

Table A.1. List of papers reviewed in this study and their foci.

Title	Scale			Energy System Coverage							
	National	Sub-national		Whole System	Mode			Sector / Technology			
		Regional	City / Town		Transport	Heating	Electricity	Housing	Bioenergy	Wind	Solar PV
A new hybrid approach for evaluating technology risks and opportunities in the energy transition in Ireland [1]	X			X							
Ambitious mitigation scenarios for Germany: A participatory approach [2]	X			X							
Benefits and challenges of participatory methods in qualitative energy scenario development [3]	X			X							
Effects of exemplar scenarios on public preferences for energy futures using the my2050 scenario-building tool [4]	X			X							
Long-term energy scenarios: Bridging the gap between socio-economic storylines and energy modelling [5]	X			X							
Low-carbon scenarios for Russia's energy system: A participative backcasting approach [6]	X			X							
Morocco's sustainable energy transition and the role of financing costs: A participatory electricity system modelling approach [7]	X			X							
Possible hydrogen transitions in the UK: Critical uncertainties and possible decision points [8]	X			X							
Reconciling qualitative storylines and quantitative descriptions: An iterative approach [9]	X			X							
Rethinking the role of scenarios: Participatory scripting of low-carbon scenarios for France [10]	X			X							
Sustainable energy futures: Methodological challenges in combining scenarios and participatory multi-criteria analysis [11]	X		X	X							
Towards a sustainable hydrogen economy: A multi-criteria sustainability appraisal of competing hydrogen futures [12]	X			X							
Linking narratives and energy system modelling in transport scenarios: A participatory perspective from Denmark [13]	X				X						
Mitigation of CO2 emissions from the road passenger transport sector in Bahrain [14]	X				X						

New ways for the integrated appraisal of national energy scenarios: The case of renewable energy use in Austria [15]	X					X	X				
A participatory multi-criteria approach for power generation and transmission planning [16]	X						X				
Collaborative energy visioning under conditions of illiberal democracy: results and recommendations from Ecuador [17]	X						X				
Efficiency versus equity in spatial siting of electricity generation: Citizen preferences in a serious board game in Switzerland [18]	X						X				
Imagine all these futures: On heterogeneous preferences and mental models in the German energy transition [19]	X						X				
Long-Term Electricity Scenarios for the MENA Region: Assessing the Preferences of Local Stakeholders Using Multi-Criteria Analyses [20]	X						X				
Models on the wrong track: Model-based electricity supply scenarios in Switzerland are not aligned with the perspectives of energy experts and the public [21]	X						X				
Perspectives of Informed Citizen Panel on Low-Carbon Electricity Portfolios in Switzerland and Longer-Term Evaluation of Informational Materials [22]	X						X				
Strategic and user-driven transition scenarios: Toward a low carbon society, encompassing the issues of sustainability and societal equity in Japan [23]	X						X				
Integrated decision-making about housing, energy and wellbeing: A qualitative system dynamics model [24]	X							X			
Participatory system dynamics modelling for housing, energy and wellbeing interactions [25]	X							X			
Austria's wind energy potential – A participatory modelling approach to assess socio-political and market acceptance [26]	X									X	
A transdisciplinary modelling framework for the participatory design of dynamic adaptive policy pathways [27]	X										X
A methodological approach for holistic energy planning using the living lab concept: The case of the prefecture of Karditsa [28]		X		X							
Combining local preferences with multi-criteria decision analysis and linear optimization to develop feasible energy concepts in small communities [29]		X		X							
Transdisciplinary research for supporting environmental management [30]		X		X							
Using role play to explore energy perceptions in the United States and United Kingdom [31]		X		X							
Using scenario visioning and participatory system dynamics modelling to investigate the future: Lessons from Minnesota 2050 [32]		X		X							
Collaborative backcasting for transport policy scenario building [33]		X			X						

Achieving transparency and robustness of regional energy scenarios by using morphological fields in inter- and transdisciplinary project groups [34]		X				X	X				
Balanced renewable energy scenarios: a method for making spatial decisions despite insufficient data, illustrated by a case study of the Vorderland-Feldkirch Region, Vorarlberg, Austria [35]		X				X	X				
Developing transdisciplinary approaches to community energy transitions: An island case study [36]		X				X	X				
Decision support framework for developing regional energy strategies [37]		X					X				
Informed public choices for low-carbon electricity portfolios using a computer decision tool [38]		X					X				
Methodology for Microgrid/Smart Farm Systems: Case of Study Applied to Indigenous Mapuche Communities [39]		X					X				
Regional energy planning through SWOT analysis and strategic planning tools: Impact on renewables development [40]		X					X				
Understanding energy-related regimes: A participatory approach from central Australia [41]		X						X			
A spatial explicit scenario method to support participative regional land-use decisions regarding economic and ecological options of short rotation coppice (SRC) for renewable energy production on arable land: case study application for the Göttingen district, Germany [42]		X							X		
Applying the Sustainability Science Principles of the Göttingen Approach to Initiate Renewable Energy Solutions in Three German Districts [43]		X							X		
Biomass feedstock and climate change in agroforestry systems: Participatory location and integration scenario analysis of biomass power facilities [44]		X							X		
Energy, forest, and indoor air pollution models for sagarmatha national park and buffer zone, Nepal [45]		X							X		
Engaging a rural agricultural community in sustainability indicators and future scenario identification: case of San Luis Valley [46]		X							X		X
Is enhanced biodiversity protection conflicting with ambitious bioenergy targets in eastern Finland? [47]		X							X		
Tweak, adapt, or transform: Policy scenarios in response to emerging bioenergy markets in the U.S. Corn Belt [48]		X							X		
Use of a participatory approach to develop a regional assessment tool for bioenergy production [49]		X							X		
An Interactive Planning Support Tool for Addressing Social Acceptance of Renewable Energy Projects in The Netherlands [50]			X	X							

Citizen-participatory scenario design methodology with future design approach: A case study of visioning of a low-carbon society in Suita City, Japan [51]			X	X							
Co-producing energy futures: impacts of participatory modelling [52]			X	X							
InSmart – A methodology for combining modelling with stakeholder input towards EU cities decarbonisation [53]			X	X							
Multicriteria decision support in local energy planning: An evaluation of alternative scenarios for the Sustainable Energy Action Plan [54]			X	X							
Societal implications of sustainable energy action plans: from energy modelling to stakeholder learning [55]			X	X							
Exploring scenarios for more sustainable heating: The case of Niš, Serbia [56]			X			X					
Supporting energy initiatives in small communities by linking visions with energy scenarios and multi-criteria assessment [57]			X			X	X				
A methodology for community engagement in the introduction of renewable based smart microgrid [58]			X				X				
Transdisciplinary Evaluation of Energy Scenarios for a German Village Using Multi-Criteria Decision Analysis [59]			X						X		

Note

1. “Participatory system dynamics modelling for housing, energy and wellbeing interactions” [25] details on participants taken from “Integrating GMB and games in the built environment” [60]
2. “Reconciling qualitative storylines and quantitative descriptions: an iterative approach” [9] modelling tool used taken from “Modelling generation and infrastructure requirements for transition pathways” [61]
3. “Societal implications of sustainable energy action plans: from energy modelling to stakeholder learning” [55] software used for analysis taken from “Strategic Energy Planning of Residential Buildings in a Smart City: A System Dynamics Approach” [62]
4. “Energy, Forest, and Indoor Air Pollution Models for Sagarmatha National Park and Buffer Zone, Nepal” [45] software used for analysis taken from “Experience With a Hard and Soft Participatory Modelling Framework for Social-ecological System Management in Mount Everest (Nepal) and K2 (Pakistan) Protected Areas” [63]

Table A.2. Summary of the stakeholders involved with national studies.

[illegible]

Table A.3. Summary of the stakeholders involved with subnational studies.

Ref	State								Market													Number of participants
	local			national					energy industry	tourism	agriculture / forestry	construction	finance / bank	unspecified	private individuals / citizens	formal group						
	planning agency	government	energy / environment	energy / environmental	unspecified policymaker	labour / industry agencies	health / education	researchers / academia								farmer's association	energy co-op / association	environmental association	religious institution	development organisation	unspecified	
[11]		x						x	x			x			x			x				NA
[28]		x				x		x			x	x	x					x		x		17
[29]		x	x								x				x							19
[30]	x		x					x	x				x			x		x				NA
[31]															x							83
[32]	x	x		x	x		x				x				x				x			NA
[33]					x			x	x						x							NA
[34]			x					x	x				x	x				x				16
[35]		x						x	x								x					30
[36]															x							NA
[37]															x							182
[38]															x							69
[39]											x				x							NA
[40]									x	x	x				x						x	500
[41]		x																x		x		15
[42]	x															x		x				100
[43]		x	x								x				x			x				NA
[44]	x	x						x	x					x								105
[45]				x				x		x					x				x	x		NA
[46]		x		x												x		x				NA
[47]				x			x	x	x	x	x			x				x				40
[48]				x							x					x	x	x				16
[49]		x			x			x	x		x				x			x				NA
[50]		x													x		x					35
[51]															x							446
[52]		x												x	x				x		x	15
[53]	x	x						x	x					x				x				NA
[54]	x	x					x		x		x				x							NA
[55]		x							x													NA
[56]	x	x	x			x		x	x						x			x				NA
[57]		x						x	x					x	x	x		x				29
[58]															x		x					100
[59]		x									x				x		x					NA

Table A.4. Table of the qualitative and quantitative methods used in the studies reviewed.

		Qualitative Analysis								Quantitative Analysis						
		Eliciting Preferences				Visioning / Mapping				multi-criteria decision analysis	sensitivity analysis	Energy System Models				
		Individual		Group												
survey /questionnaire	semi - structured interview	dialogue / deliberation	interactive display / serious game	scenario generation / backcasting	SWOT analysis	storytelling / visioning	cognitive mapping			resource assessment	system dynamics modelling	agent based modelling	simulation tool	optimisation tool		
National	[1]			x		x										x
	[2]	x						x								x
	[3]	x				x		x								
	[4]				x											
	[5]					x										x
	[6]		x			x										
	[7]					x						x				
	[8]		x			x										x
	[9]		x			x						x				
	[10]	x				x								x		
	[11]		x			x				x						
	[12]		x			x				x						
	[13]					x										x
	[14]		x			x								x		
	[15]		x			x				x						
	[16]	x								x						x
	[17]		x	x				x								
	[18]	x		x	x											
	[19]		x			x										
	[20]	x				x				x					x	
	[21]	x		x	x											
	[22]	x			x											
	[23]	x														x
	[24]		x					x	x							
	[25]		x						x				x			
	[26]	x				x							x			
	[27]			x										x		
Subnational	[11]					x				x		x				
	[28]						x		x							
	[29]	x							x	x	x					x
	[30]		x			x			x				x			

[31]				X											
[32]					X			X				X			
[33]	X	X			X										
[34]			X	X	X				X						
[35]				X							X				
[36]	X	X	X												X
[37]	X			X											
[38]	X			X											
[39]	X	X									X				
[40]						X					X				
[41]		X			X										
[42]					X				X		X				
[43]		X	X				X								
[44]	X								X		X				
[45]					X			X				X			
[46]		X	X		X						X				
[47]	X								X						
[48]	X				X										
[49]		X							X		X				
[50]			X	X											
[51]	X		X	X	X		X	X							
[52]				X							X				
[53]		X			X				X						X
[54]	X								X	X					
[55]					X			X				X			
[56]					X	X	X							X	
[57]					X				X		X				
[58]		X	X				X								
[59]			X						X		X				

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