



The bearded vulture, untouched alpine landscapes and sustainable tourism

How they can deal with renewable energies in the Alps –
experiences in the recharge.green project

24.-25.10.2013 Energy Platform Workshop Luzern

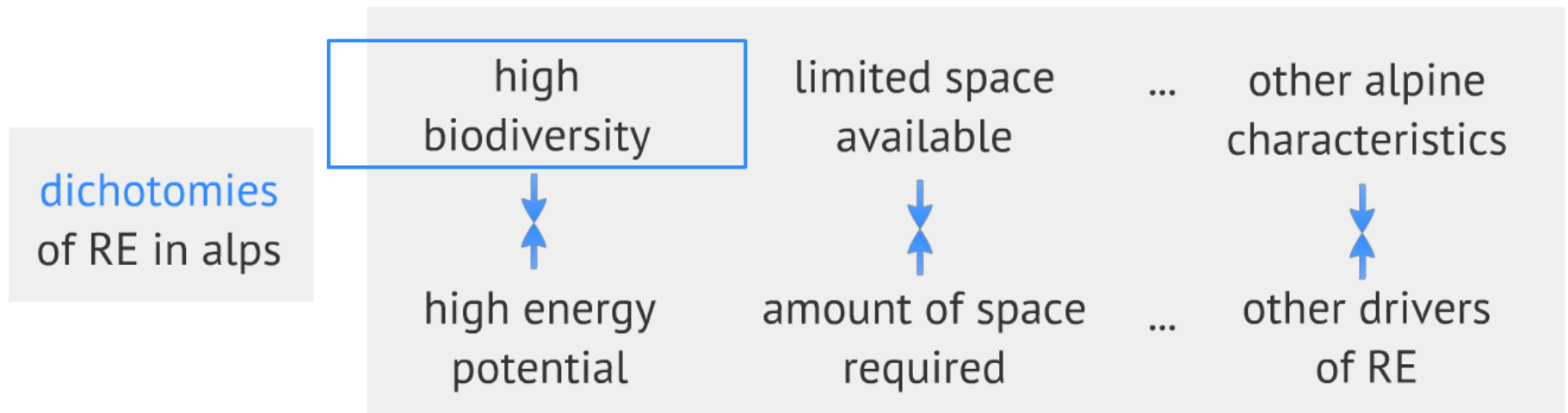


Richard Hastik, University of Innsbruck,
Department of Geography

Structure

- I. Recharge.green: Objectives and partners
- II. Ecosystem services & conflicts
- III. Situation in pilot areas
- IV. Development of tools

recharge.green objectives



- Impact of renewable energy on alpine ecology?
- How much r.e. can reasonably be used in the alps?
- Concept of ecosystem services for conflict handling?

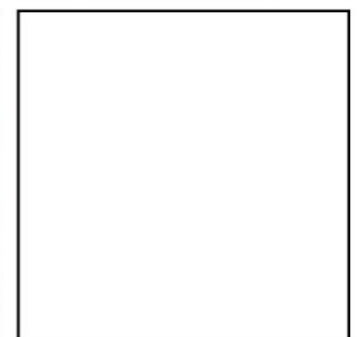
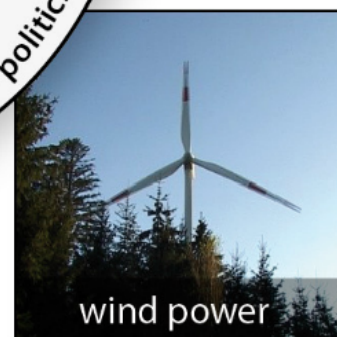
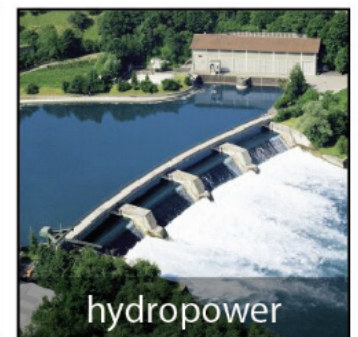
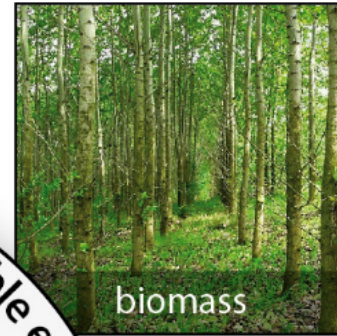
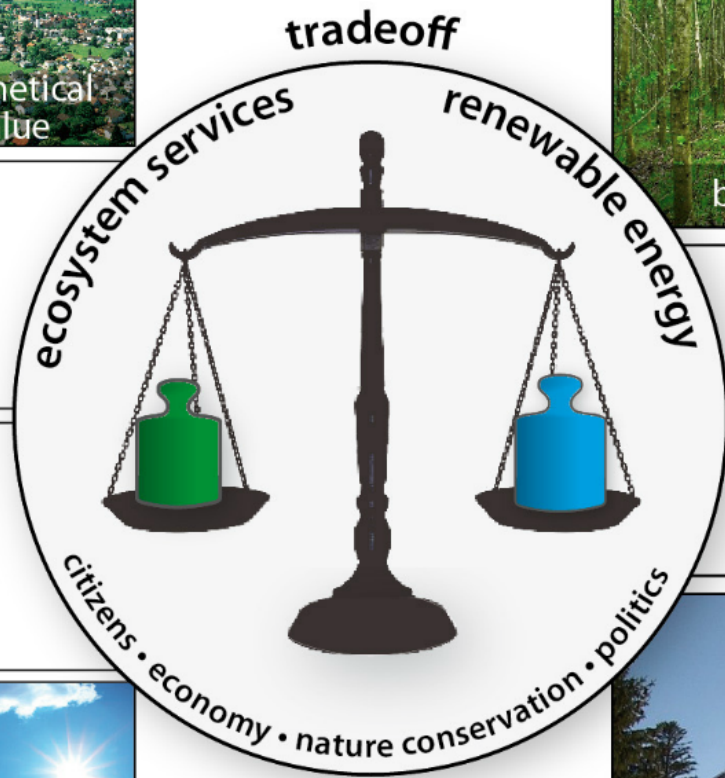
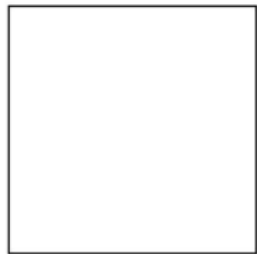
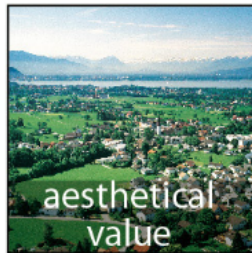
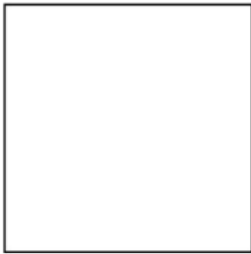


illustration by author

recharge.green partners



Recharge.green institutes & pilot areas

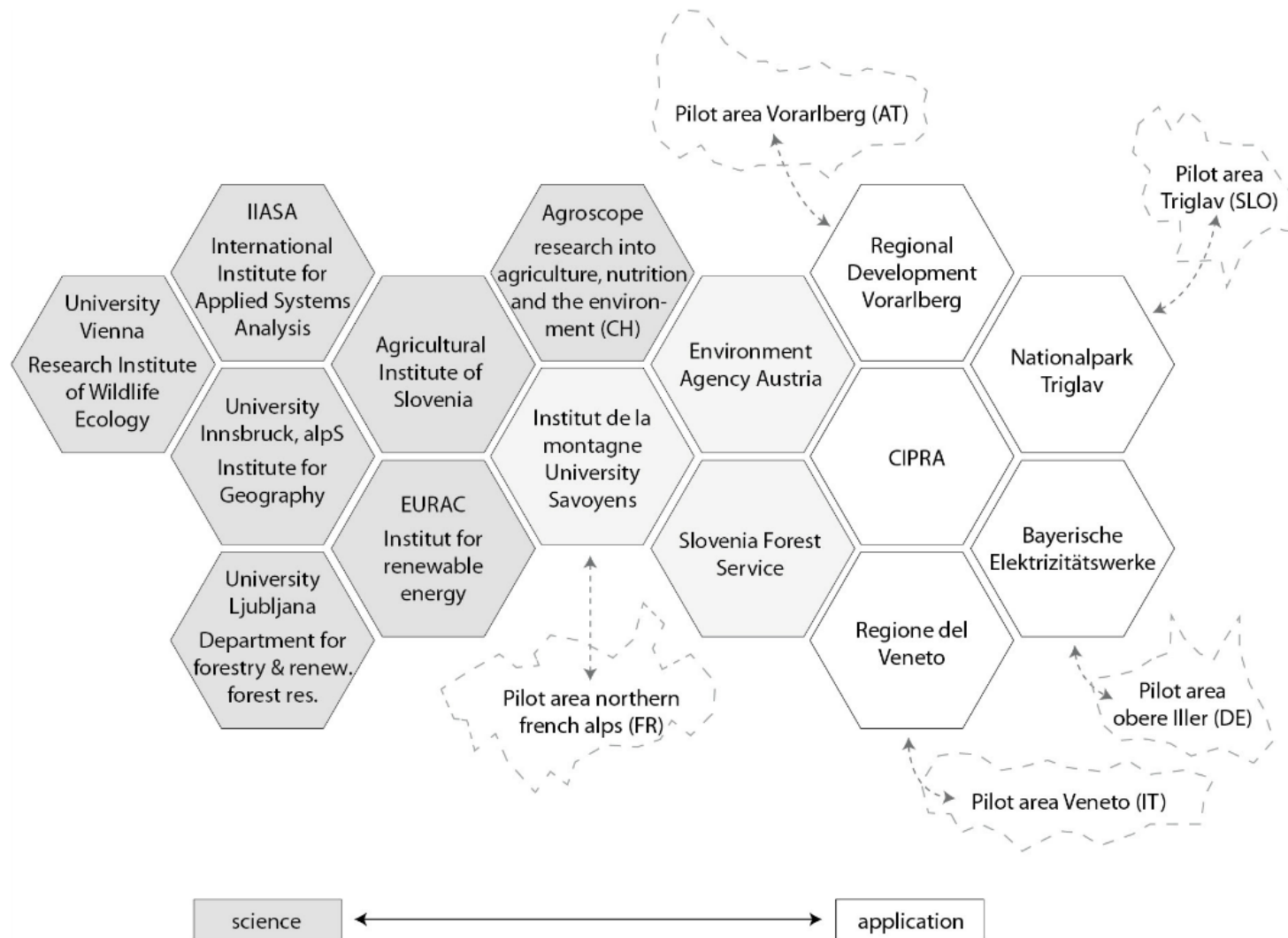


illustration by author

recharge.green approach & work packages:

WP4 potentials + conflicts

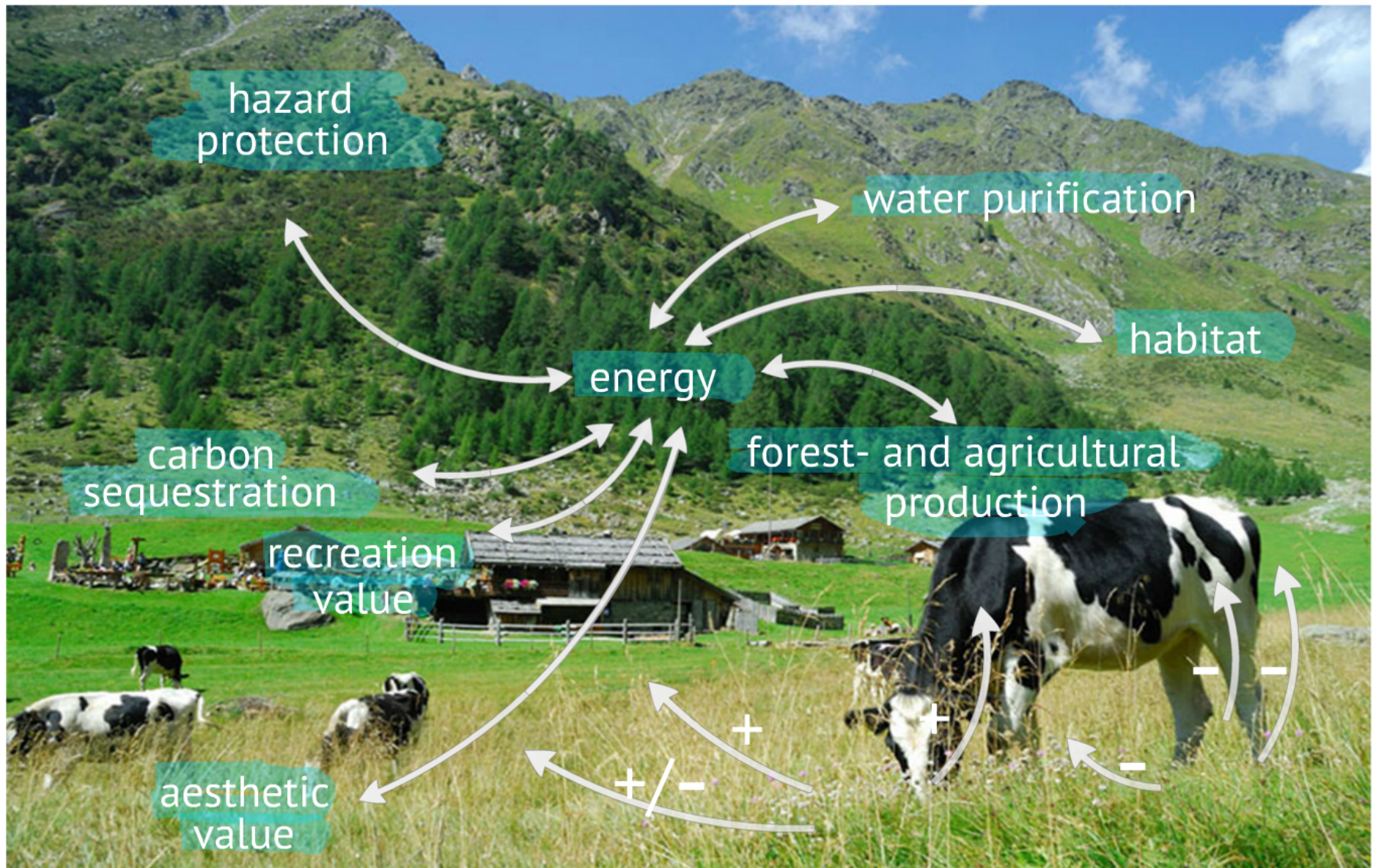
Status quo on RE production,
potentials, ecosystems, conflicts,
stakeholders, legal framework,
governance approaches
Generation of RE potential maps
Analysis of conflicts and tradeoffs
with ecosystem services

WP5 economic dimensions

Socioeconomic indicators for
decision making
Multicriteria spatial decision support
system based for optimal siting of RE
based on scenarios
Recommendations for strategic
environmental assessments

WP6 testing and implementation in pilot areas

reality check for strategic results, SEA procedure & trade-off module



ecosystem services tradeoffs in context of ...

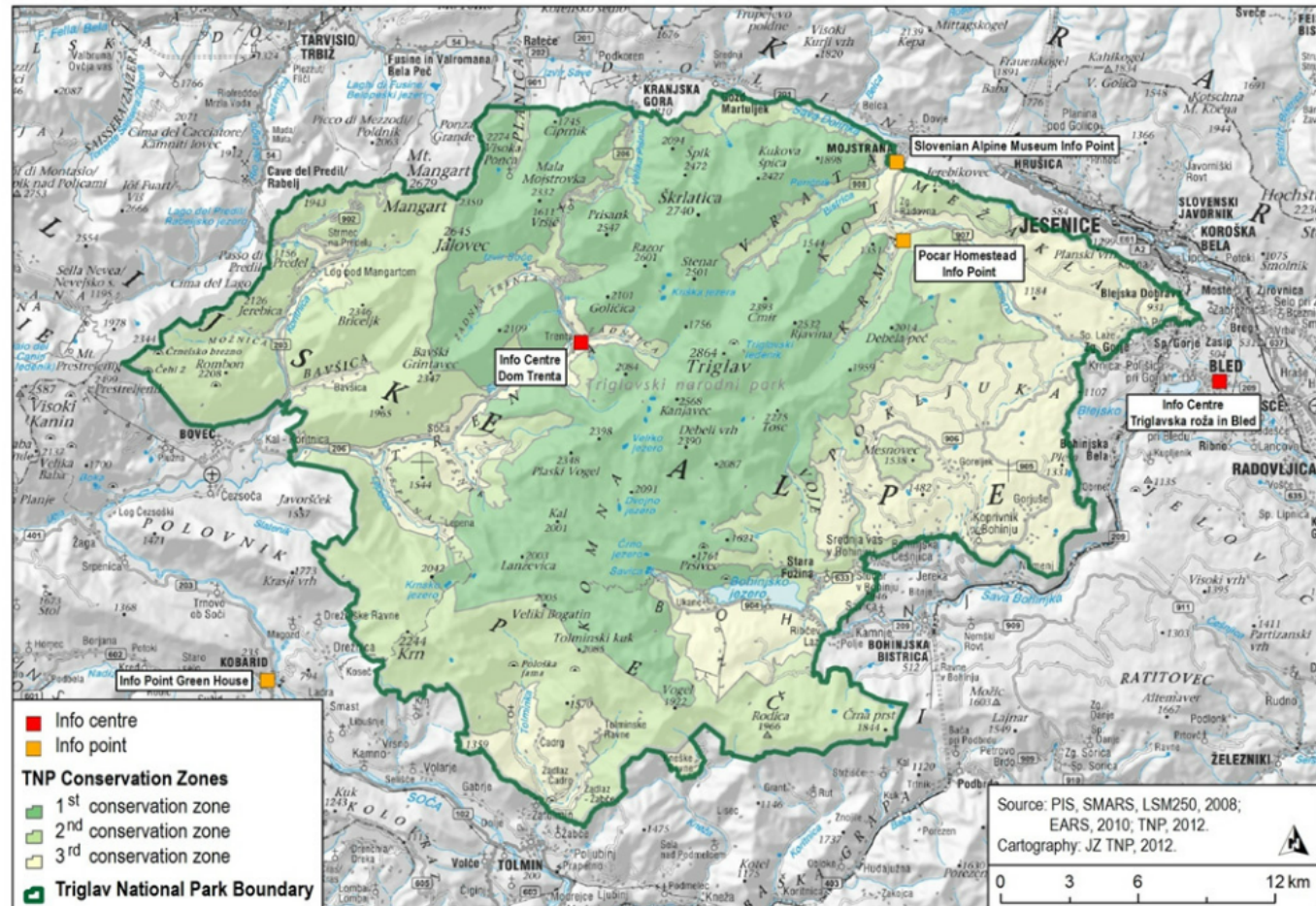


situation in pilot areas - Triglav National Park



83981 ha (4% SLO)
37 settlements,
2444 inhabitants
3 conservation zones

ecologically important
areas, rare species,
Natura 2000 sites,



TNP biomass strategy



... assure multiple
service functioning

... primarily based on
conservation zones

!?

TNP conservation zones

	land use limitations	Resulting biomass strategy
1st	only traditional pasture	No forest management and use
2nd	only traditional activities	Sustainable forest management and use according to forest management plans
3rd	all sustainable activities	Forest management and use according to management plans

TNP strategies on other RE

other RE only within settlements or for self – sufficiency



Solar panels at Pokrovec mountain pasture



Solar panels & collectors and wind turbine at Kredarica hut



Small hydropower Zadlaščica

Situation in pilot areas - [Regione Veneto](#)

- Mis/Maè Valley in/near National park/Dolomiti Unesco site
- RE use (Hydropower, Biomass) in particular regarding aesthetics & unique geomorphic features?
- Water derivations? Impact of Dam?



different regions - different (social) settings



ground-mounted PV in
Biosphere Park Grosses
Walsertal
tourism & RE!?

situation in pilot areas - Leiblachtal/Vorarlberg



participative approach
for defining energy
strategy 2020 (2050)

formation of energy regions
monitoring

pilot region Leiblachtal - wind energy (?)

- New potential measurements
- Proactive public events
- Local funding, energy region
- Landscape aesthetics? (Raumplanung)
- Hydropower on state scale!
- Missing guidelines



Hochberg/Pfänder: Potential & location for windmills? (photomontage by author)

recharge.green - development of tools

- Recommendations for SEA
- Multi-criteria decision support tool
- Concept of sample hectares (Vorarlberg)

(first) inputs for SEA

- Guidelines such as Alpine Convention (2011) on small scale hydropower required by pilot areas for other energy sources
- No-go areas vs. restricted areas vs. priority areas
- "Soft" criteria in particular for restricted areas, e.g. based on ecological impact / impact on ecosystem services, support by local population (!), socioeconomic impact, long term economic benefit, other RE resources (stability), energy targets on other scales, ...
- Chances of inconsidering ESS should be evaluated. What if ...

(first) inputs for SEA

What if ...

- Not only conflict potential but also positive potential matrix?
- based on Ecosystem Services?

	(nature)	(landscape)	(settlement)	(traffic)
	habitat quality	landscape aesthetics	recreation	further ESS
Wind power				
Biomass				
Hydropower				
PV				

sketch for a possible illustration on fictitious conflict potentials based on Alpine Convention (2012) by Author

(first) inputs for SEA / DSS development

Multi-criteria spatial decision support tool:

- Energy potentials
- Ecosystem services (values/rankings) based on scenarios
- Conflicts = potentials vs. services (see also Alpine Convention 2012?)
- Optimal siting of RE production based on socioeconomic scenarios
- Total economic value evaluation of scenarios
- Final visualization in easy usable WEB-GIS

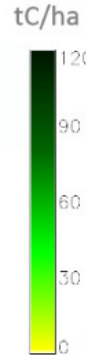
Ecosystem trade-offs of forest areas



- **G4M** estimates the impact of forestry activities on carbon sequestration and supply of biomass in the Alps (258,000 km² total area, 115,000 km² forest).
- Forests managed to maximize two ecosystem values through changing the rotation period:
 - S1: Maximization of carbon stock in forests.
 - S2: Maximization of production.

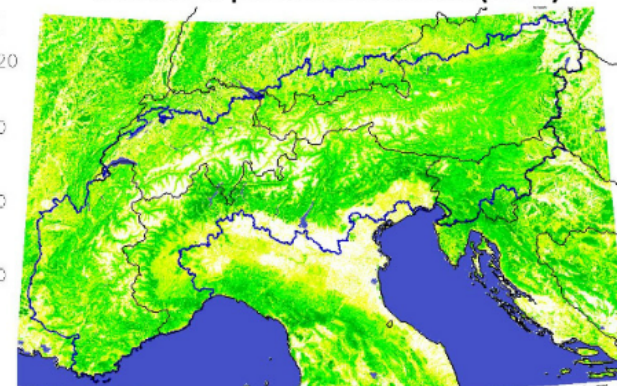
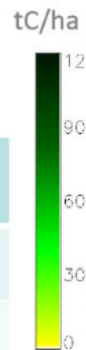
	S1: Carbon sequestration	S2: Biomass production
Harvest potential (Mt C /year):	11	23
Carbon stock (Mt C):	1,057	577

1: Carbon sequestration scenario (stock)



Carbon stock of forests if we would apply a policy with carbon sequestration as primary goal (lots of old trees, dark green color)

2: Biomass production scenario (stock)



Carbon stock of forests if we would apply a policy with biomass production as primary goal (trees frequently chopped, light green color)

Economic bioenergy potential

BeWhere estimates the optimal allocation of bioenergy production plants and associated harvesting intensity.

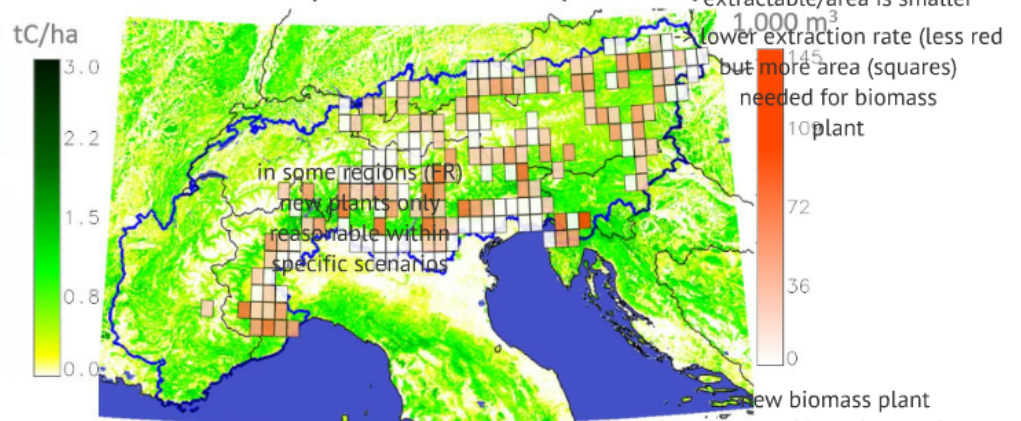
- Bioenergy is competing with other energy production types (i.e. costs of fossil fuels).
- Economic supply: 14 TWh (heat & electricity) met by both scenarios.
- Significant local difference of harvesting intensity.

Harvesting intensity/cell (1,000 m ³ /yr)	Total harvested amount in S1: (1,000 m ³ /yr)	Total harvested amount in S2: (1,000 m ³ /yr)
0 – 12	208	88
13 – 32	1,098	498
33 – 60	2,820	1,341
61 – 87	1,851	1,194
88 – 141	478	3,290

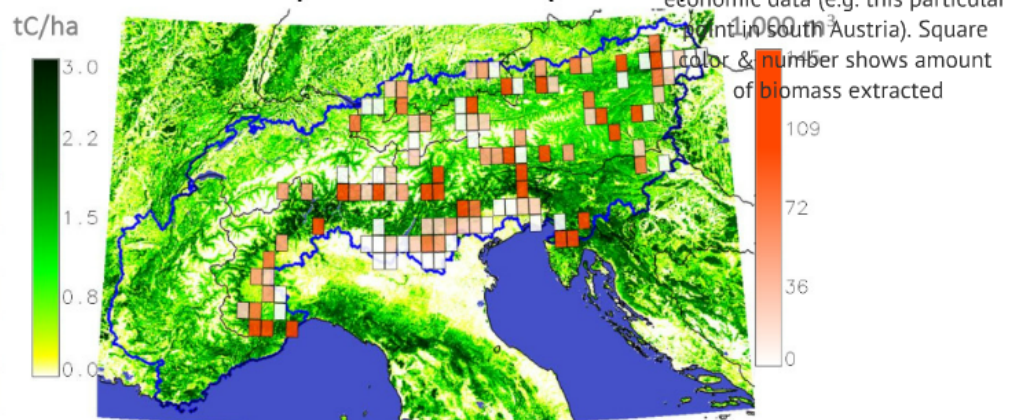
Source: BeWhere www.iiasa.ac.at/BeWhere



S1: Carbon sequestration scenario (increment)



S2: Biomass production scenario (increment)



JECAMI Interface

gis.nationalpark.ch/arcgisserver_app/econnect/jecami.htm

Firefox hat diese Website daran gehindert, ein Pop-up-Fenster zu öffnen.

econnect
Restoring the web of life

HOME ABOUT THE PROJECT PILOT REGIONS WORK PACKAGES PARTNERS & OBSERVERS NEWS & EVENTS DOWNLOAD AREA LINKS

Map Satellite Hybrid Terrain

CSI SMA PAM CARL

CSI Service

☐ for Pilot areas ☐ for Alpine Space

www.econnectproject.eu
and work with Jecami!

☒ Pilot areas
☐ Municipality borders
☐ Protected areas
☐ Landuse LAN
☐ Landuse Planning LAP
☐ Population POP
☐ Infrastructure INF
☐ Altitude Topography TOP
☒ Fragmentation FRA
☐ Patch Cohesion COH
☐ Edge density ED
☐ Environmental Protection ENV
☐ Ecological Measures ECO
☐ CSI

Activate function and display indices by clicking in the map

Search

Search a municipality inside a pilot region:

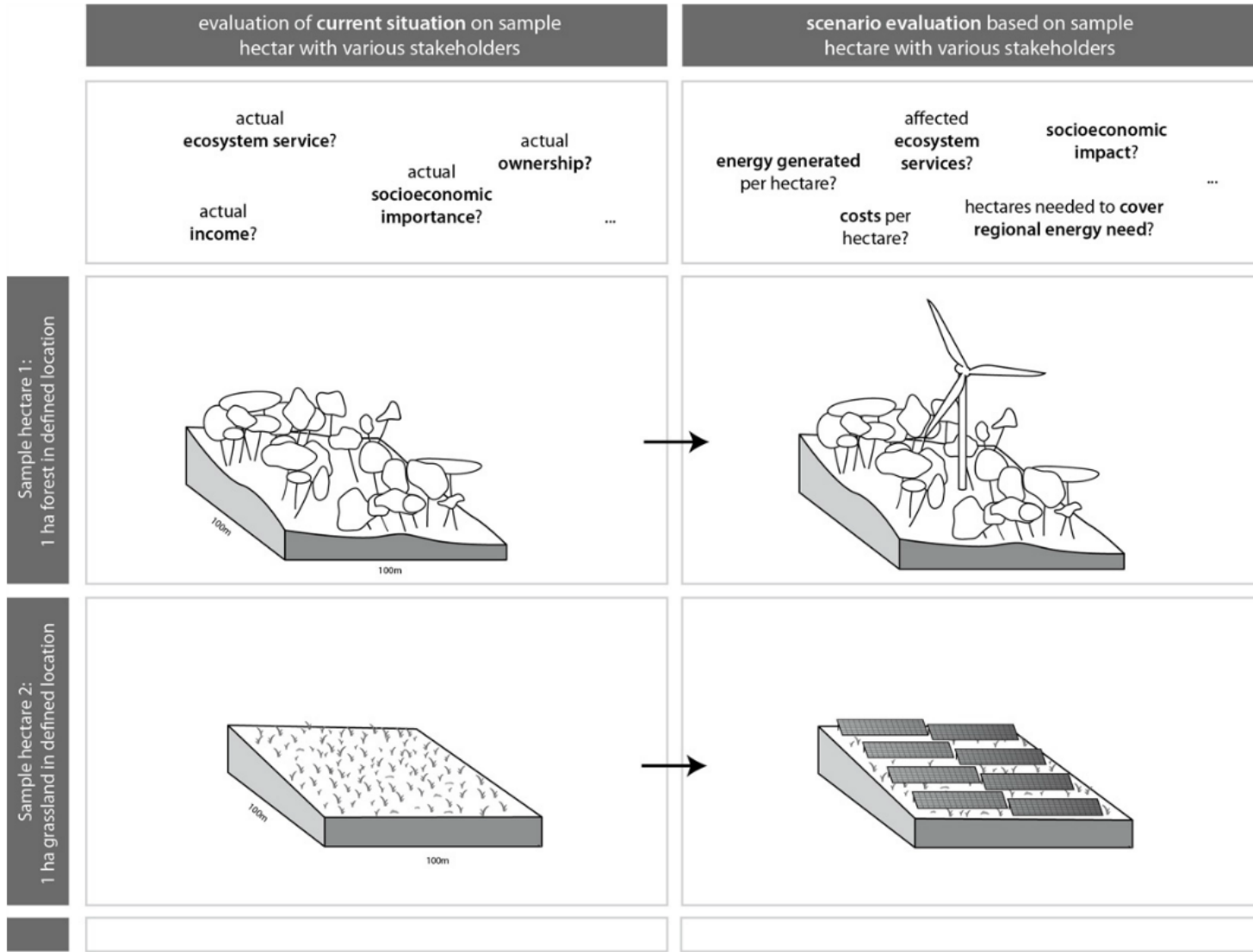
Search pilot region:
Rhaethian Triangle

Search Place or Address

1 Search 2 Select & Upload 3 Calculation Chart Table Report

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Sample hectares concept (pilot area Vorarlberg)



RE in the alps

increased conflict potential ...

... increased chances for innovative solutions?

recharge.green - International conference on
balancing renewable energy and nature in the Alps
12.-13. November, Brig (CH)