Renewable Energy and Landscape Quality

Michael Roth
Sebastian Eiter
Sina Röhner
Alexandra Kruse
Serge Schmitz
Bohumil Frantál
Csaba Centeri
Marina Frolova
Matthias Buchecker
Dina Stober
Isidora Karan
Dan van der Horst
(eds.)

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Content

PREFACE

Climate change was considered the biggest potential threat to the global economy in a survey of 750 experts at the World Economic Forum in 2016 (http://reports.weforum.org/global-risks-2016/). This risk is linked to other global risks such as social instability and large-scale involuntary migration (ibid.) which shows the interrelation between environmental, economic, and socio-cultural aspects at the global scale. Both the problems of climate change mitigation/renewable energy production and the loss of landscape/environmental quality have to be addressed at various scales from global policy down to local action.

On a regional and local level, Nuertingen-Geislingen University (NGU) as a university of applied sciences intensively pursues inter- and transdisciplinary research and teaching of economic, ecological, and societal aspects of sustainable development. The German name of the University—Hochschule für Wirtschaft und Umwelt or University for Economy and Environment—underlines this integrative approach. Also, on the research map of the German Rectors' Conference, NGU is included with two research priorities related to environment/landscape and energy/economy:

- Applied agricultural research, landscape development, environmental planning and nature conservation
- Sustainable management in the energy, automotive, and real estate industries

Against this background, the COST Action TU1401 'Renewable Energy and Landscape Quality' has been fully within the research scope of our university and contributed significantly to the international visibility of NGU as a research institution with a strong focus on transfer and application. Leading an international research network of this size with more than 200 participants from 37 countries in Europe and beyond would not be possible without both institutional support of the university as well as personal dedication and devotion of the faculty and staff involved.

With 97 contributing authors, the book *Renewable Energy and Landscape Quality* as a main product of the four-year COST Action shows the potential of international and interdisciplinary collaboration. I hope that this book finds a responsive audience, so that future policies, political decisions, and planning documents can contribute to optimise trade-offs between renewable energy systems and landscape quality protection by promoting an effective and efficient renewable energy policy without jeopardising the assigned values and inherent qualities of European landscapes.

Nuertingen, April 2018

Prof. Dr. Carola Pekrun
Vice-Rector for Research and Transfer at
Nuertingen-Geislingen University

0.1

INTRODUCTION

Michael Roth & Sebastian Eiter

In response to climate change, limited fossil fuels, and rising energy demand and prices, renewable energy is being heavily promoted throughout Europe. While objectives to boost renewable energy and trans-European energy networks are ambitious, it is increasingly understood that public acceptance becomes a constraining factor, and general support for green energy does not always translate into local support for specific projects. Perceived landscape change and loss of landscape quality have featured heavily in opposition campaigns in many countries, even though renewable energy can facilitate sustainable development, especially in disadvantaged regions rich in wind, water, biomass, geothermal, or solar energy.

Climate change mitigation and adaptation is a major societal challenge, and renewable energy is a core element in the transition to a low-carbon society. This will reshape our landscapes. It is unlikely that existing landscape management mechanisms will be effective in adapting to climate change and facilitating renewable energy development. New deliberative, interdisciplinary, and integrated approaches are needed to inform and guide the transformation process and to create a vision and coalition for reconciling renewable energy systems and landscape quality across public, stakeholders, and sectoral, administrative, and geographical boundaries.

Against this background, COST Action TU1401 'Renewable Energy and Landscape Quality (RELY)', running from 16 October 2014 to 15 October 2018 investigated the interrelationships between renewable energy production and landscape quality, and the role of public participation for the acceptance of renewable energy systems. Starting as a relatively small network with around 20 academics from 18 institutions in 13 European countries and Canada at the proposal stage, the partnership grew rapidly over the lifetime of the Action: more and more countries joined the Action and individual attention was raised through networking tools and events like training schools, special sessions and co-organisation of scientific conferences, and a traveling exhibition. In the final phase of the Action, the research network consisted of more than 200 individual members from nearly 100 institutions (academic, governmental, and non-governmental) in 35 European countries, Canada, and Israel. The disciplinary backgrounds of the members involved include social sciences, engineering, political sciences, and interdisciplinary fields like geography, landscape planning, and landscape architecture. With this wide coverage in terms of geographical scope and disciplinary background, the Action network formed an ideal basis to overcome fragmented national and sectoral research, language, and cultural barriers. Moreover, the Action consolidated existing research networks across the natural science/social science/engineering divide, thereby creating a network of networks:

- EEEL: Emerging Energies, Emerging Landscapes
- PECSRL: The Permanent European Conference for the Study of the Rural Landscape
- EUCALAND: European Culture expressed in Agricultural Landscapes
- RESERP: Spanish Renewable Energy and Landscape Network
- IALE-Europe: International Association for Landscape Ecology—European Chapter
- NLRN: Nordic Landscape Research Network
- NIES: Nordic Network for Interdisciplinary Environmental Studies

This book presents the results of almost four years of collaboration. The large network of the Action has made it possible to produce a pan-European synopsis of 32 contributing countries regarding their national situations concerning renewable energy and landscape quality (section 1).

The Action was organised in four working groups (WGs): WG 1 reviewed specific renewable energy production systems and their impacts on landscape character and quality in Europe from a past, present, and future perspective and produced a systematic review of the nexus between renewable energy systems and Europe's landscapes' qualities (section 2). WG 2 assessed landscape functions and qualities and their sensitivity to and potential for specific renewable energy production systems. These analyses were used to produce: (i) a typology of best practices of sustainable, landscape-compatible renewable energy production systems, (ii) guidance for assessing the potential of areas for specific renewable energy systems in terms of effects on landscape quality or character, (iii) a catalogue of relevant criteria, indicators, and respective GIS-available proxy-data for assessing the suitability of landscapes for renewable energy systems (section 3). WG 3 investigated socio-cultural aspects of sustainable renewable energy production and proposed modes and means of integrating specific aspects of renewable energy in participatory toolkits to increase public acceptance of renewable energy projects (section 4). WG 4 focused on the synthesis of findings, the dissemination of results towards different target groups, and the facilitation of collaboration across working groups by providing a multi-lingual glossary of terms (section 5).

COST stresses cooperation in science and technology by addressing academics, public and private (research) institutions, as well as non-governmental organisations (NGOs), in order to increase research impact on policy-makers, regulatory bodies, and national decision-makers as well as on the private sector. That emphasis is also reflected in this book: to supplement existing communication channels like scientific articles, conference presentations, and the Action's website (http://www.cost-rely.eu/), a book format and layout were chosen, which is intended to motivate potential readers to explore the multi-facetted aspects of renewable energy landscapes. At the same time, the book addresses policy-makers at EU and national levels as well as decision-makers in public agencies and business to encourage internationally accepted best practice. Following the general principle of the European Landscape Convention, and general provision of the Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, that the public is entitled to environmental information, this book can also inform and empower citizens and NGOs to build on solid research results in participation and decision-making processes.

It is with great appreciation that we acknowledge the funding provided by the COST Association over the past four years as part of the EU Framework Programme Horizon 2020. Without that specific funding scheme that allows both cooperation and exchange, targeting a wide geographical scope across Europe and beyond, leveraging national research investments and building capacity by connecting high-quality scientific communities in Europe and worldwide, this book would not have been possible.

0.2

COST RELY FACTSHEET: A SUCCESS STORY

Sina Röhner & Alexandra Kruse

Participating countries in 2018	37
ITC countries	18
Individual participants	200
MC meetings, always combined with WG meetings	7
WG meetings	14
Core group meetings	4
Thematic meetings	2
Training schools	2 with 44 participants
Co-organisers of conferences	3
STSM (Short term scientific missions)	17
Exhibitions of the COST RELY Travelling Exhibition	15
Translation of the COST RELY Flyer	10
Publications (from 2014-2018 in April, around 10 to come)	37
Surveys	2
Case Studies collected	WG 2: 51 in 20 countries, WG 3: 25 in 12 countries
COST RELY Glossary	48 terms translated into 28 languages including Esperanto
Photo Database with special RE types, RE landscapes and RE and landscape quality	> 100 photos
Photo competitions	3

Table 0.2.1
COST RELY in figures

The main objective of the Action was to develop a better understanding of how European landscape quality and renewable energy deployment can be reconciled to make socio-environmental contributions to the sustainable transformation of energy systems. Four Working Groups put their focus on different aspects during the four-year lifetime of the Action:

1. Renewable energy production systems and impacts on landscape quality
2. Landscape sensitivity and potentials in terms of renewable energy production
3. Socio-cultural aspects of sustainable renewable energy production
4. Synthesis of findings and dissemination

The Core Group of the Action consisted of the Action Chair Michael Roth from Germany and Action Vice-Chair Sebastian Eiter from Norway, the working group chairs and vice-chairs as listed in Figure 0.2.1, and the STSM Coordinator, Serge Schmitz from Belgium. The position of WG4 vice-chair was transferred during the Action from Malgorzata Lachowska (Poland) to Isidora Karan.

In addition the activities of the working groups, the Action was quite active in dissemination activities and events. Figure 0.2.2 shows the time table of the work done during the four years of the Action.

The Action was submitted by academics from 13 European countries plus Canada. At the kick-off meeting in October 2014, the Action had already grown to members from 27 European countries plus Canada, and it kept growing to 200 participants from

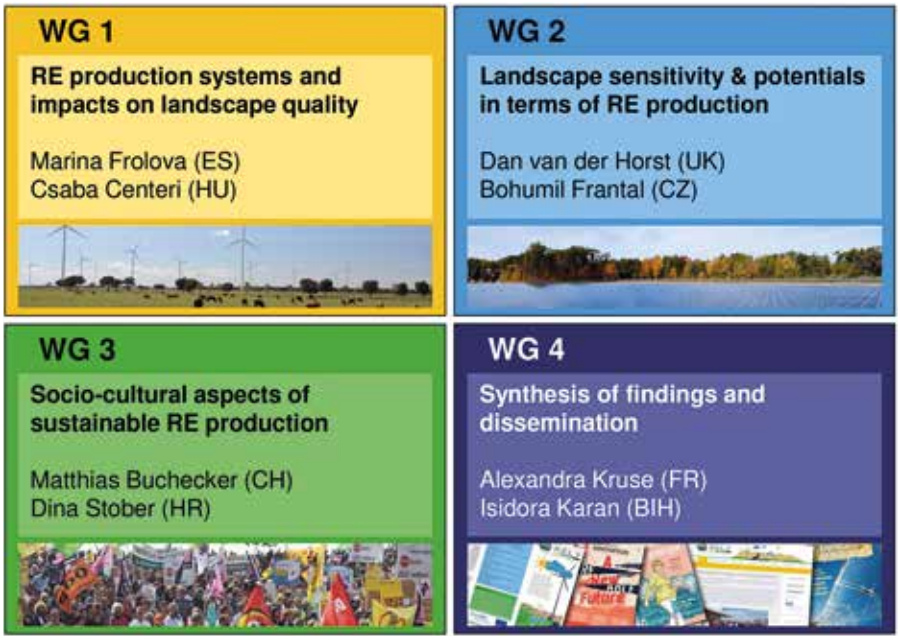

Figure 0.2.1
The four working groups of the COST Action RELY and their topics

Milestones and timetable

Duration: October 2014 - October 2018

Activity	Year							
	1		2		3		4	
Kick-off phase								
Working Group 1: Systematic review, meta-analysis								
Working Group 2: Strategic case studies								
Working Group 3: Multidimensional scenarios								
Working Group 4: Synthesis, dissemination								
Milestones								
Meeting, incl. kick off meeting	X	X	X	X	X	X	X	X
Annual progress report		X		X		X		
Action conferences		X		X			X	
Training Schools with special focus on ECI				X		X		
Publication of a comprehensive Action book								X
Final Action report								X

Figure 0.2.2
Timetable of RELY

35 European countries as well as from Canada and Israel until the final conference in September 2018.

Besides Cyprus and Luxembourg **inclusiveness target countries** (ITC) were well represented in the Action. Almost 50 % of the participating countries and almost 40 % of participants belong to ITCs, as well as all four WG vice-chairs. The share of participants from IT countries at meetings was between 40 % (Lisbon, Portugal, 2015) and up to 67 % (Brno, Czech Republic, 2018). Nearly 65 % of the STSMs between 2015 and 2018 were carried out by members from ITCs and nearly half of the participants of the two training schools also came from ITCs. Meetings in ITCs were held in Bosnia & Herzegovina, Czech Republic, Croatia, Hungary, Portugal, and Slovenia.

Regarding **gender balance** COST RELY was doing fine: 47 % of all participants were female. In the Core Group, 50 % of the members were female. The share of female participants at meetings was between 37 % (kick-off Meeting) and 53 % (Lisbon, Portugal, 2015). Half of the STSMs were carried out by female participants and 59 % of the training school participants were also female.

The action chair and three out of four WG vice-chairs are **early career investigators** (ECI), who were also well represented within the whole Action.

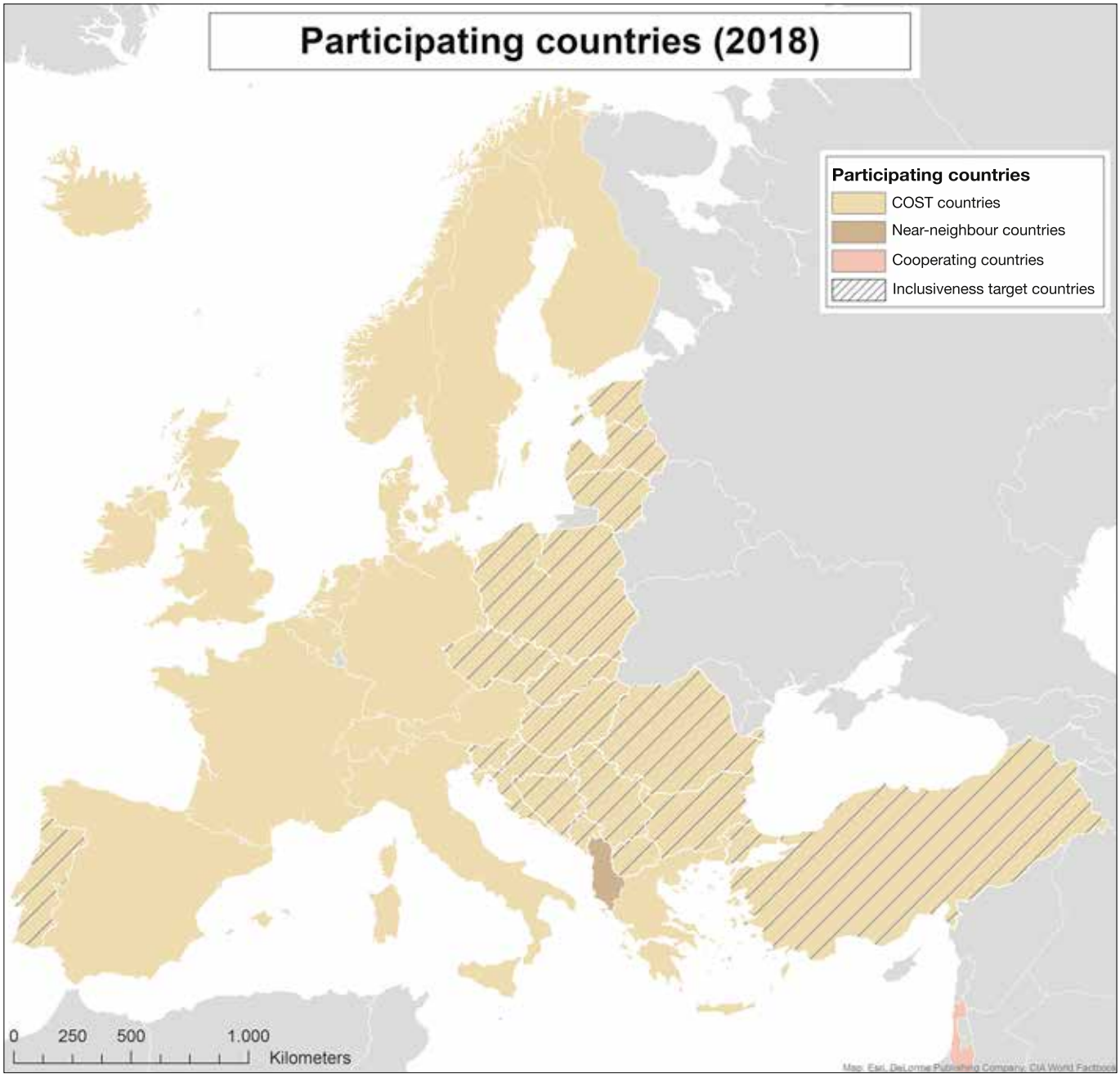

Figure 0.2.3
Countries participating in the COST Action RELY.
Author: Sina Röhner.

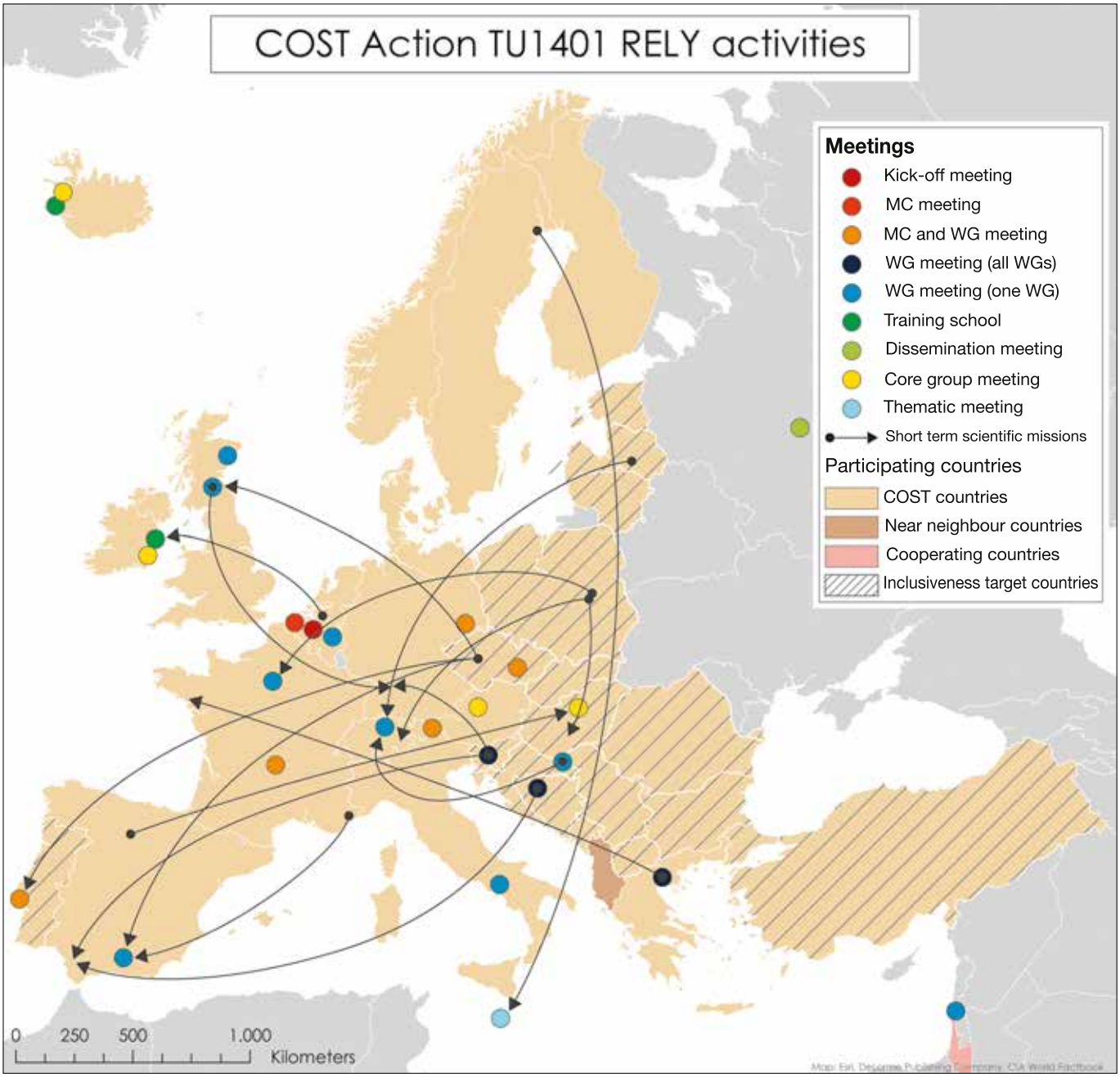

Figure 0.2.4
Meetings and STSMs of the COST Action RELY. Author: Tadej Bevk.