COST Action TU 1401

RELY

Renewable Energy and Landscape Quality

Working Group 2

Landscape sensitivity and potentials in terms of renewable energy production

Working Group 2 assesses the potential and sensitivity of landscape functions and landscape quality for the development of specific renewable energy production systems.

Objectives

- **Potential and risk analysis** for landscape functions and landscape quality by renewable energy production systems
- **Assessment of the vulnerability** of specific landscape functions and landscape quality to specific renewable energy production systems

Methods

- **Best practice approach** through strategic case studies
- **Case studies from national projects** with external observation, analysis and documentation
- **Expert assessment** (Delphi method)
- **Matrix method**
- **Typologisation** - combining quantitative (PCA, cluster analysis) and qualitative methods (concept of attribute space)

Results

- **Typology** of best practices of sustainable, landscape compatible renewable energy production systems
- **Guidance** for assessing the potential of areas for specific renewable energy production in terms of effects on landscape quality and character
- **Catalogue** of relevant criteria, indicators and GIS proxy data for assessing the suitability of landscapes for renewable energy production systems

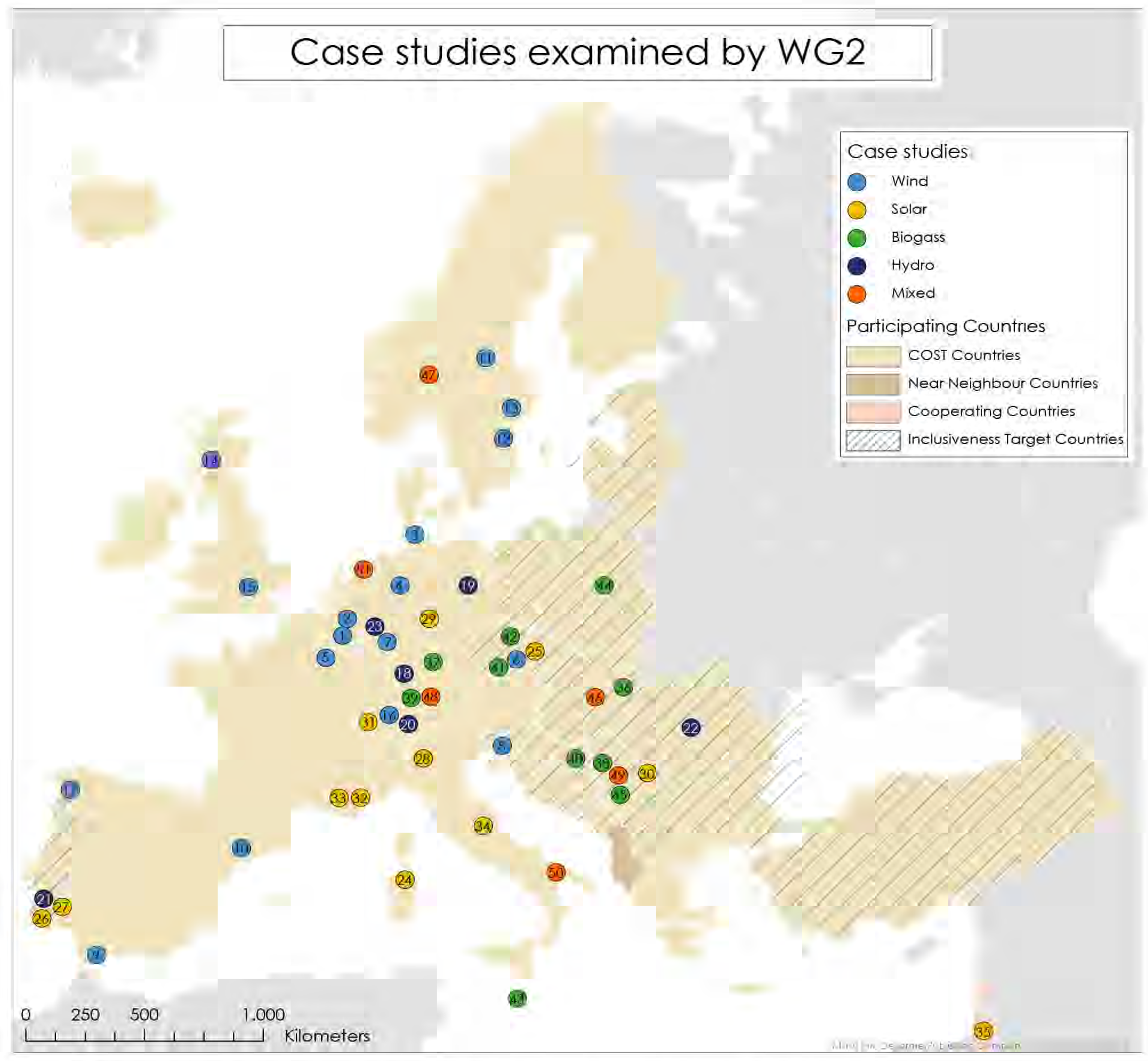

Figure 3: Locations of smart practice case studies which were analysed. Numbers correspond to cases (rows) in the table below. It can be observed that most project are located in peripheral border areas.

Surveys were distributed to participants to establish compatibility between landscape functions/land cover classes and renewable energy production systems.

Scale of compatibility
1 = Completely compatible
2 = Rather compatible
3 = Neutral / not relevant
4 = Rather conflicting
5 = Absolutely conflicting

Type of Landscape Functions			Wind power on-shore	Wind power off-shore	Marine energy	Small/micro hydropower	Large hydropower	Solar PV ground-mounted	Solar PV on-roof	Solar thermoelectric	Geothermal	Biomass	Biogas	TOTAL
			Type of Renewable Energy											
Type of Landscape Functions	1. Regulation functions	1.1 Climate regulation	1	1	1	1	2	2	2	1	1	3	3	18
		1.2 Natural hazards reduction	3	3	3	2	1	3	3	3	3	4	4	32
		1.3 Water supply and regulation	3	3	4	2	1	3	3	3	3	4	4	33
		1.4 Soil formation and retention	3	3	3	3	3	3	3	3	3	5	5	37
	2. Habitat functions	2.1 Living space for plants and animals	4	2	3	3	5	4	3	5	4	4	4	41
		2.2 Living space for humans	4	2	3	2	5	4	1	5	4	3	4	37
	3. Production functions	3.1 Food production (agriculture & aquaculture)	2	3	3	3	4	5	3	5	3	5	5	41
		3.2 Natural resources processing (industry, manufacture)	1	3	3	3	3	4	1	5	4	3	4	34
		3.3 Energy conversion	1	1	1	1	1	1	1	1	1	1	1	11
		3.4 Transportation	1	3	3	2	2	1	1	4	4	4	2	27
		3.5 Waste treatment and disposal	1	3	3	3	3	3	3	3	2	1	1	26
	4. Cultural functions	4.1 Science (nature and biodiversity protection)	4	4	4	2	5	5	2	5	4	4	4	43
		4.2 Aesthetic (visual attractiveness)	5	4	4	4	4	4	3	5	5	4	5	47
		4.3 Historical and cultural values	5	3	3	3	4	5	4	5	5	4	5	46
		4.4 Tourism & recreation	4	4	3	2	2	4	1	4	2	3	5	34
TOTAL			42	42	44	36	45	51	34	57	48	52	56	

Figure 1: Questionnaire on compatibility of landscape functions and renewable energy production systems

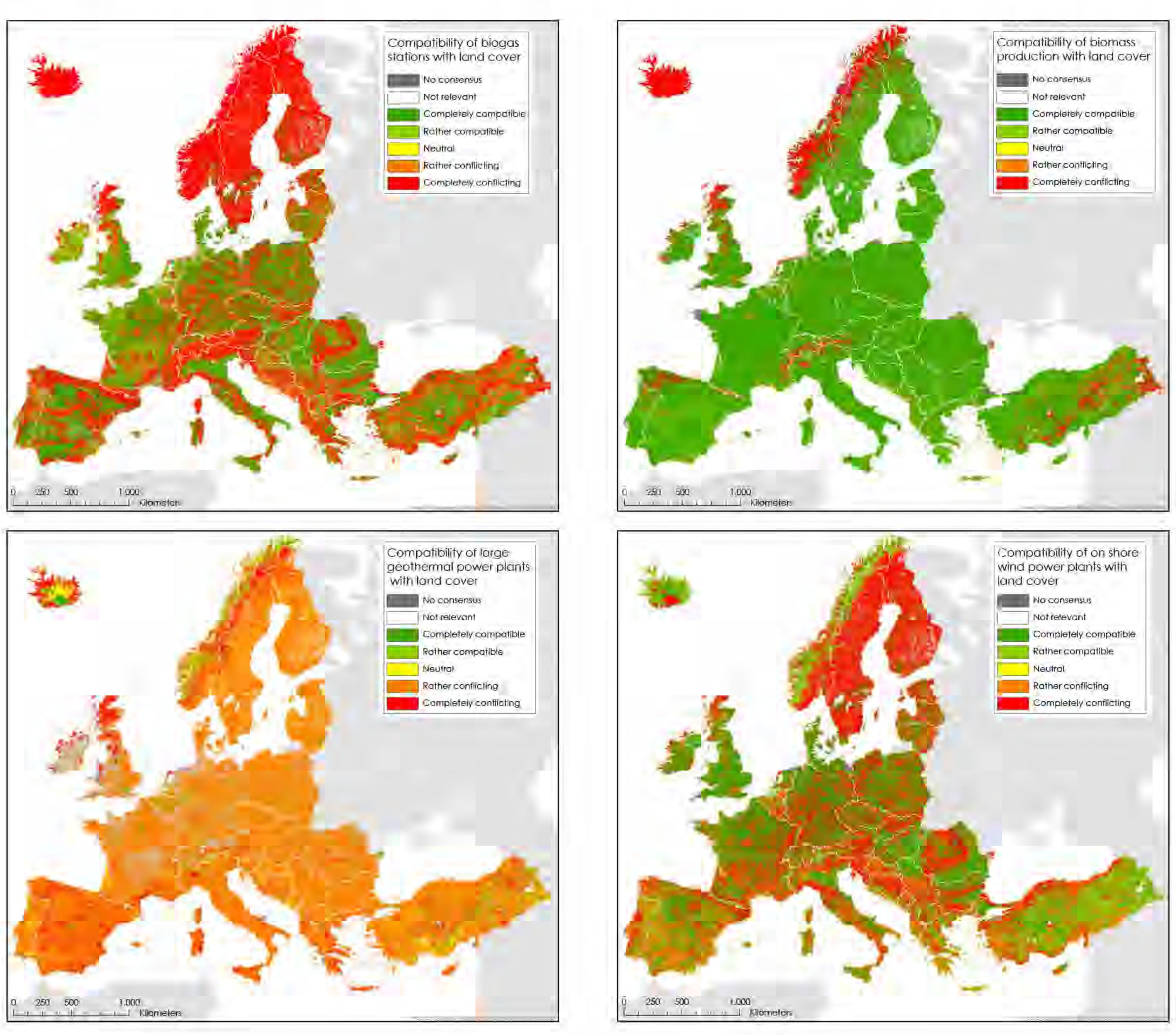

Figure 2: Maps of compatibility between CORINE land cover and biogas stations (top left), biomass production (top right), large geothermal power plants (bottom left) and on-shore wind power plants (bottom right)

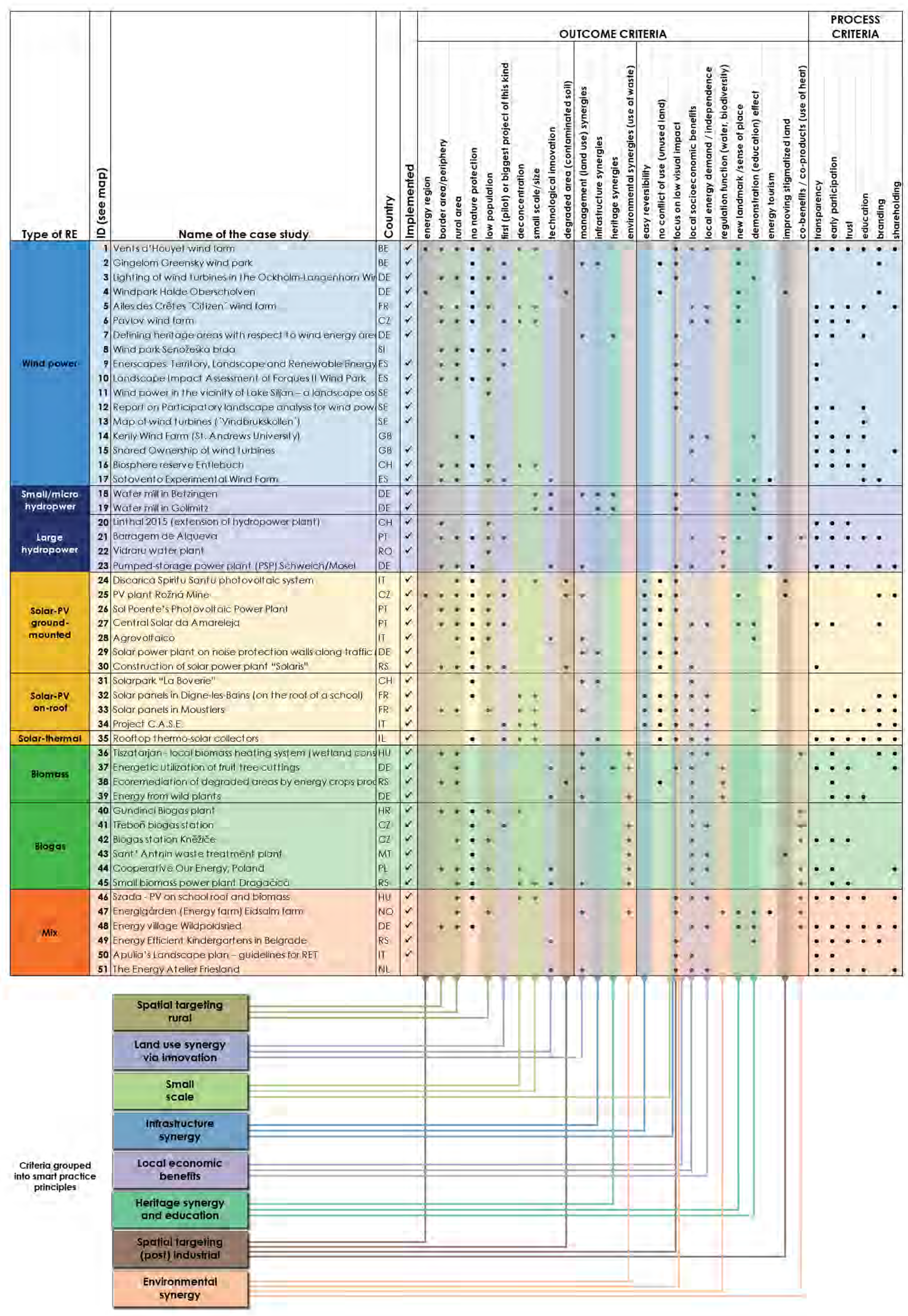

Figure 4: Categorization of smart practice case studies by the type of energy (rows) and classification of outcome and process criteria (columns), then grouped into smart practice principles via PCA

Contact

Action Chair:
Prof. Dr. Michael Roth
Nürtingen-Geislingen University - School of Landscape Architecture, Environmental and Urban Planning
Schelmenwasen 4-8 michael.roth@hfwu.de
72622 Nürtingen, Germany Phone: +49 7022/201-181

Website: http://www.cost-rely.eu

Action Vice Chair: Dr. Sebastian Eiter, NIBIO - Norwegian Institute of Bioeconomy Research, see@nibio.no

WG 1
Chair: Dr. Marina Frolova, University of Granada, Spain - mfrolova@ugr.es
Co-Chair: Csaba Centeri, Szent Istvan University, Hungary - centeri.csaba@mkk.szie.hu

WG 2
Chair: Dr. Dan Van der Horst, University of Edinburgh, United Kingdom - dan.vanderhorst@ed.ac.uk
Co-Chair: Bohumil Frantal, Academy of Sciences of the Czech Republic, Czech Republic - frantal@geonika.cz

STSM Coordinator: Prof. Dr. Serge Schmitz, University of Liege, Belgium, s.schmitz@ulg.ac.be

WG 3
Chair: Dr. Matthias Buchecker, Swiss Federal Research Institute WSL - matthias.buchecker@wsl.ch
Co-Chair: Dina Stober, University of Josip Juraj Strossmayer Osijek, Croatia - dstober@gfos.hr

WG 4
Chair: Dr. Alexandra Kruse, Institute for Research on European Agricultural Landscapes, France - kruse@eucalandnetwork.eu
Co-Chair: Dr. Isidora Karan, Research Center for Space, Bosnia and Herzegovina - isidora_karan@yahoo.com

About COST

COST is the longest-running European framework supporting transnational cooperation among researchers, engineers and scholars across Europe. It is a unique means to jointly develop own ideas and new initiatives across all fields in science and technology, including social science and humanities, through pan-European networking of nationally funded research activities. Based on a European intergovernmental framework for cooperation in science and technology, COST has been contributing - since its creation in 1971 - to closing the gap between science, policy makers and society throughout Europe and beyond.

EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY

COST is supported by the EU framework Programme Horizon 2020