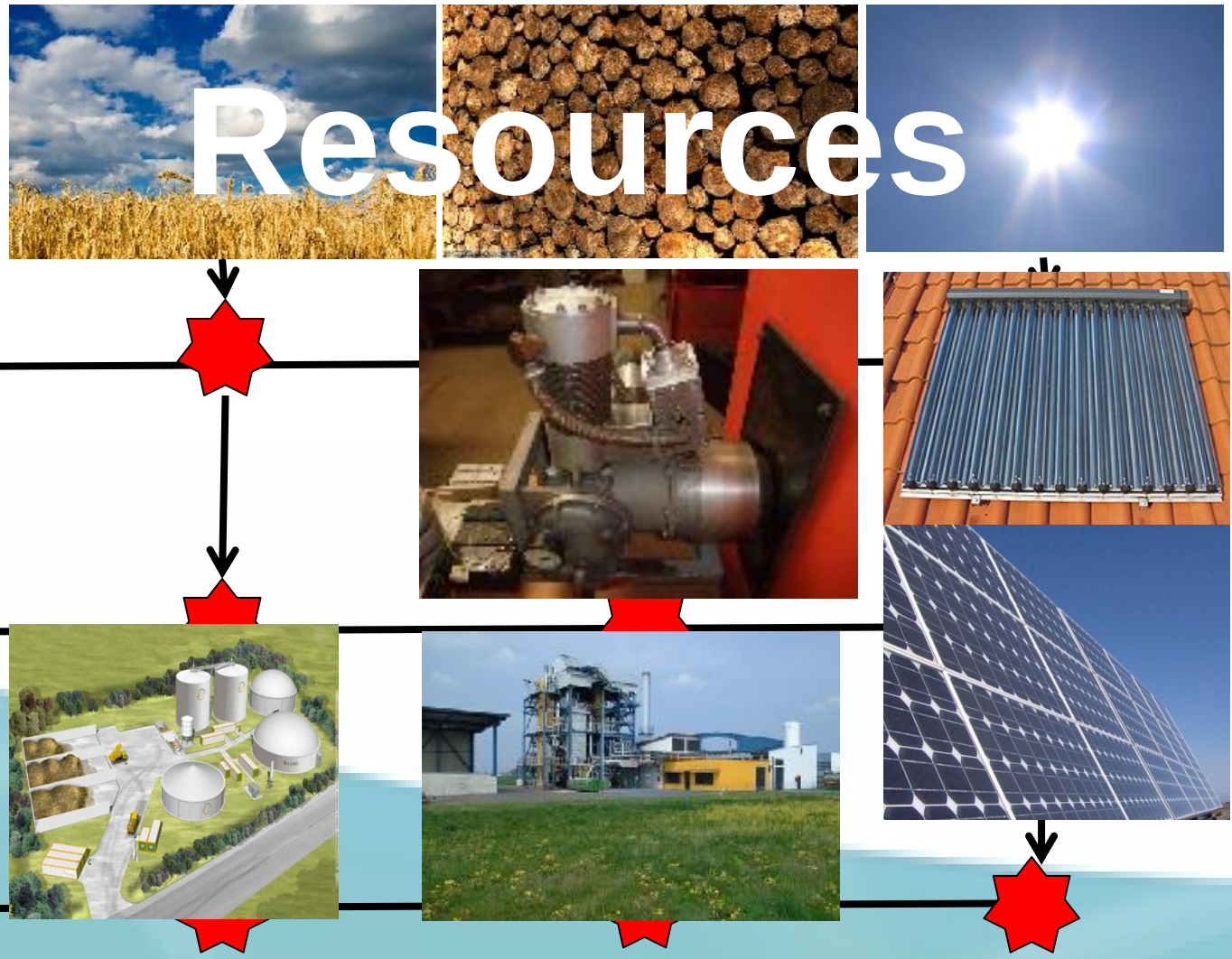


- „Flameless“ renewable energies are based on discontinuous sources
- Therefore storage becomes crucial

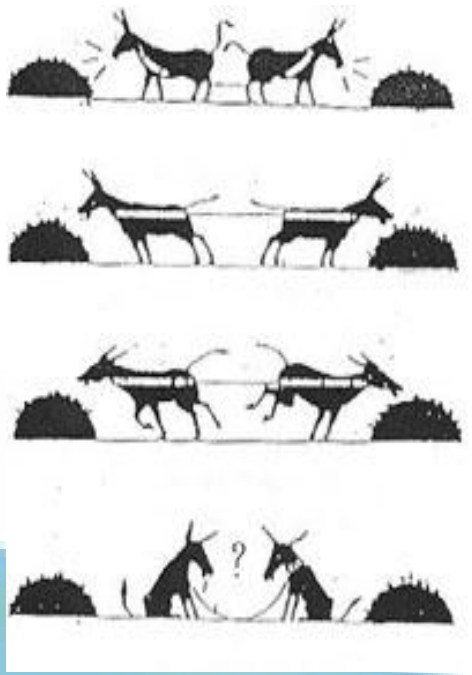
Bio-resources as storage



Regions as active links between resources and grids



In times of change regions see…



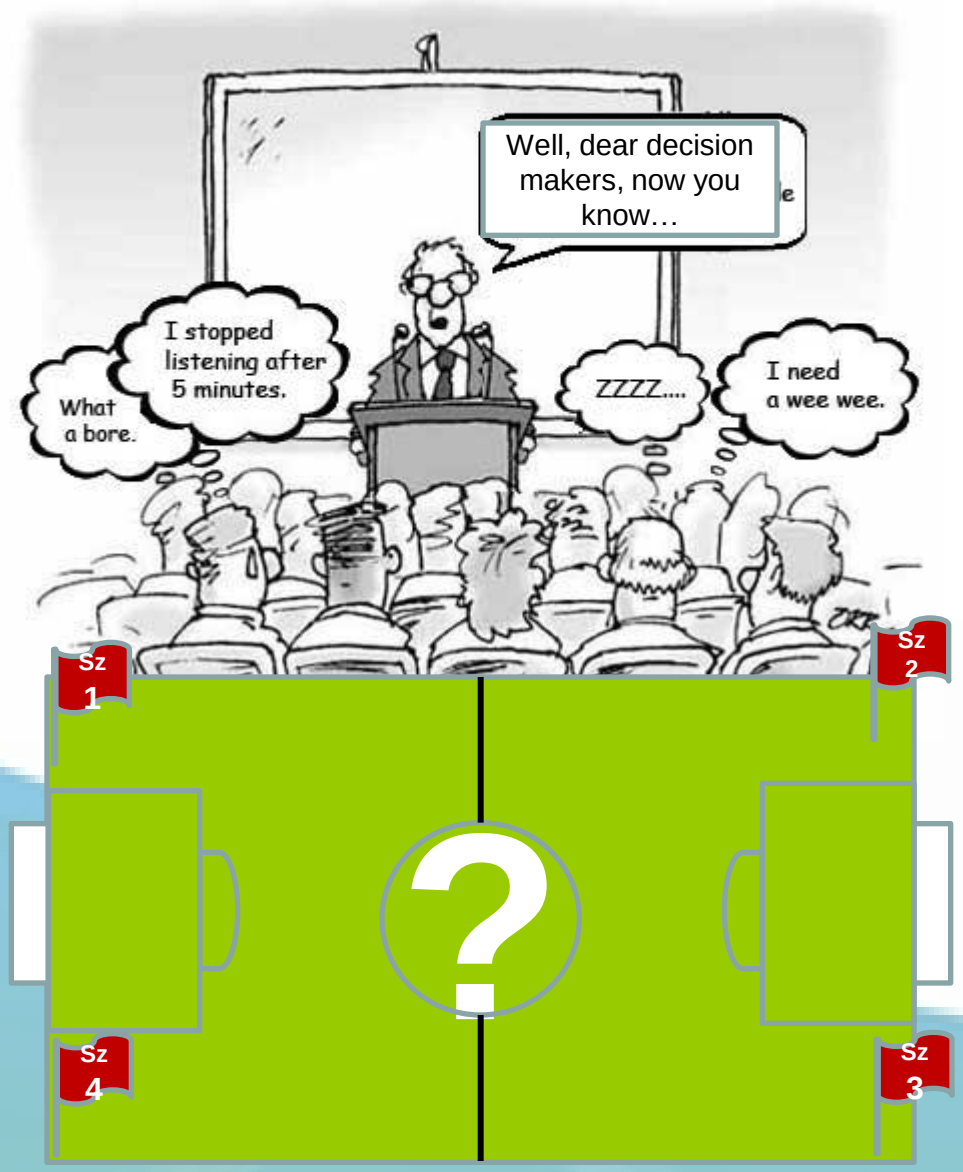
- Strategic confusion
- Science and technology preferences
- “Pseudo-activity”
- Decision avoidance

The Problem

We have many actors

How to make them see
a bright common future?

Deciding is a societal process



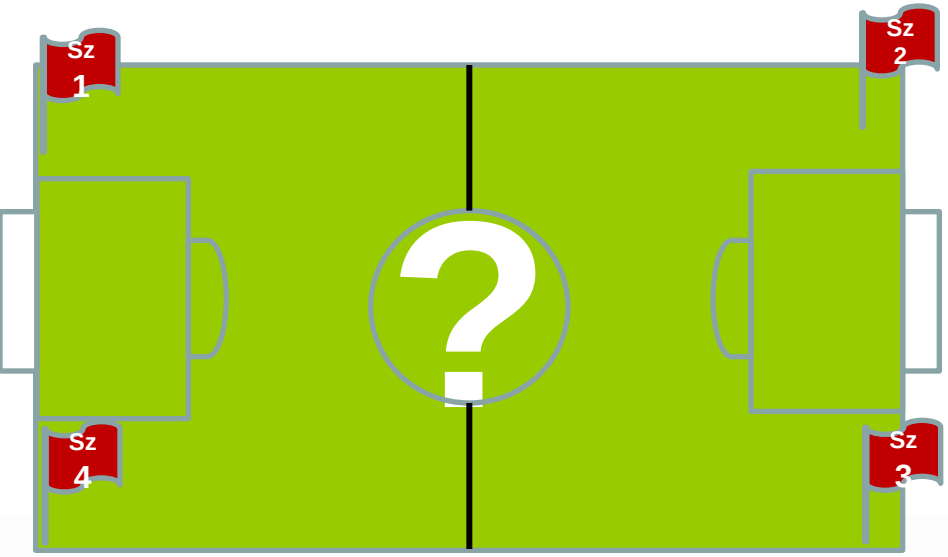
- Avoid lecturing
- Accept and integrate knowledge from stakeholders
- What you can achieve:
  - Consistent future scenarios
  - Comprehensive information
  - Enabeling stake holders to decide

The case study

- Northern part of Upper Austria, bordering Germany and Czech Republic
- 3080 km²
- 270.000 inhabitants

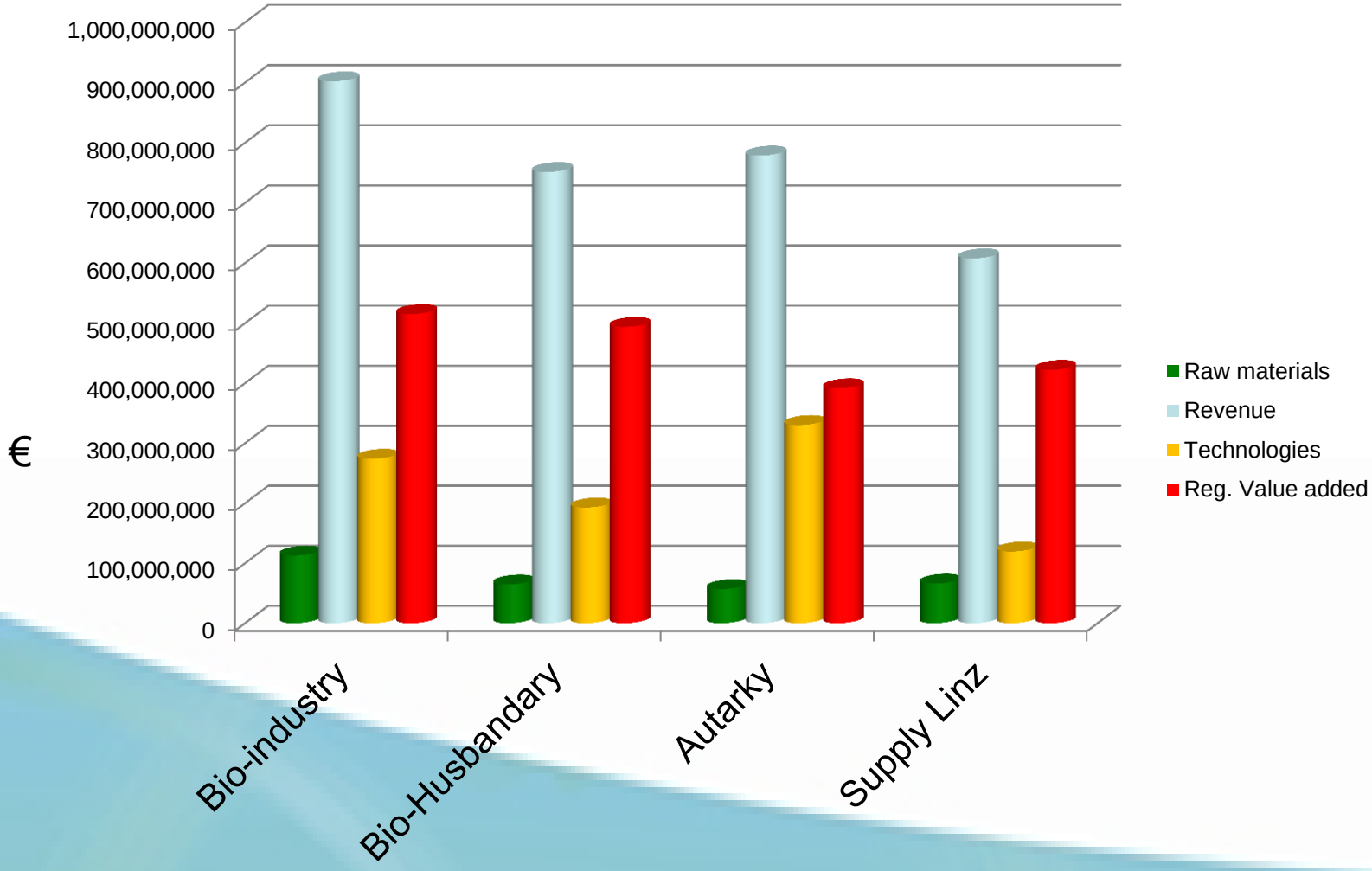
- Dominated by grass land and forest
- Close to urban centre Linz
- Developed road, electricity and gas grid
- High number of commuters

Three basic scenarios

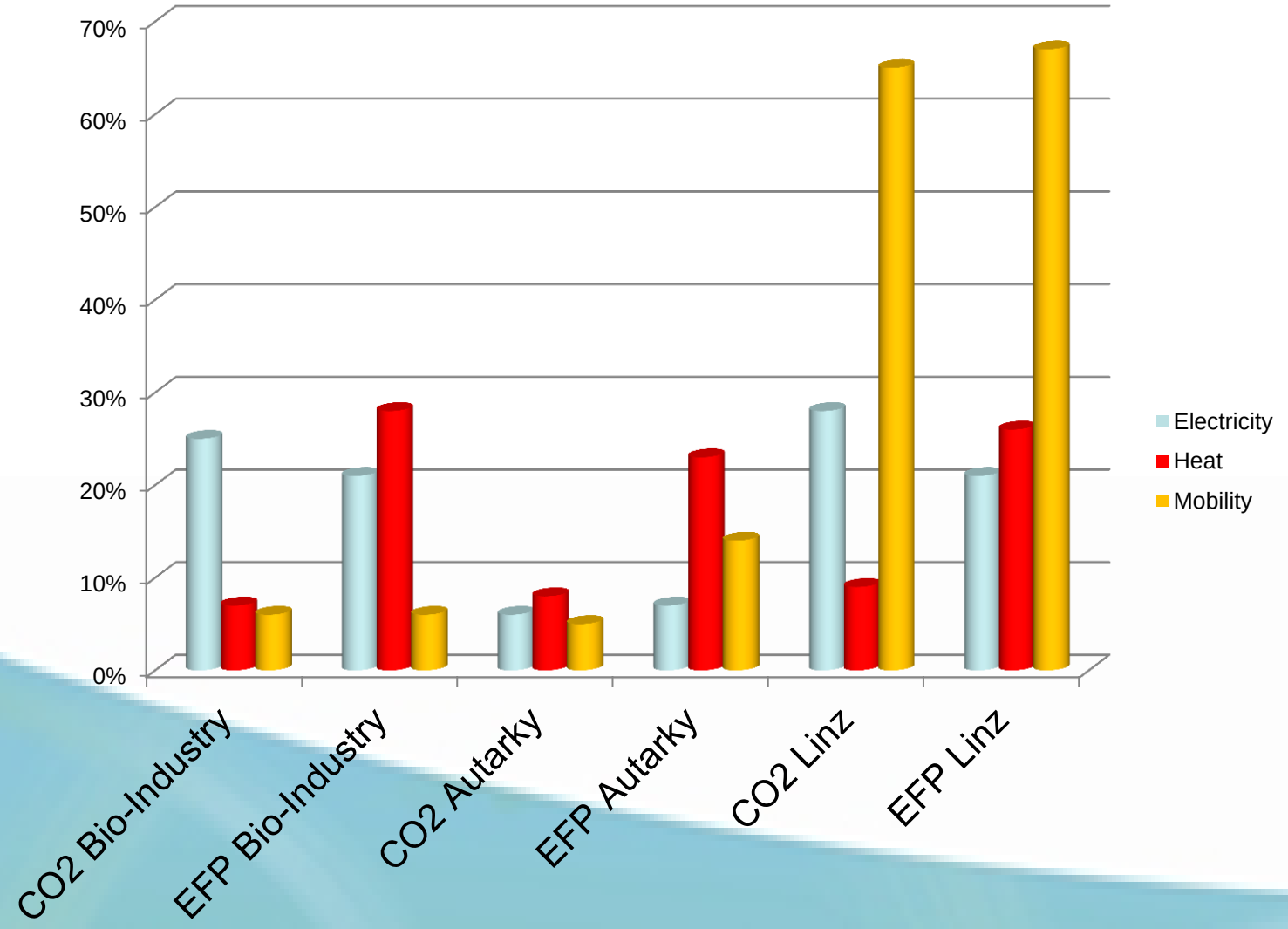


- Basic boundary conditions
  - Land distribution remains constant
  - Residential heat may be covered by insulation, individual systems or (restricted) district heating
- The sceanrios
  - Optimal regional revenue
  - Autarky
  - Supplying Linz (partly)

Comparing scenarios: Economy



Comparing scenarios: Ecology



Summary of scenario comparison

- „Bio-Industry“, „Bio-Husbandry“) offer almost identical regional value added
- „Bio-Industry“ requires much higher investment and relies on external market development (mobility, chemicals)
- „Autarky“ requires highest investment, offers lowest ecological pressure but also lowest regional value added
- „Supplying Linz“ in particular, but also „Bio-Husbandry“ require least change in existing economic activity and culture
- Ecological pressures can be reduced dramatically for heat and electricity, for mobility only if large parts of economy are re-structured

Challenge for higher education- How can we co-operate?

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- Provide students with interdisciplinary knowledge and tools to support rational decisions in regions

→ Example: Styrian Academy

- Provide students with real world problems
- Offer transdisciplinary experience

→Example: Student Camp :metabolon

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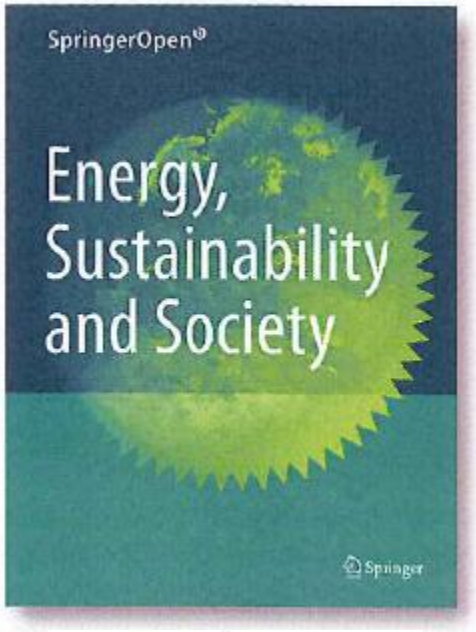

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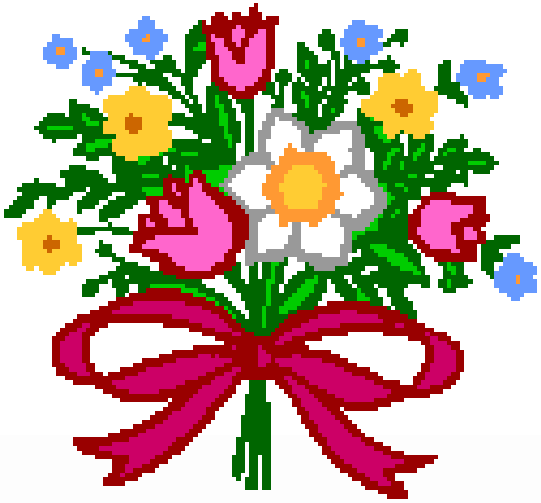

Thank you for your attention!

And if you want to evaluate yourself or your process ecologically, visit www.fussabdrucksrechner.at