The multidimensional co-benefits and injustices of low carbon transitions in Europe

Invited Presentation to Energy Evaluation Europe's 2021 Virtual Conference on "Accelerating the Energy Transition for All," London, United Kingdom, March 15-18, 2021

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Case study selection: France (1970/80s), Germany (1990s), Norway (2000s), UK (2010s)

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Research design (mixed methods)

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Sixty-four semi-structured expert research interviews

Country	Date	Illustrative Institutions
France	July 2018	CEA (Atomic Energy Commission of France), Electricité de France, ESSEC Business School, Greenpeace, International Energy Agency, Organization of Economic, Cooperation and Development, WISE-PARIS
Germany	July 2018	BMWi (Federal Ministry for Economic Affairs and Energy), Ecologic Institute, Fraunhofer Institute for Solar Energy Systems ISE, German Solar Association (BSW-Solar), the German Energy Agency, the German Solar Energy Society (DGS), Zentrum für Sonnenenergie- und Wasserstoff-Forschung Baden-Württemberg (ZSW)
Norway	June - September 2018	Energi Norge, Ministry of Transport and Communications, Norwegian Public Roads Administration, NTNU (Norwegian University of Science and Technology), Statnett, the Norwegian Electric Vehicle Association (NEVA), TOI (The Institute of Transport Economics)
Great Britain	August 2018	Department for Business Energy & Industrial Strategy, Citizens Advice, Energy Saving Trust, Good Energy, Oxford University, Smart Energy GB, University College London

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Five focus groups: Lewes (Great Britain), Colmar (France), Freiburg (Germany, two of them), and Stavanger (Norway)

Research design (mixed methods)

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Twelve internet forums (three per country, more than 2m total members) with 58 further responses

Country	Forum	Description	Members	Responses
Norway	Elbilforum.no	Norwegian EV forum	20,487	7
Norway	Tesla motors club Norway	Online forum for Tesla owners in Norway	N/A	4
Norway	SpeakEV	Online electric car forum for all EV owners and enthusiasts	16,152	0
Germany	Photovoltaik forum.com	A solar forum in German	100,823	2
Germany	Solarstrom-forum.de	Photovoltaic forum in German	2,329	0
Germany	Building Technology Forum - Solar Energy	Online forum for all building technologies including solar	N/A	0
GB	Money Saving Expert	Consumer forum	1,778,314	1
GB	Navitron	Private company forum on a range of energy issues	7139	0
GB	OVO Energy	Private company forum on a range of energy issues		0
GB	The IET	The Institution of Engineering and Technology	N/A	38
France	Que Choisir	Consumer forum	130536	1
France	Forum photovoltaique	Energy forum	42596	5
France	Droit Finances	Consumer finances forum	N/A	0

Research design limitations (and defenses)

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- Although open to the public, expert responses (interviews) outnumbered public responses (focus groups and forums)
- The paper is critical, exploring only injustices and not positive justices
- Due to the wealth of empirical data—three methods, four countries—virtually no space for triangulation with a deep literature review
- We also took an ethnographic approach that did not correct or problematize responses, so we present the data unfiltered, even when it may have misperceptions
- We did nonetheless code *all* data and also conduct frequency counts and content analysis
- We also have other research looking at 120 dis-benefits or injustices: “Decarbonization and its discontents: a critical energy justice perspective on four low-carbon transitions,” *Climatic Change* 155, 581–619 (2019).

Findings: More detailed results in the study … how many in total?

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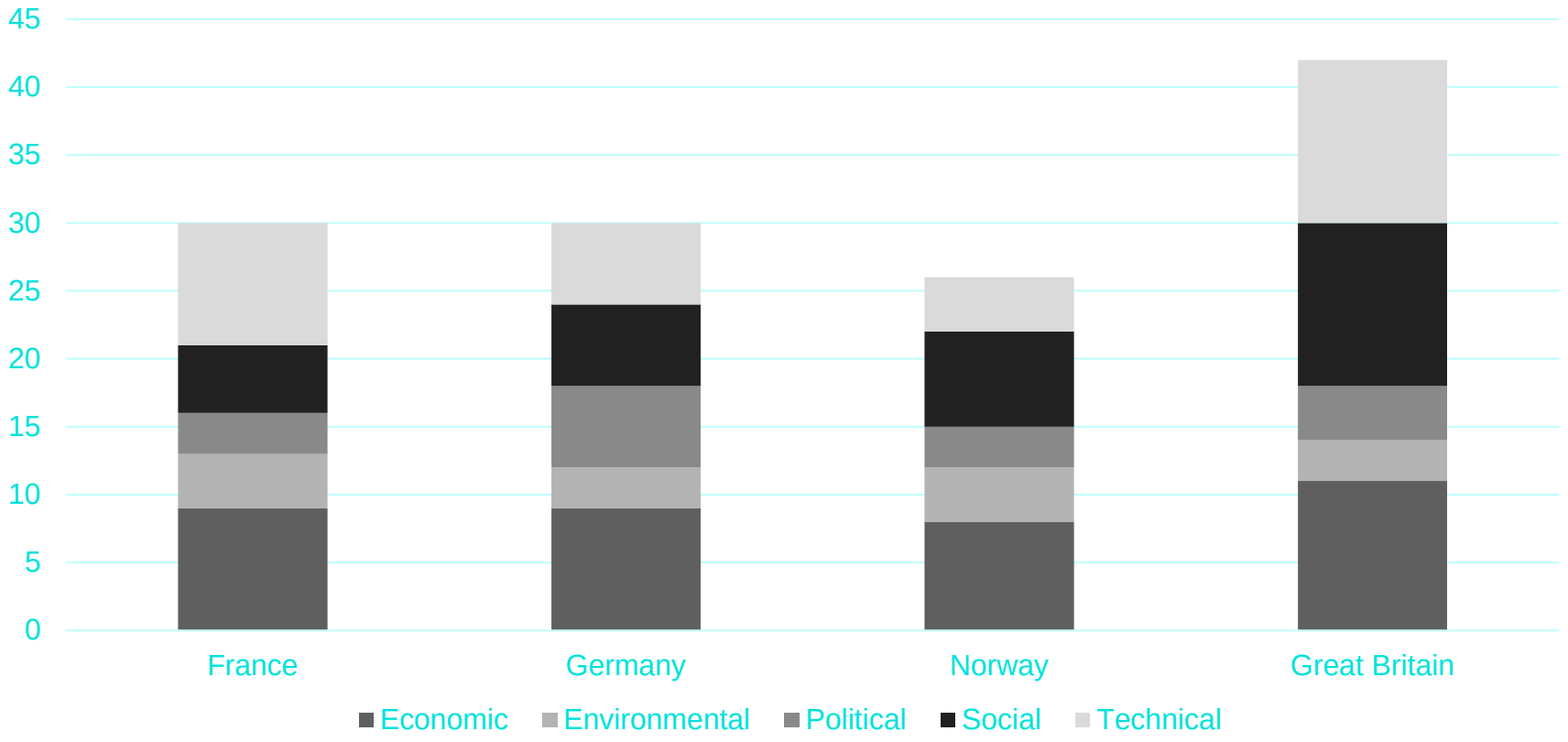
No.	Type	Benefit	Supported by[a]	Frequency[b]
1	Economic	Cheap electricity for France	RI	10
2	Environmental	Low carbon energy source	RI, IF	10
3	Economic	Created well-paid and stable jobs in nuclear industry	RI	9
4	Political	Secured energy independence and energy security, reduced fossil fuel imports	RI, IF	7
5	Social	Supported egalitarian energy access	RI	7
6	Social	Galvanized pride in national project	RI	6
7	Economic	Supported industrial growth	RI, FG	6

Findings: summary of co-benefits

- Our evidence accumulates into 128 (inductively or analytically) distinct co-benefits.
- A significant number of these were **economic** (37), such as fuel savings, jobs, exports, and profits.
- Others were **environmental** (14), such as displaced air pollution, mitigated climate change, reduced land use impacts, and other avoided externalities
- Our remaining 77 co-benefits do not fall into these broad categories of "cost" and "carbon." We captured 30 **social** benefits, as diverse as the way in which nuclear power galvanized national pride in France to the way in which electric vehicles elicited positive feelings of prestige and environmental consciousness in Norway.
- We captured 31 **technical** benefits, from the ways in which smart meters are facilitating distributed generation in Great Britain to the ways in which PV stimulated innovations in solar PV technology in Germany.
- We captured 16 **political** benefits, from policy learning across all four cases, as well as improvements to energy security and reduced energy dependence in all four cases

Source: Benjamin K. Sovacool, Mari Martiskainen, Andrew Hook, Lucy Baker," Beyond cost and carbon: The multidimensional co-benefits of low carbon transitions in Europe," *Ecological Economics*, Volume 169, 2020, 106529

Co-benefits are almost equally distributed across the transitions or technologies



Concluding thoughts and insights

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- The energy studies and energy economics communities may need more sophisticated research designs that are capable of understanding and capturing the non-environmental and non-economic aspects of low carbon innovation
- The complementarity or coupling of innovations (e.g., smart meters with solar PV, EVs with energy storage) suggests the need to move beyond analyzing individual technologies to entire systems
- Analysts and policymakers should look beyond carbon pricing, and exclusively economic or environmental benefits, instruments, and institutions

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