Energy Research & Social Science 136 (2026) 104724

Contents lists available at ScienceDirect

Energy Research & Social Science

journal homepage: www.elsevier.com/locate/erss

Original research article

Fossil fuel phaseout, renewable energy, and just transition discourse at COP26 and COP28: A discourse network analysis of Instagram posts

Mark Shakespear [a,*], Yasmin Koop-Monteiro [b], Mark C.J. Stoddart [c], David B. Tindall [a], Andrew K. Jorgenson [a,d]

[a] Department of Sociology, University of British Columbia, 6303 NW Marine Dr., Vancouver, British Columbia, V6T 1Z1, Canada
[b] Department of Sociology and Anthropology, University of Prince Edward Island, Charlottetown, Canada
[c] Department of Sociology, Memorial University of Newfoundland, St. John's, Canada
[d] Department of Theoretical Economics, Vilnius University, Vilnius, Lithuania

ARTICLE INFO

Keywords:
Energy transition
Just transition
Fossil fuels
Renewable energy
Climate change
UNFCCC
Discourse network analysis

ABSTRACT

The authors conduct a comparative discourse network analysis of Instagram posts discussing the 2021 (COP26) and 2023 (COP28) UN climate change conferences. COP26 produced the first UNFCCC agreement to explicitly acknowledge the central role of fossil fuels in climate change, calling for the phasedown of unabated coal power and phaseout of inefficient fossil fuel subsidies. The COP28 agreement further acknowledged the need to transition away from fossil fuels in energy systems, in a just, orderly, and equitable manner. Given that just transitions, involving the phaseout of fossil fuels, and their replacement by renewable energy sources, are critical to mitigating climate change, the authors draw from a sample of 5820 Instagram posts to examine whether discussion around these topics has intensified and diffused online between COP26 and COP28. The findings show that discussion of all three topics increased, and diffused among a wider range of organisation types, during this period. However, just transition discourse remained relatively marginal, and absent among business organisations, during COP28. These findings appear promising for effective climate change mitigation, as fossil fuel phaseout and renewable energy expansion topics are being mainstreamed. However, the relative marginalisation of just transition discourse, and its continued exclusion by business organisations, may undermine the potential to achieve substantial phaseouts of fossil fuels and replacement by renewables, owing to a lack of consideration of justice concerns and factors that lead to resistance or acceptance of such projects.

1. Introduction

Energy is central to discussions on how to address anthropogenic climate change because climate change is primarily driven by the concentration of greenhouse gases in the atmosphere from fossil fuel combustion [1]. Discussions of addressing climate change therefore often centre on the need to reduce, or phaseout, fossil fuel consumption, increase energy efficiency, and, most importantly, to transition from fossil fuels to other energy sources, primarily renewable energies (and to a lesser extent sources such as nuclear, and hydrogen).

Energy transitions are in part technical, but are also social [2]. Since fossil fuels are highly integrated into societies, transitions to other energy sources may be disruptive to economies and communities, e.g., those dependent on fossil fuel (and fossil fuel adjacent) industries. Further, certain demographics or regions may be disproportionately affected by such transitions. Initiatives focused on 'just transitions' thus seek to minimise disruption to, and increase the well-being of, those impacted by energy transitions. Such initiatives also often aim to address pre-existing inequalities – such as economic, Indigenous-settler, and rural-urban – through transition efforts [2–6].

Energy is a focal point of climate change politics. However, nation-states have been slow to undertake substantive transitions from fossil fuels to renewable energy, and even less so *just* transitions (e.g., [7]). Similarly, at the international level there has been a contrast between official deliberations and broader discussion of the role of fossil fuels and energy more broadly in relation to climate change. The role of fossil fuels was only recently acknowledged in the final agreements at United Nations Framework Convention on Climate Change (UNFCCC) COP

* Corresponding author.
E-mail addresses: m.shakespear@ubc.ca (M. Shakespear), ykoop-monteiro@upei.ca (Y. Koop-Monteiro), mstoddart@mun.ca (M.C.J. Stoddart), tindall@mail.ubc.ca (D.B. Tindall), andrew.jorgenson@ubc.ca (A.K. Jorgenson).

https://doi.org/10.1016/j.erss.2026.104724
Received 27 September 2025; Received in revised form 13 January 2026; Accepted 17 April 2026
Available online 24 April 2026

(conference of the parties) meetings. First, the 2021 COP26 final agreement included a focus on coal phasedown and phaseout of inefficient fossil fuel subsidies. Later, at COP28 in 2023 there was a focus on transitioning away from all fossil fuels. This study examines energy discourse on Instagram during these two United Nations COP meetings (COP26 in Glasgow, Scotland in 2021, and COP28 in Dubai, United Arab Emirates in 2023). While Instagram discourse does not in itself reflect the views of policymakers or directly impact outcomes of official deliberations at COP conferences, a growing body of research shows that Instagram is an important space for political communication and mobilisation (e.g., [8]), including for ecological issues and movements [9–12].

Due to their importance for mitigating climate change, we focus on whether three key energy-related topics (fossil fuel phaseout, expansion of renewable energy, and just transition) have intensified and diffused on Instagram between COP26 and COP28. We examine their prevalence on Instagram relative to broader energy discourse and their prevalence as used by different types of organisations/groups. We also consider whether the relationship between these topics changes across our COP26 and COP28 samples. Our analysis reveals that, between COP26 and COP28, discourse on Instagram supporting fossil fuel phaseout, renewable energy expansion, and just transition became more prevalent, and diffused across a broader range of organisation types. Further, fossil fuel phaseout and renewables expansion were increasingly co-occurring topics for the COP28 sample. However, discussion of just transition remains relatively limited, and is notably absent among business organisations, for COP28 posts. Regarding the potential feasibility of climate change mitigation efforts, the findings are in part positive. These topics are becoming mainstreamed in COP-adjacent social media spaces. Fossil fuel phaseout and renewable energy uptake are also increasingly articulated as necessarily interconnected endeavours. Yet, the ongoing marginalisation of just transition discourse – and particularly its marginality among business actors – raises concerns about the viability and/or broader implications of energy transitions. Without attention to justice-related issues and the social dynamics that shape support or opposition to renewable energy, the success of fossil fuel phaseout efforts and transitions to renewable energy may be hindered. Even if this does not occur, overlooking social justice considerations is likely to deepen existing social inequalities or give rise to new ones.

2. Literature review and background

2.1. Climate change, fossil fuels, renewable energy, and just transitions

Phasing out fossil fuels and transitioning to renewable energy is necessary to mitigate greenhouse gas emissions to address climate change. These objectives are intrinsically linked, since renewable energy uptake does not automatically decrease fossil fuel use. From 1960 to 2009, nations' uptake of renewable energy (and nuclear) only minimally displaced fossil fuels, instead primarily adding to the overall energy mix [13]. Today, this trend continues globally: in 2023, global renewable energy capacity additions increased by nearly 50% – the fastest growth rate in nearly two decades [14] – while energy-related carbon dioxide emissions rose 1.1%, reaching a new record high of 37.4 Gt [15]. In 2024 the global trend in emissions continued, rising by 0.8%. Yet trends between regions diverged, as increases in fossil fuel emissions in BRICS countries (Brazil, Russia, India, China, and South Africa), emerging markets and developing economies due to rapid economic and population growth outweighed reductions in advanced economies from continued increases in low-emissions energy sources, such as renewables and nuclear, led by solar and wind growth [16]. In recent years uptake of renewables and other energy sources appears to be slightly slowing the growth of fossil fuel emissions [15], and within particular regions, such as OECD (Organisation for Economic Co-operation and Development) countries, renewables are beginning to partially displace fossil fuels [17]. However, renewables are not sufficiently replacing them, and global fossil fuel consumption and emissions continue to increase [18].

Transitions from fossil fuels to renewable energy sources are in part technological undertakings, yet literature has increasingly considered social concerns as crucial considerations for such transitions [19,20]. Social dimensions considered by such work include social inequality and power, democracy and public participation, and community wellbeing [2,3,21–23]. Central foci in this research include 'energy democracy,' [21] 'energy justice,' [24,25] and 'just transitions' [3,4,6]. Energy democracy movements and scholarship focus on collective ownership or control over energy systems, often emphasising prosumerism – the consumption of resources by their producer(s) [26–28]. Energy democracy movements and scholars present renewables as more capable than fossil fuels of facilitating such goals, since the former tend to be more dispersed and less capital-intensive [21,26–29]. Energy justice scholarship focuses on equitable distribution of risks and benefits from energy systems, and the procedural dimension of equitable involvement or representation/recognition of relevant stakeholders in planning and operation of energy systems [30,31].

Just transition scholarship focuses primarily on shifting from fossil fuel to renewable energy systems in a manner that addresses pre-existing social inequalities, as well as new inequalities, or other socio-economic impacts, that may arise from transitions [32]. Regarding pre-existing inequalities, just transition policies may prioritise energy insecure communities, which are often poorer, rural, and in certain regions, can be comprised predominantly of racial minorities, such as Indigenous or Black communities [32–35]. Just transition initiatives can intersect with the goals of energy democracy and energy justice [36]. Though focused on energy, just transition efforts encompass a wide scope, considering how entire industries, regions, and communities may be affected by large-scale energy transitions [4,6]. Just transition policies can include jobs or skills retraining from fossil fuel to renewable energy or other green or low-carbon industries, grants for localised, smaller-scale, or co-operative energy projects, greater involvement in planning, implementation, or operation of new projects, or monetary compensation for neighbouring projects [6,35,37–39]. Research finds that just transition policies can increase support for transitions from fossil fuels to renewable energy [40,41], including in fossil fuel producing regions [42–48].

2.2. The UNFCCC and COP meetings

Our analysis of energy discourse focuses on Instagram posts discussing UNFCCC COP meetings. COPs are 'regularly scheduled critical events' [49] for global climate governance, which attract organisations/collective actors from across the world (and various sectors of society) to address the global climate crisis. The UNFCCC was signed by 187 nations at the Rio Earth Summit in 1992. Countries have since held annual international conferences to co-ordinate efforts to address climate change. The primary focus of COPs is negotiations by nation-states to produce final agreements. However, a vast and increasing range of official and non-official side events also take place at COPs, which are important (beyond final agreements) for social network tie formation/reinvigoration, side agreements, amplifying voices of participants and unofficial attendees, and shaping public discourse about climate change and related issues [49–51].

UN organisations and frameworks are focal points of a 'global environmental regime' which fosters culture and social relationships conducive to environmentalism [52]. As the focal point for international meetings about climate change, COP conferences foster and play host to a global climate community and culture [53]. COPs (and society in general) have seen increasing numbers of issues, actors, and institutions framed as relevant to climate change and efforts to address it [54]. Aside from the role of nation-states in this process in part through COP negotiations and side-events, NGOs have also played a prominent role, framing various social issues as relevant to climate change and thus entering the space of global climate politics [55,56].

Discussions and policies around energy, and particularly fossil fuels and renewables, have long been a core issue for climate change politics. Despite this, explicit mention in COP final agreements of the role of fossil fuels as drivers of climate change, and thus the need to transition from fossil fuels to alternative energy sources, has only occurred recently after three decades of COPs. The 1997 Kyoto Protocol, developed at COP3, bound nations to cut greenhouse gas emissions, to be implemented through frameworks including emissions trading, the Clean Development Mechanism (facilitating projects between developed and developing countries), and Joint Implementation mechanism (facilitating projects between developed countries) [57]. The Protocol's First Commitment Period for emissions reductions targets ran until 2012. At COP18, the Doha Amendment introduced a second commitment period, from 2013 to 2020 [58]. Throughout the 2000s, COP decisions promoted low-carbon development and technology transfer mechanisms to support mitigation efforts, e.g., establishing the Green Climate Fund at COP16 in 2010 [59]. At COP21, the Paris Agreement was introduced, which comprised a new, nationally-determined framework for emissions reductions [60]. Just transition discourse first emerged in UNFCCC negotiations at COP15 in 2009, where the International Trade Union Confederation pushed for its inclusion in a draft text, though it did not appear in the final decision documents. However, just transition language focused on 'decent work and quality jobs' amidst shifts to a low-carbon society was adopted in final agreements the following year at COP16 [61]. Similar language was included in the Paris Agreement text [62]. At this time, renewable energy initiatives were gaining traction. E.g., at COP21, France and India launched the International Solar Alliance between over 120 countries to greatly expand the adoption of solar power in developing countries [63]. Despite the significance of these developments, mention of fossil fuels continued to be excluded from official UNFCCC agreements until COP26 and COP28, which can be considered key developments in the COP process around energy discourse.

At COP26 in Glasgow in 2021, countries adopted the Glasgow Climate Pact, which contained the first reference in a UN climate agreement explicitly mentioning fossil fuels – calling for the "phase-down of unabated coal power and phaseout of inefficient fossil fuel subsidies" [64]. The agreement also outlines the need to increase finance for climate adaptation and loss and damage funds, strengthen ocean-based actions, and technology development and transfer. The "Global Methane Pledge" was also introduced at COP26, signed by over 100 countries, "to commit to collectively reduce global methane emissions by 30% by 2030" [65]. COP28 in Dubai in 2023 marked another historic agreement regarding fossil fuels. The decision document stated the need to "transition away from fossil fuels in energy systems, in a just, orderly and equitable manner" while reiterating the previous statements around coal introduced at COP26, and the need to decrease methane emissions. The agreement also included goals to triple global renewable energy capacity and double energy efficiency improvements by 2030 [66]. Both agreements also reiterate the aforementioned language around just transitions, while COP28 operationalised the "Just Transition Work Programme," which has since convened dialogues around integrating these just transition principles into countries' nationally-determined contributions under the Paris Agreement [67].

2.3. Social media and COP meetings

Due to the significance of the COP26 and COP28 outcomes for energy discourse, especially around fossil fuels, but also around renewables and just transition, in this study we examine such energy-related discourse online around these events. As a qualification, we note that Instagram provides a COP-adjacent public space for critique and commentary upon the COP proceedings. However, it is outside the formal 'empowered spaces' where multi-lateral deliberation and decision-making occurs, including the crafting of final agreements. Though social media commentary may not have a direct impact on COP outcomes, Instagram provides a unique social media forum that is valuable because it provides publicly-visible online space for a broad range of actors (e.g., social movement, civil society, governmental, business, and media) to comment on official COP deliberations and final agreements, and to shape how climate change impacts and potential solutions are interpreted in the broader culture. It can serve as a space for critical counter-discourse, as well as a space for mobilising online and offline action on climate-related issues [12].

Social media has increasingly been examined as a space for political communication and mobilisation [8], including around ecological issues [9,11] and climate change [10,12]. Research has examined energy-related social media discussions around particular energy sources, often focused on specific regions, social media platforms, or types of actors. E.g., examining general public discussions on X (formerly Twitter) of coal-fired power plant closures in Australia [68] and nuclear power plants in Turkey [69], or sentiment analysis of sustainable energy-related Tweets by electricity utilities in the U.S. [70]. Related to the latter, research has documented pro-fossil fuel messaging on social media as an avenue for climate obstruction. E.g., examining Canadian fossil fuel industry advocacy and mobilisation on Facebook [71], and how major global fossil fuel corporations attempt to green their image by promoting renewable energy sources on X, yet while promoting natural gas as a necessary climate solution [72].

Instagram is, however, relatively under-examined as a space for political communication, especially compared to X [73], despite billions of users, and higher levels of audience engagement than other social media platforms [74,75]. To our knowledge there is no research examining fossil fuel phaseout and just transition discourse on Instagram, or studying the relationship between these and discussion of fossil fuels and renewables more broadly. Neither is there research to our knowledge examining how different types of actors contribute to this discourse on social media. Our research thus seeks to address these gaps in the literature.

3. Methods and data

Our data consists of posts on Instagram commenting on COP26 and COP28 UNFCCC climate negotiations while they were taking place. Energy, and especially fossil fuels, were a focal point at both conferences. As COPs are highly publicized international events concerning climate change, this highlights the utility and relevance of our data for examining climate-related energy discourses and how different types of actors shape them. Our data collection, coding, and analytical methods are the same as those undertaken in previous studies that used the COP26 sample (see [10,12]) and the COP26 and COP28 samples (see [76]). We collected posts (including images, account name, and captions) from Instagram during two separate periods in 2021 and 2023, during pre-COP, COP, and post-COP periods of COP26 (October 27–November 16, 2021) and COP28 (November 26–December 16, 2023). We combined all posts collected from each day into separate pdfs (21 pdfs for 21 data collection days, per period). We then conducted qualitative visual and text analysis of the COP26 and COP28 Instagram post samples within NVivo. The coding process was semi-structured, beginning with three coding meta-categories: discourse, imagery, and organisations/collective actors (grouped by organisation type). Within these broad categories, we added subcodes inductively based on content. Unless otherwise stated in the name of a node (e.g. "critique fossil fuel expansion," or "critique fossil fuel proponents/stakeholders"), posts coded under a particular discourse (e.g. "fossil fuel phaseout," "renewable energy," "fossil fuels to renewables transition," "just transition from fossil fuels") indicate support. We used Instagram's translation function on captions for non-English posts. Further details on COP26 and COP28 data collection are described below.

3.1. COP26 sample

The COP26 sample was collected using NVivo NCapture, a web browser plug-in, which took screengrabs of #COP26-tagged posts from the Instagram website and combined them in pdfs (generating 21 pdfs for each of the 21 data collection days). Instagram displays posts according to an algorithm that combines "recency" (e.g. how new a post is), "connection" (e.g. how connected the user is to the content producer), and predicted "interest" (based on users' past likes, etc.) [8]. To prioritise recency and mitigate the influence of users' connections in the hashtag content search, we created a new Instagram account to collect data during COP26. Posts were collected daily during COP26 programming (between 10 am and 4:30 pm in Glasgow).

To focus on resonance, only posts that received at least 1 "like" were included in the sample. We also excluded posts that were 24 h or older at the time of data collection,[1] and collected data during COP programming hours to prioritise posts commenting on ongoing deliberations. Recent posts commenting on the deliberations with at least one like demonstrate a threshold of participation in deliberative online communities that take place around COP conferences, capturing discourse on COP itself, or climate change more broadly, that is engaged with by other online users as it happens. This data thus represents discourse in unofficial spaces of deliberation that take place around COP conferences.

We collected a total of 2417 #COP26-tagged Instagram posts, and tracked the total number of #COP26-tagged posts (totalling N = 290,036 on the final data collection day). We collected 414 posts from the pre-COP period (October 27–30 2021), 1645 posts from the COP period (October 31–November 13 2021), and 358 posts from the post-COP period (November 14–16 2021). Our sample represents 0.83% of all posts that were tagged with the #COP26 hashtag up to November 16 2021.

3.2. COP28 sample

We created another new Instagram account for COP28 data collection. Using the website's "Explore" search, we took screenshots directly from Instagram (using a desktop web-browser) of posts with at least 1 like that contained "COP28" in captions or hashtags. Instagram's "Explore" search resembles its default ("Top recent posts") search as both options are based on algorithms that display content based on users' predicted interest in a post and connections to content posters, although its default search also prioritises recency. To account for this, we only collected posts that were shared less than 24 h prior to our daily searches. We also collected posts during conference programming for COP28. Our rationale remained the same for this wave of data collection, regarding collecting posts with at least one like that were less than 24 h old to prioritise engagement with the conference proceedings.

We made these changes to our data collection protocol because, at the time of data collection, NCapture no longer collected Instagram posts. Further, Instagram's default ("Top recent posts") search option limited the number of posts that could be collected since the desktop version displayed a maximum of 28 posts, and, while the mobile app displayed more posts, the additional time and effort involved in taking mobile screenshots and collating them would have resulted in fewer posts being collected during COP programming. Lastly, we opted for a more inclusive sampling protocol, capturing any post containing "COP28," including in hashtags or captions. We collected posts daily during COP28 programming (between 10 am and 3 pm in Dubai).

We sampled a total of 3403 posts containing "COP28" in their captions or hashtags, while tracking the daily number of posts containing "COP28" (which totalled 158,378 on the final data collection day). We collected 568 posts during the pre-COP period (November 26–29, 2023), 2522 from the COP period (November 30–December 13 2023), and 313 from the post-COP period (December 14–16 2023). Our sample of 3403 posts represents approximately 2.15% of all posts containing "COP28" up to December 16 2023.

3.3. Discourse network analysis

After coding the posts from both samples in NVivo, we imported four separate co-occurrence matrices (one for co-occurring energy topics for each of the COP26 and COP28 samples, and one for co-occurring energy topics and organisation types for each sample) into Visone network mapping software to generate four separate discourse network analysis (DNA) diagrams, comparing two distinct modes of network data: 1) co-occurring energy topics, and 2) the actors that favour those topics, across each sample.

DNA is a network-based method for analysing discourse employed by groups of actors and/or texts around a topic, or group of topics. Researchers can create single mode networks from text data, including concept-concept networks (e.g. comprised of energy topics that co-occur in the same text(s), with different topics represented by distinct nodes in the network), or multi-modal networks, such as two-mode actor-concept networks (e.g. actors that discuss the same topics across texts, with different topics and different actors each represented by distinct nodes in the network) [77]. In network terms, the number of co-occurrences of a concept, or the number of times a given actor discusses a certain topic, equates to tie/vertex strength [78] between nodes, and is represented by numbers in the co-occurrence matrix, and line thickness in the visual network. Like traditional network analysis, network mapping software can calculate degree centrality [79] of nodes in DNA networks, where raw centrality of a node is the sum of the number of ties connecting it to other nodes, and standardised centrality divides that number by the total number of ties in the network. Degree centrality of concept nodes in discourse networks indicates the prevalence of a topic within a particular realm of discourse, and for actor nodes, the prevalence of that actor (or actor type) in the discourse [80]. The four networks depicted in our findings (Figs. 3–6) use standardised centrality measures for comparison across our two samples, and the figures display only ties with at least three co-occurrences, for ease of interpretation.

4. Findings

We begin this section by comparing the top ten most prevalent energy-related topics in our samples of Instagram posts for COP26 and COP28. We then compare the types of actors discussing those topics at COP26 and COP28, and those that co-occur within the COP26 and COP28 samples.

Fig. 1 depicts example Instagram posts from the COP26 (A and B) and COP28 (C and D) samples. A demonstrates support for "renewable energy." B demonstrates support for "just transition" and "renewable energy." C demonstrates support for "decarbonisation," and "fossil fuel phaseout," and demonstrates the "critique of fossil fuel proponents/stakeholders" discourse. D demonstrates support for "just transition" and "fossil fuel phaseout." Fig. 2 shows the top ten energy-related topics in posts discussing COP26 and COP28.[2] Fossil fuel phaseout (stated generally about all fossil fuels, or about specific ones, and occasionally promoting fossil fuel divestment or ending subsidies) was by far the most prevalent topic for both conferences, by a considerable margin. Most of

[1] Posts Instagram dates "23 hours ago" could range from 23 to 23 h and 59 min old. When posts reach 24 h old, Instagram labels them as "posted a day ago," until they reach 48 h old. For each day, we therefore only collected posts that were dated "23 h ago" or less to ensure we did not collect posts from outside our time range.

[2] We determined the top 10 topics to include by summing the number of posts for each energy topic across both samples, retaining the 10 topics with the highest sum.

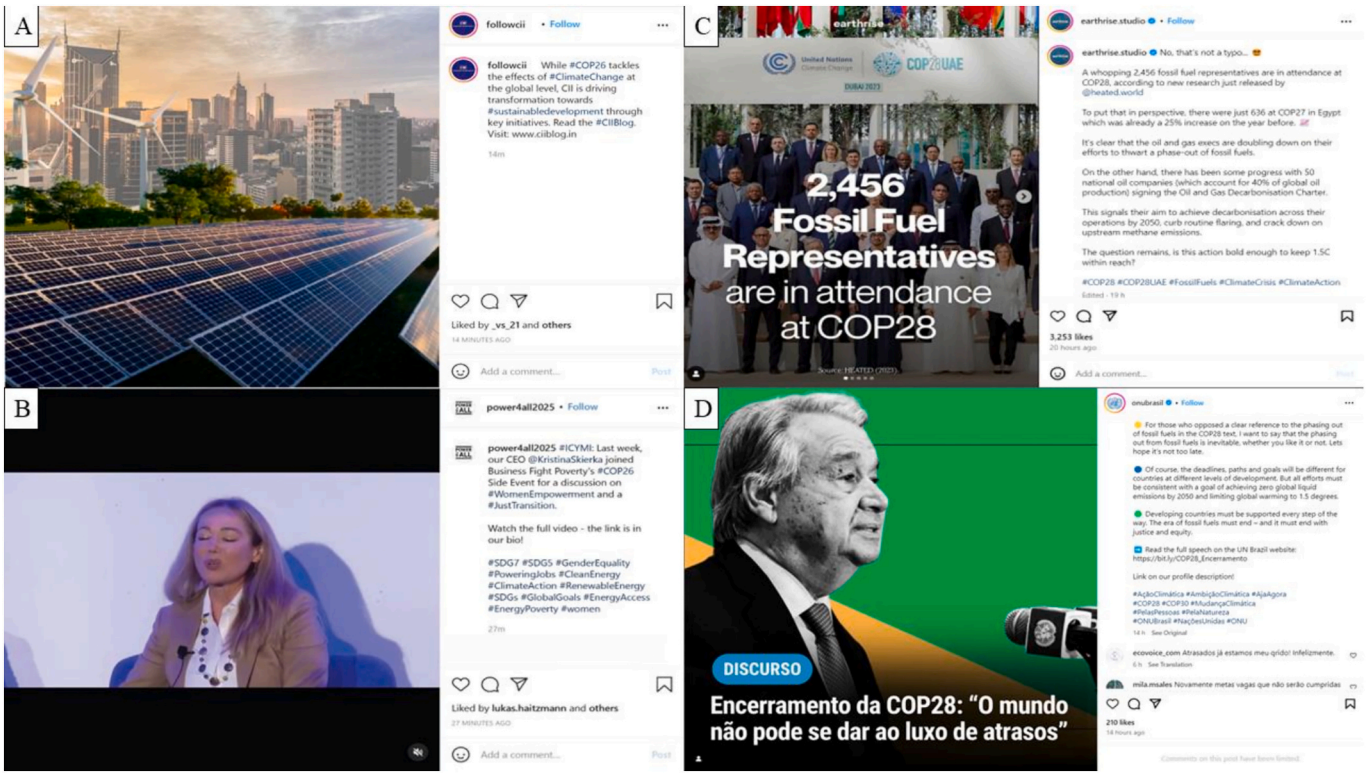

Fig. 1. Example posts from COP26 (A and B) and COP28 (C and D) samples.

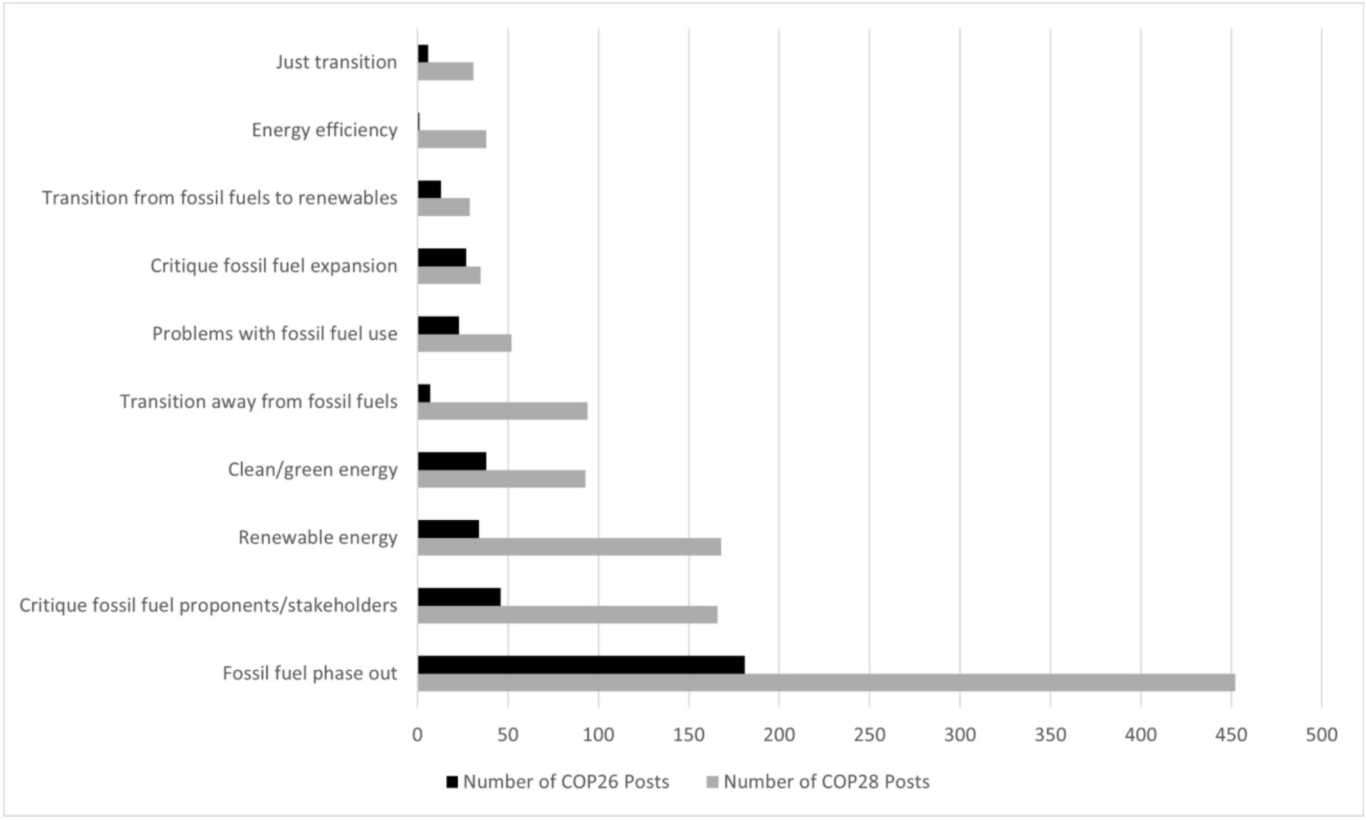

Fig. 2. Frequency of top 10 energy topics at COP26 and COP28.

these posts discussed fossil fuel phaseout generally for COP28. This was sometimes the case for COP26, but for the latter many posts specifically discussed phasing out coal, which was uncommon for COP28, aligning with the focus at COP26 negotiations around addressing coal. Posts

discussing the need to phaseout oil or gas specifically were infrequent for both conferences. Promotion of renewable energy as a solution to climate change was also a highly discussed topic across each conference (albeit much less than fossil fuel phaseout), gaining traction and garnering the fourth highest amount of posts for COP26, and the second most for COP28. However, posts explicitly promoting transitions from fossil fuels to renewables were consistently less prevalent than those simply promoting renewable energy. Just transition was also consistently less frequent than the fossil fuel phaseout and renewables topics, yet was discussed slightly more at COP28 than the transition from fossil fuels to renewables topic.

Other critiques of fossil fuels and fossil fuel proponents were continuously prevalent at each COP. Critiques of fossil fuel proponents (most often fossil fuel corporations and/or governments for obstructing or being slow to act on climate change) were the second and third most prevalent topic, respectively. Critiques of fossil fuel expansion (e.g., of governments authorising permits for new oil and gas operations), and discussion of problems with fossil fuel use (such as pollution, environmental degradation, and health impacts), as well as ambiguous promotion of 'transitioning away from fossil fuels,' and 'clean' or 'green' energy were also relatively prevalent for each COP, while energy efficiency was a prevalent topic at COP28 but not COP26.

4.1. Energy discourses favoured by various organisation types for COP26 and COP28

Figs. 3 and 4, respectively present two-mode networks of the types of organisations/groups (black triangles) discussing various energy-related discourses (grey circles) in their Instagram posts for COP26 and COP28. In the COP26 sample, the most prominent organisation/group types discussing energy (as shown by node size, which represents raw degree centrality) were NGO/social movement organisations, followed by media, business, then government/political, and community organisations. Posts by international agencies, education/think tanks, and Indigenous organisations were more prevalent for COP28, and thus are included in the COP28 network and not for COP26. However, community organisations were less prevalent and are not included in the network. For COP28, media organisations were the most prevalent, followed by NGO/social movement actors, then government/political, international agencies, education/think tanks, business, then Indigenous organisations.

For COP26, NGO posts primarily discussed phasing out fossil fuels, many critiqued fossil fuels in various ways, and some promoted renewable energy, transitioning from fossil fuels to renewables, and clean/green energy. Business posts primarily promoted fossil fuel phaseout, renewable, and clean/green energy, and some critiqued fossil fuel proponents, and problems with fossil fuel use, and promoted decarbonisation, and electrification.[3] Media posts primarily promoted fossil fuel phaseout, many critiqued fossil fuels in various ways, and some promoted renewable, and clean/green energy. Government/political, and community organisations only discussed fossil fuel phaseout.

For COP28, posts by all organisations frequently critiqued fossil fuels in various ways. Additionally, NGO posts mainly promoted fossil fuel phaseout, also promoting renewables, and to a lesser extent, transitions from fossil fuels to renewables, and just transitions. Media posts primarily promoted fossil fuel phaseout, renewables, and clean/green energy, and some promoted just transitions, and transitions from fossil fuels to renewables. Business organisations promoted a range of energy topics fairly equally, notably including fossil fuel phaseout, renewables, and transitions from renewables to fossil fuels, but were the only organisation type not to promote just transitions from fossil fuels. Government organisations discussed a wider range of energy topics at COP28 than COP26, primarily promoting renewables, then fossil fuel phaseout, and to a lesser extent, just transitions from fossil fuels. International agencies primarily promoted fossil fuel phaseout, then renewable, and clean/green energy, and some promoted just transitions. Education/think tanks primarily promoted fossil fuel phaseout, followed by renewables, yet also to a minor extent, just transitions. Indigenous organisations only discussed three energy topics: primarily promoting fossil fuel phaseout, followed by renewable energy, and just transitions.

A number of notable discourses not present for COP26 were present, albeit sparse, at COP28. This includes promoting the need to ensure or expand energy access (only from NGOs), energy efficiency (by all actors except Indigenous and business, and most often by governments, media, and NGOs), nuclear energy and biofuels (only media organisations), and green hydrogen (only media and business). Additionally, a small number of media posts promoted fossil fuels.

Comparing across the COP26 and COP28 two-mode networks for the key energy topics, fossil fuel phaseout was the most central topic. All organisations included in each sample advocated for fossil fuel phaseout, which consistently was the most, or one of the most, discussed topics for all organisation types. NGO/social movement and media organisations were the most prominent advocates for fossil fuel phaseout around both conferences.

Promotion of renewable energy was prominent across both conferences, but more for COP28, where it was the second most central topic discussed by organisations as a whole, behind fossil fuels. For COP26, business organisations were the most prominent advocates for renewables, followed by NGOs and media, while no other organisations in this sample promoted it. For COP28, all organisation types promoted renewables – primarily media, followed by NGOs, government, business, international agencies, then Indigenous. Explicit promotion of transitions from fossil fuels to renewables was sparser around both conferences, but was discussed by a wider range of organisations at COP28, including media, business, and NGOs, yet only NGOs at COP26. Just transition was also a less prominent topic across both conferences, yet it was promoted somewhat more frequently at COP28, and, notably, by a much wider range of actors, including all except business organisations, while NGOs were the only organisations to promote just transition at COP26. NGOs were still the primary advocates for just transition at COP28, followed by media, then international agencies, then education/think-tank, and Indigenous actors.

4.2. Co-occurring energy discourses for COP26 and COP28

Figs. 5 and 6, respectively, show the co-occurring energy discourses at COP26 and COP28. For COP26 posts, fossil fuel phaseout is the most central topic, which was discussed mainly alongside various critiques of fossil fuels (phaseout's co-occurrences with critiquing fossil fuel expansion being the most frequent of all topic co-occurrences for COP26 posts), and to a lesser extent, promotion of clean/green energy, and renewables, then varying energy transition discourse, including just transition. Fossil fuel phaseout was still the most central topic for COP28, again being discussed alongside various critiques of fossil fuels. However, posts promoting fossil fuel phaseout now most often also promote renewables, and promote just transitions more often than for COP26. A relatively small number of posts decried the need for phasing out fossil fuels, instead promoting them, some posts framing them as an environmentally friendly energy source.

Posts promoting renewables became more central for COP28 relative to COP26. Posts in the former sample tended to also discuss renewables as a form of clean/green energy, or promoted fossil fuel phaseout, or the need to transition from renewables to fossil fuels, followed by various critiques of fossil fuels, and other energy transition discourse – of which just transition was promoted the least. For COP28, renewables were discussed the most alongside promoting fossil fuel phaseout – which was

[3] We include "decarbonisation" and "transition away from fossil fuels" as separate nodes from fossil fuel phaseout, since these are more ambiguous terms that could mean phasing out fossil fuels, but could also mean reducing fossil fuel use without phasing out.

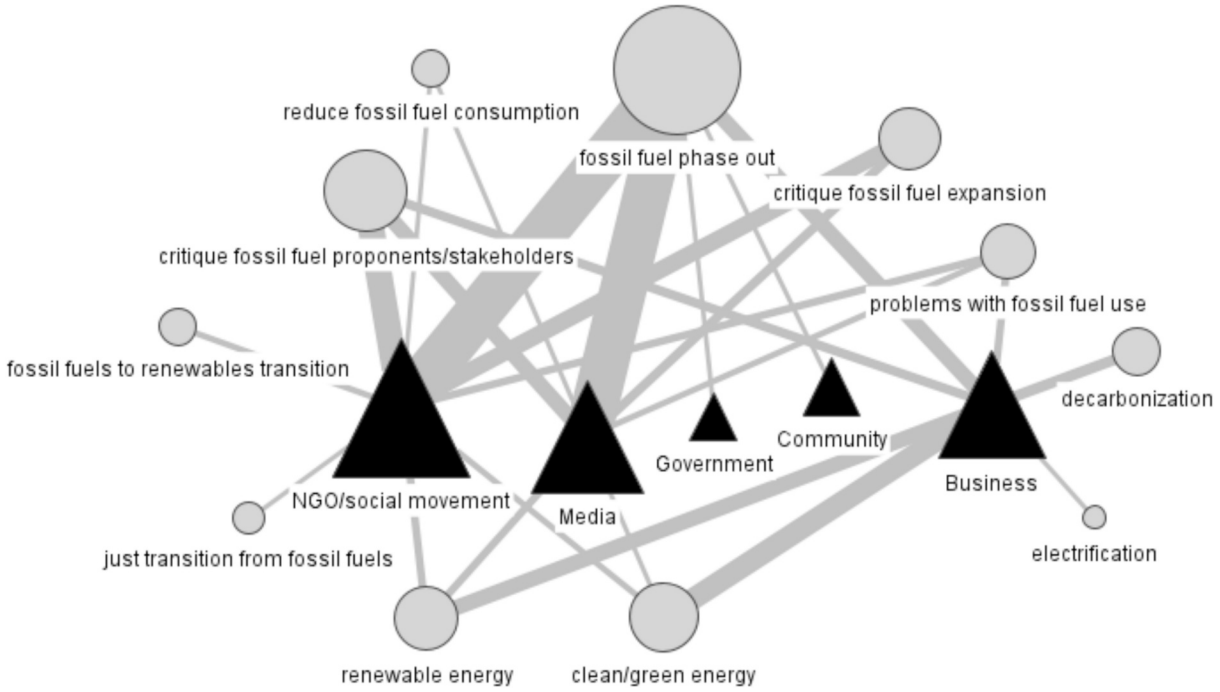

Fig. 3. Two-mode organisation type and energy discourse network for COP26.

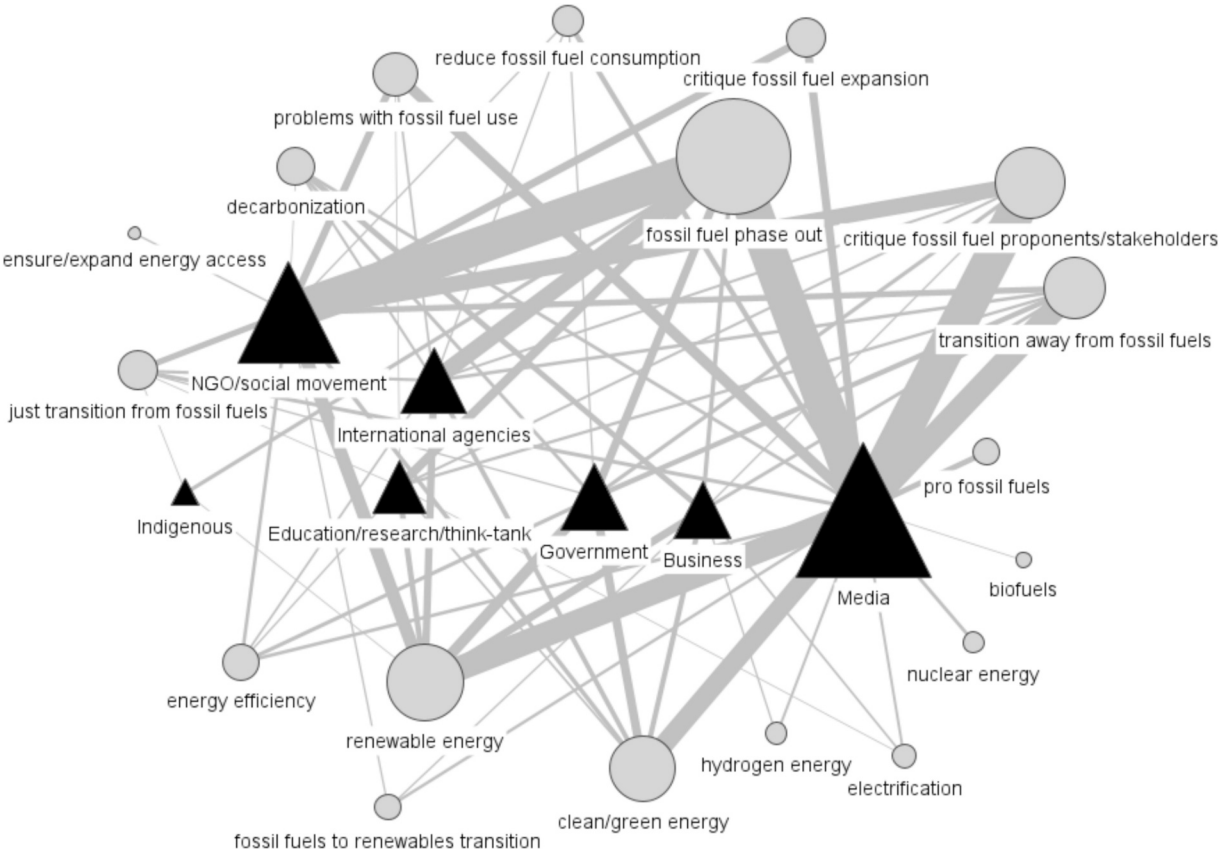

Fig. 4. Two-mode organisation type and energy discourse network for COP28.

the most common topic co-occurrence for the COP28 posts. Again, posts promoting renewables often also critiqued fossil fuels in various ways, and promoted renewables as a form of clean/green energy, yet also often promoted energy efficiency, and to a lesser extent transitions from fossil fuels to renewables. As for COP26, posts promoting renewables promoted just transition relatively infrequently. A small number of COP28 posts promoting renewables also promoted hydrogen, nuclear, and electrification, which is not the case for COP26.

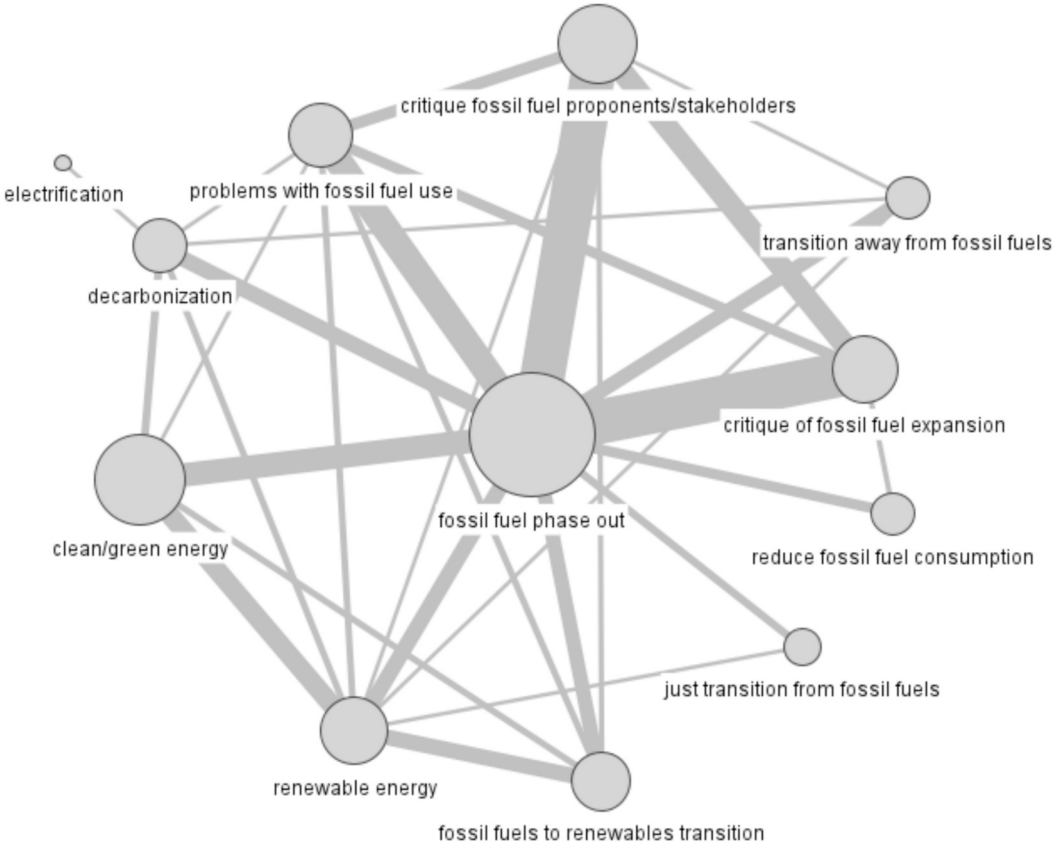

Fig. 5. One-mode energy discourse network for COP26.

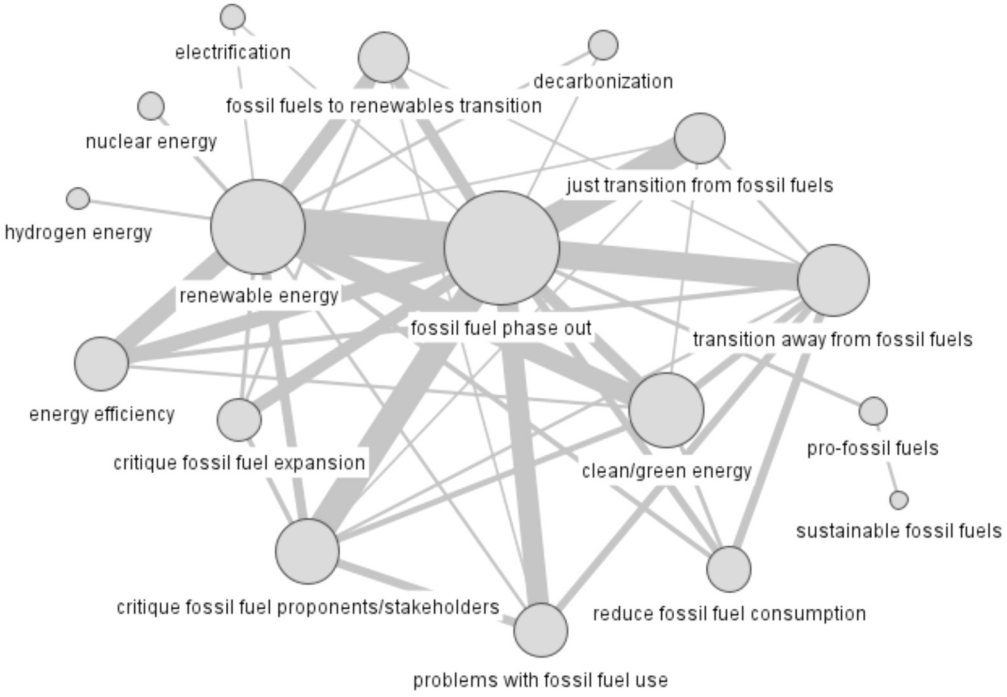

Fig. 6. One-mode energy discourse network for COP28.

Posts promoting just transitions from fossil fuels were one of the least central for COP26, this topic co-occurring sometimes with fossil fuel phaseout, and to a lesser extent renewables, but no other topics. For COP28, just transition increased somewhat in centrality, and co-occurred with a greater number of energy topics, again including renewables, but primarily with fossil fuel phaseout.

5. Discussion and conclusion

In this study we examine whether discourse on Instagram promoting fossil fuel phaseout, renewable energy, and just transitions became more prevalent and diffused among a wider range of actors between UNFCCC conferences COP26 and COP28. We also examine whether the frequency of co-occurrences between these topics changed throughout this period. Our findings show that since COP26 in Glasgow, support for fossil fuel phaseout has consistently been the most common and central topic among energy discourse in our data. An increasingly broad range of organisation types promoted fossil fuel phaseout around the two conferences. The frequency and centrality of fossil fuel phaseout, and the broad range of organisations and other energy discourses that co-occur with it, indicate an already intensified and diffuse use of phaseout discourse at COP26, and further intensification and diffusion through COP28, albeit while COP26 placed a greater emphasis on phasing out coal specifically, while the latter focused almost entirely on phasing out fossil fuels more generally. The co-occurrence of phaseout discourse with a broad range of other energy topics suggests that actors use fossil fuel phaseout as a 'conceptual handle or peg' [81], or 'cultural anchor' [82] through which they articulate a range of climate-related energy discourses, which may facilitate its promotion by a wide range of organisation types. Consistently frequent promotion of fossil fuel phaseout by NGO/social movement and media organisations also highlights the role that media and civil society play in intensifying and diffusing this discourse, at least on social media.

Promotion of renewable energy also intensified from COP26 to COP28. This topic appeared more frequently, with connections to a wider range of energy discourse. Renewable energy expansion also diffused among a wider range of actors, being discussed by all organisation types for COP28. Discourse around renewables thus becomes similar to that of fossil fuel phaseout for COP28, anchoring energy discourse for a range of organisations. Relatedly, another notable change from COP26 to COP28 is that Instagram discourse around fossil fuel phaseout shifted from primarily critiquing fossil fuels – which was the most common topic co-occurrence for COP26 – to increasingly also promoting renewable energy as a viable energy source, and a necessary replacement to fossil fuels – fossil fuel phaseout and renewables being the most common topic co-occurrence for COP28.

The centrality and co-occurrence of fossil fuel phaseout and renewables expansion discourses is an optimistic finding in light of ongoing global trends of fossil fuel emissions increasing alongside renewable energy uptake, which indicates that, thus far, renewable energy has not actually displaced fossil fuels from the global energy mix. Even under relatively climate-friendly governments, this trend has been facilitated by an "all of the above" approach to energy, which in the USA was introduced by President Obama to integrate renewables into the energy mix while prioritising economic growth and energy security [83]. This continued under President Biden, as record federal investments in renewables through the Inflation Reduction Act occurred alongside record domestic oil and gas production [84]. This was prompted in part by Russia's invasion of Ukraine in 2022, which led to concerns over energy security amidst a global energy crisis. European countries (especially Norway) also responded by scaling-up oil and gas production, and increasing renewables expansion, to reduce dependence on Russian fossil fuels [85–87]. To effectively mitigate climate change, it is crucial that fossil fuel phaseout is promoted alongside renewable energies. Our findings indicate the role that online discourse can play in facilitating this.

Just transition discourse also intensified in frequency and topic co-occurrence, and diffused among a wider range of actors between COP26 and COP28. Just transition was promoted only by NGO/social movement organisations in our COP26 data, but by all organisation types except business in our COP28 data, NGOs and media organisations being the strongest proponents. Similar to fossil fuel phaseout and renewables discourse, this indicates that just transition is being mainstreamed, and becoming more prominent among broader energy and climate discourse. This highlights the role that civil society and media play in propelling this change, which echoes previous research on the important role played by social movements in pushing the limits of climate discourse as they mobilise around the COP meetings [88].

However, just transition discourse is still relatively marginal, even around COP28, and the majority of just transition posts in both samples did not articulate details of what a just transition looks like, rather promoting just transitions in general alongside fossil fuel phaseout, and/or renewables uptake. On this note, there were no posts in either sample that explicitly referenced discourses like energy democracy or energy justice. Perhaps most significantly however, is the siloing of just transition discourse, where no business organisations advocated for it in either sample. This is a point of concern for the viability, and/or characteristics, of large-scale transitions from fossil fuels to mitigate climate change. First, the absence of justice concerns in energy transition efforts may undermine the acceptance of renewable energy projects, particularly among regions or communities dependent on fossil fuel or agricultural industries, or rural communities more broadly [35,37–39,41,44,45,47,48,89].

Another concern raised by the siloing of business actors from just transition discourse is the potential for rapidly growing renewable energy industries to overlook their disproportionate ecological, sociocultural, or economic impacts on particular demographics or groups, or to overlook the potential to address pre-existing inequalities. Renewable energy projects that do not consider such impacts may perpetuate or exacerbate historical or contemporary patterns of extractive or colonial relationships divided along lines including urban-rural, Indigenous-settler, or racial majority/minority, etc. [35,90–99], particularly when large/utility-scale renewables projects are favoured over small-scale or distributed ownership [100]. This is a significant potential problem since business organisations tend to favour clean/green growth or market-based responses to climate change, which can include renewable energy projects, yet often overlook, or at least do not prioritise, justice concerns [101–105]. Importantly, just transition efforts should consider not just renewable energy projects themselves, but also upstream mining for necessary minerals, manufacturing, and downstream disposal/recycling of renewable energy technologies. The negative impacts of these upstream and downstream processes tend to disproportionately affect semi/peripheral countries or regions, and underserved or already disadvantaged populations, while the positive effects concentrate more in core countries/regions, and privileged populations [106–108].

Finally, our findings highlight the role that Instagram (and social media more broadly) plays in broadening the participation of a wide range of actors in international climate change and energy discourse and — indirectly — politics, and the value of such spaces for fostering greater representation of under-represented perspectives and groups. Though official COP spaces often focus on technological or market-oriented solutions [14,29], outside of formal UN deliberations and agreements a wide range of actors (e.g. social movements, Indigenous peoples, and business interests) engage in their own climate communications offline and online [50,109]. Previous research has demonstrated how social movement actors influenced the adoption of 'climate justice' and 'loss and damage' issues in official COP deliberations and agreements [50], alongside a wide range of social movement interests [88]. Our data does not directly focus on official agreements. However, the intensification of support for fossil fuel phaseout/just transition, and the diffusion of just transition from NGOs to a wider range of actors, provides empirical evidence of different actors shaping online discourse over time alongside the increasing adoption of these discourses in official spaces.

Our findings are promising in illustrating the diffusion of fossil fuel phaseout and renewable energy expansion discourse. However, we also highlight challenges regarding the siloing of just transition by business interests. This is perhaps reflective of challenges with using social media as a venue for counter-discourses, or to influence political outcomes. Our

data shows that NGOs and media organisations largely drive the energy discourse on Instagram around COP meetings. Yet, nation-states are the most influential actors in official UNFCCC proceedings, and state and business actors — including an increasing presence at COP meetings by fossil fuel lobbyists — arguably have more influence over climate change outcomes (i.e., the renewables vs. fossil fuels energy mix, and greenhouse gas emissions) due to their central political economic roles. Though increased support for fossil fuel phaseout and just transition online and in official UN spaces is promising, this does not necessarily lead to concrete outcomes in policy or emissions reductions, in part due to the disproportionate influence that states and business interests have, which means they may say one thing and do another, or exaggerate their support for a particular outcome. That powerful actors can say one thing and do another further supports our claim that the siloing of just transition discourse by business interests even in low-stakes or low-commitment online discourse raises concerns about the viability of concrete just transition outcomes, and of fossil fuel phaseout and climate mitigation more broadly. However, these problems also reinforce the importance of fostering participation of a wide range of actors in climate discourse and politics. They also highlight the ongoing importance of research into the potentials and limitations of social media platforms such as Instagram for influencing changes to energy discourse and political outcomes within formal spaces of deliberation such as COP meetings.

To conclude, our findings show that discourse on Instagram promoting renewable energy, just transition, and fossil fuel phaseout increased, and diffused among a wider range of organisation types, between COP26 and COP28. However, just transition discourse is still relatively marginal, and excluded by business organisations for the COP28 sample. These findings are in part promising for effective climate change mitigation, since such topics appear to be diffusing into mainstream discourse, and fossil fuel phaseout and renewables are increasingly promoted independently and together. However, the continued exclusion of just transition discourse by business organisations, and the relative marginalisation of just transition discourse in general, may undermine the potential to achieve substantial phaseouts of fossil fuels and replacement by renewables, owing to a lack of consideration of justice concerns and factors that lead to resistance or acceptance of such projects. Even if this does not impede the viability of transitioning from fossil fuels to renewables, it is likely that a lack of justice concerns would exacerbate pre-existing social inequalities, or create new ones.

CRediT authorship contribution statement

Mark Shakespear: Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Yasmin Koop-Monteiro:** Writing – review & editing, Visualization, Validation, Software, Project administration, Methodology, Data curation. **Mark C.J. Stoddart:** Writing – review & editing, Supervision, Software, Methodology, Data curation, Conceptualization. **David B. Tindall:** Writing – review & editing, Supervision, Investigation. **Andrew K. Jorgenson:** Writing – review & editing, Supervision.

Declaration of competing interest

The authors declare to have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

References

[1] Intergovernmental Panel on Climate Change (IPCC), AR5 Climate Change 2014: Mitigation of Climate Change, Retrieved September 24, 2025, https://www.ipcc.ch/report/ar5/wg3/, 2014.

[2] R.P. Thombs, When democracy meets energy transitions: A typology of social power and energy system scale, Energy Res. Soc. Sci. 52 (2019) 159–168, https://doi.org/10.1016/j.erss.2019.02.020.

[3] S. Jasanoff, Just transitions: A humble approach to global energy futures, Energy Res. Soc. Sci. 35 (2018) 11–14, https://doi.org/10.1016/j.erss.2017.11.025.

[4] H.L. Lai, P. Devine-Wright, J. Hamilton, S. Mander, D. Clery, I. Rattle, A. Martin, S. Ryder, P. Taylor, A place-based, just transition framework can guide industrial decarbonisation with a social licence, Energy Res. Soc. Sci. 121 (9) (2025) 103967, https://doi.org/10.1016/j.erss.2025.103967.

[5] R. Quitzow, G. Bersalli, L. Eicke, J. Jahn, J. Lilliestam, F. Lira, A. Marian, D. Süsser, S. Thapar, S. Weko, S. Williams, B. Xue, The COVID-19 crisis deepens the gulf between leaders and laggards in the global energy transition, Energy Res. Soc. Sci. 74 (2021) 101981, https://doi.org/10.1016/j.erss.2021.101981.

[6] X. Wang, K. Lo, Just transition: A conceptual review, Energy Res. Soc. Sci. 82 (2021) 102291, https://doi.org/10.1016/j.erss.2021.102291.

[7] N. Dusyk, J. Axsen, K. Dullemond, Who cares about climate change? The mass media and socio-political acceptance of Canada's oil sands and Northern Gateway Pipeline, Energy Res. Soc. Sci. 37 (2018) 12–21, https://doi.org/10.1016/j.erss.2017.07.005.

[8] T. Leaver, T. Highfield, C. Abidin, Instagram: Visual Social Media Cultures, Polity, Cambridge, 2020.

[9] P. Jallinoja, M. Vinnari, M. Niva, Veganism and plant-based eating: Analysis of interplay between discursive strategies and lifestyle political consumerism, in: M. Bostrom, M. Micheletti, P. Oosterveer (Eds.), The Oxford Handbook of Political Consumerism, Oxford University Press, Oxford, 2018, pp. 157–180, https://doi.org/10.1093/oxfordhb/9780190629038.013.52.

[10] Y. Koop-Monteiro, M.C.J. Stoddart, D.B. Tindall, Animals and climate change: A visual and discourse network analysis of Instagram posts, Environ. Sociol. 9 (4) (2023) 409–426, https://doi.org/10.1080/23251042.2023.2216371.

[11] D.N. Lu, Performing zero waste: lifestyle movement, consumer culture, and promotion strategies of social media influencers, Environ. Sociol. 10 (1) (2023) 12–29, https://doi.org/10.1080/23251042.2023.2267829.

[12] M.C.J. Stoddart, Y. Koop-Monteiro, D.B. Tindall, Instagram as an arena of climate change communication and mobilization: A discourse network analysis of COP26, Environ. Commun. 19 (2) (2025) 218–237, https://doi.org/10.1080/17524032.2024.2377719.

[13] R. York, Do alternative energy sources displace fossil fuels? Nat. Clim. Chang. 2 (6) (2012) 441–443, https://doi.org/10.1038/nclimate1451.

[14] International Energy Agency (IEA), Renewables 2023: Analysis and Forecasts to 2028, Retrieved September 24, 2025, https://www.iea.org/reports/renewables-2023, 2024.

[15] IEA, CO2 Emissions in 2023: A New Record High, But is There Light at the End of the Tunnel?, Retrieved September 24, 2025, https://www.iea.org/reports/co2-emissions-in-2023/, 2024.

[16] IEA, Global Energy Review 2025: C02 Emissions, Retrieved September 19, 2025, https://www.iea.org/reports/global-energy-review-2025/co2-emissions/, 2025.

[17] S.K. Pata, M. Balcilar, Decarbonizing energy: evaluating fossil fuel displacement by renewables in OECD countries, Environ. Sci. Pollut. Res. 31 (2024) 31304–31313, https://doi.org/10.1007/s11356-024-33324-8.

[18] D.J. Davidson, M. Gross, Time of change, a time for change: Energy-society relations in the twenty-first century, in: D.J. Davidson, M. Gross (Eds.), The Oxford Handbook of Energy and Society, Oxford University Press, Oxford, 2018, pp. 1–12, https://doi.org/10.1093/oxfordhb/9780190633851.013.0001.

[19] M.C.J. Stoddart, P. McCurdy, N. Slawinski, C.G. Collins, Envisioning energy futures in the North Atlantic oil industry: Avoidance, persistence, and transformation as responses to climate change, Energy Res. Soc. Sci. 69 (2020) 101662, https://doi.org/10.1016/j.erss.2020.101662.

[20] M.C.J. Stoddart, J. McLevey, V. Schweizer, C. Wong, Climate change and energy futures – theoretical frameworks, epistemological issues, and methodological perspectives, Soc. Nat. Resour. 33 (11) (2020) 1331–1338, https://doi.org/10.1080/08941920.2020.1830456.

[21] M.J. Burke, J.C. Stephens, Political power and renewable energy futures: A critical review, Energy Res. Soc. Sci. 35 (2018) 78–93, https://doi.org/10.1016/j.erss.2017.10.018.

[22] J. Meadowcroft, What about the politics? Sustainable development, transition management, and long term energy transitions, Policy. Sci. 42 (2009) 323–340, https://doi.org/10.1007/s11077-009-9097-z.

[23] L. Raymond, Policy perspective: Building political support for carbon pricing – lessons from cap-and trade policies, Energy Policy 134 (2019) 110986, https://doi.org/10.1016/j.enpol.2019.110986.

[24] K. Jenkins, B.K. Sovacool, D. McCauley, Humanizing sociotechnical transitions through energy justice: An ethical framework for global transformative change, Energy Policy 117 (2018) 66–74, https://doi.org/10.1016/j.enpol.2018.02.036.

[25] B.K. Sovacool, S.E. Bell, C. Daggett, C. Labuski, M. Lennon, L. Naylor, J. Klinger, K. Leonard, J. Firestone, Pluralizing energy justice: Incorporating feminist, anti-racist, Indigenous, and postcolonial perspectives, Energy Res. Soc. Sci. 97 (8) (2023) 102996, https://doi.org/10.1016/j.erss.2023.102996.

[26] M.J. Burke, J.C. Stephens, Energy democracy: Goals and policy instruments for sociotechnical transitions, Energy Res. Soc. Sci. 33 (2017) 35–48, https://doi.org/10.1016/j.erss.2017.09.024.

[27] B. Van Veelen, D. van der Horst, What is energy democracy? Connecting social science energy research and political theory, Energy Res. Soc. Sci. 46 (2018) 19–28, https://doi.org/10.1016/j.erss.2018.06.010.
[28] K. Szulecki, Conceptualizing energy democracy, Environ. Polit. 27 (1) (2018) 21–41, https://doi.org/10.1080/09644016.2017.1387294.
[29] E.M. Gui, I. MacGill, Typology of future clean energy communities: An exploratory structure, opportunities, and challenges, Energy Res. Soc. Sci. 35 (2018) 94–107, https://doi.org/10.1016/j.erss.2017.10.019.
[30] K. Jenkins, D. McCauley, R. Heffron, H. Stephan, R. Rehner, Energy justice: A conceptual review, Energy Res. Soc. Sci. 11 (2016) 174–182, https://doi.org/10.1016/j.erss.2015.10.004.
[31] I. Suboticki, S. Heidenreich, M. Ryghaug, T.M. Skjølsvold, Fostering justice through engagement: A literature review of public engagement in energy transitions, Energy Res. Soc. Sci. 99 (2023) 103053, https://doi.org/10.1016/j.erss.2023.103053.
[32] P. Newell, D. Mulvaney, The political economy of the 'just transition', Geogr. J. 179 (2) (2013) 132–140, https://doi.org/10.1111/geoj.12008.
[33] J. Kimmerling, Oil, lawlessness and indigenous struggles in Ecuador's Oriente, in: H. Collinson (Ed.), Green Guerillas: Environmental Conflicts and Initiatives in Latin America and the Caribbean, Monthly Review Press, New York, NY, 1996.
[34] P. Newell, Trade and environmental justice in Latin America, New Polit. Econ. 12 (2) (2007) 237–259, https://doi.org/10.1080/13563460701302992.
[35] R.S. Nilson, R.C. Stedman, Reacting to the rural burden: Understanding opposition to utility-scale solar development in upstate New York, Rural. Sociol. 88 (2) (2023) 578–605, https://doi.org/10.1111/ruso.12486.
[36] S. Sweeney, J. Treat, Trade Unions and Just Transition: The Search for a Transformative Politics, Trade Unions for Energy Democracy, 2018. Retrieved September 24, 2025, http://unionsforenergydemocracy.org/wp-content/uploads/2018/04/TUED-Working-Paper-11.pdf.
[37] M. Chewinski, S. Anders, J.R. Parkins, Agricultural landowner perspectives on wind energy development in Alberta, Canada: Insights from the lens of energy justice and democracy, Environ. Sociol. 9 (4) (2023) 477–489, https://doi.org/10.1080/23251042.2023.2247627.
[38] J.R. Parkins, S. Anders, J. Meyerhoff, M. Holowach, Landowner acceptance of wind turbines on their land: Insights from a factorial survey experiment, Land Econ. 98 (4) (2022) 674–689, https://doi.org/10.3368/le.98.4.012521-0008R1.
[39] S. Patel, J.R. Parkins, Assessing motivations and barriers to renewable energy development: insights from a survey of municipal decision-makers in Alberta, Canada, Energy Rep. 9 (2023) 5788–5798, https://doi.org/10.1016/j.egyr.2023.05.027.
[40] P. Bergquist, M. Mildenberger, L.C. Stokes, Combining climate, economic, and social policy builds public support for climate action in the US, Environ. Res. Lett. 15 (5) (2020) 054019, https://doi.org/10.1088/1748-9326/ab81c1.
[41] P.T. Madsen, D.S. Hansen, K. Sperling, C. Houeland, K.E.H. Jenkins, Abandoning fossil fuel production: What can be learned from the Danish phase-out of oil and gas? Energy Res. Soc. Sci. 103 (2023) 103211 https://doi.org/10.1016/j.erss.2023.103211.
[42] D. Bolet, F. Green, M. González-Eguino, How to get coal country to vote for climate policy: The effect of a 'Just Transition Agreement' on Spanish election results, Am. Polit. Sci. Rev. 118 (3) (2024) 1344–1359, https://doi.org/10.1017/S0003055423001235.
[43] J.A. Crowe, R. Li, Is the just transition socially accepted? Energy history, place, and support for coal and solar in Illinois, Texas, and Vermont, Energy Res. Soc. Sci. 59 (2020) 101309, https://doi.org/10.1016/j.erss.2019.101309.
[44] G. Evans, L. Phelan, Transition to a post-carbon society: Linking environmental justice and just transition discourses, Energy Policy 99 (2016) 329–339, https://doi.org/10.1016/j.enpol.2016.05.003.
[45] N. Gaikwad, F. Genovese, D. Tingley, Creating climate coalitions: Mass preferences for compensating vulnerability in the world's two largest democracies, Am. Polit. Sci. Rev. 116 (4) (2022) 1165–1183, https://doi.org/10.1017/S0003055422000223.
[46] A.F. Gazmararian, Fossil fuel communities support climate policy coupled with just transition assistance, Energy Policy 184 (2024) 113880, https://doi.org/10.1016/j.enpol.2023.113880.
[47] A.F. Gazmararian, D. Tingley, Uncertain Futures: How to Unlock the Climate Impasse, Cambridge University Press, Cambridge, 2023, https://doi.org/10.1017/9781009405331.
[48] Q. Hasan, R.J. Heffron, S. Mohtadi, B.D. Blankenship, I. Overland, J. Urpelainen, Stepping into the just transition journey: The energy transition in petrostates, Energy Res. Soc. Sci. 113 (2024) 103553, https://doi.org/10.1016/j.erss.2024.103553.
[49] M.C.J. Stoddart, D.B. Tindall, M. Brockhaus, M. Kammerer, Conference of the parties meetings as regularly scheduled critical events for global climate governance: Reflecting on COP 26 and the Glasgow Climate Pact, Soc. Nat. Resour. 36 (4) (2023) 1–9, https://doi.org/10.1080/08941920.2023.2175284.
[50] J. Hadden, Networks in Contention: The Divisive Politics of Climate Change, Cambridge University Press, Cambridge, 2015, https://doi.org/10.1017/CBO9781316105542.
[51] H. Stevenson, J.S. Dryzek, Democratizing Global Climate Governance, Cambridge University Press, Cambridge, 2014, https://doi.org/10.1017/CBO9781139208628.
[52] J.W. Meyer, D.J. Frank, A. Hironaka, E. Schofer, N.B. Tuma, The structuring of a world environmental regime, 1870–1990, Int. Organ. 51 (4) (1997) 623–651. https://www.jstor.org/stable/2703501.
[53] S. Aykut, J. Foyer, E. Morena, Globalising the Climate: COP21 and the Climatisation of Global Debates, Routledge, Milton, 2017.
[54] S. Aykut, L. Maertens, The climatization of global politics: Introduction to the special issue, Int. Politics 58 (2021) 501–518, https://doi.org/10.1057/s41311-021-00325-0.
[55] J.I. Allan, Seeking entry: Discursive hooks and NGOs in global climate politics, Glob. Policy 9 (4) (2018) 560–569, https://doi.org/10.1111/1758-5899.12586.
[56] K. Bäckstrand, J.W. Kuyper, B.O. Linnér, E. Lövbrand, Non-state actors in global climate governance: From Copenhagen to Paris and beyond, Environ. Polit. 26 (4) (2017) 561–579, https://doi.org/10.1080/09644016.2017.1327485.
[57] Earth Negotiations Bulletin (ENB), Summary Report, 1–11 December 1997: UNFCCC COP3, Retrieved September 24, 2025. https://enb.iisd.org/events/unfccc-cop-3/summary-report-1-11-december-1997, 1997.
[58] ENB, Summary report, 26 November – 8 December 2012: Doha Climate Change Conference, Retrieved September 24, 2025. https://enb.iisd.org/doha-climate-change-conference-cop18/summary-report, 2012.
[59] ENB, Summary Report, 29 November – 11 December 2010: Cancún Climate Change Conference, 2010. Retrieved September 24, 2025, https://enb.iisd.org/cancun-climate-change-conference-cop16/summary-report.
[60] ENB, Summary report, 29 November – 13 December 2015: Paris Climate Change Conference, 2015. Retrieved September 24, 2025, https://enb.iisd.org/paris-climate-change-conference-cop21/summary-report.
[61] V. Johansson, Just transition as an evolving concept in international climate law, J. Environ. Law 35 (2) (2023) 229–249, https://doi.org/10.1093/jel/eqad017.
[62] United Nations Framework Convention on Climate Change (UNFCCC), Paris Agreement, Retrieved September 24, 2025, https://unfccc.int/files/meetings/paris_nov_2015/application/pdf/paris_agreement_english_.pdf, 2015.
[63] A. Neslen, India unveils global solar alliance of 120 countries at Paris climate summit, The Guardian. (2015). Retrieved May 8, 2025, https://www.theguardian.com/environment/2015/nov/30/india-set-to-unveil-global-solar-alliance-of-120-countries-at-paris-climate-summit.
[64] UNFCCC, The Glasgow Climate Pact – Key Outcomes from COP26, Retrieved September 24, 2025, https://unfccc.int/process-and-meetings/the-paris-agreement/the-glasgow-climate-pact-key-outcomes-from-cop26, 2021.
[65] ENB, Summary Report, 31 October – 13 November 2021: Glasgow Climate Change Conference, 2021. Retrieved September 24, 2025, https://enb.iisd.org/glasgow-climate-change-conference-cop26/summary-report.
[66] ENB, Summary Report, 30 November – 13 December 2023: UN Climate Change Conference – United Arab Emirates, 2023. Retrieved September 24, 2025, https://enb.iisd.org/united-arab-emirates-climate-change-conference-cop28-summary.
[67] UNFCCC, Summary of Global Climate Action at COP 28, Retrieved September 24, 2025, https://unfccc.int/sites/default/files/resource/Summary_GCA_COP28.pdf, 2023.
[68] K. Morgan, M. Cheong, S. Bedingfield, "Power to the people!": Social media discourse on regional energy issues in Australia, Australas. J. Inf. Syst. 22 (2018), https://doi.org/10.3127/ajis.v22i0.1678.
[69] E.K. Özyirmidokuz, O.F. Aydinm, E.A. Stoica, Whose voices shape Turkey's nuclear discourse? A social media sentiment study of digital environmental activism, Energy Res. Soc. Sci. 131 (2026) 104497, https://doi.org/10.1016/j.erss.2025.104497.
[70] J. Corbett, B.T.R. Savarimuthu, From tweets to insights: A social media analysis of the emotion discourse of sustainable energy in the United States, Energy Res. Soc. Sci. 89 (2022) 102515, https://doi.org/10.1016/j.erss.2022.102515.
[71] R. Neubauer, N. N. Graham, H. Krobath, Defending "Canadian energy": connective leadership and extractive populism on Canadian Facebook, Environ. Commun. 17 (6) (2023) 634–652, https://doi.org/10.1080/17524032.2023.2235919.
[72] Y. Si., D. Desai, D. Bozhilova, S. Puffer, J.C. Stephens, Fossil fuel companies' climate communication strategies: industry messaging on renewables and natural gas, Energy Res. Soc. Sci. 98 (2023) 103028, https://doi.org/10.1016/j.erss.2023.103028.
[73] L.J. MacDowall, P. de Souza, "I'd Double Tap That!": Street art, graffiti, and Instagram research, Media Cult. Soc. 40 (1) (2018) 3–22, https://doi.org/10.1177/0163443717703793.
[74] D. Jaramillo-Dent, A.M.A. Pérez-Rodríguez, #Migrantcaravan: The border wall and the establishment of otherness on Instagram, New Media Soc. 23 (1) (2021) 121–141, https://doi.org/10.1177/1461444819894241.
[75] C. Karsgaard, M. MacDonald, Picturing the pipeline: Mapping settler colonialism on Instagram, New Media Soc. 22 (7) (2020) 1206–1226, https://doi.org/10.1177/1461444820912541.
[76] Koop-Monteiro, Y., M. Shakespear, M.C.J. Stoddart, D.B. Tindall, and A. Jorgenson. Under review (*Mobilization*). Climate Activism, Social Media And Political Opportunity: Instagram Climate Communication at COP26 and COP28.
[77] P. Leifeld, Policy debates and discourse network analysis: A research agenda, Polit. Govern. 8 (2) (2020) 180–183, https://doi.org/10.17645/pag.v8i2.3249.
[78] A. Barrat, M. Barthélemy, R. Pastor-Satorras, A. Vespignani, The architecture of complex weighted networks, Proc. Natl. Acad. Sci. 101 (11) (2004) 3747–3752, https://doi.org/10.1073/pnas.0400087101.
[79] L.C. Freeman, Centrality in social networks conceptual clarification, Soc. Networks 1 (3) (1978) 215–239, https://doi.org/10.1016/0378-8733(78)90021-7.
[80] A. Nerghes, I. Hellsten, P. Groenewegen, A toxic crisis: Metaphorizing the financial crisis, Int. J. Commun. 9 (2015) 106–132.
[81] R. Benford, D.A. Snow, Framing processes and social movements: An overview and assessment, Annu. Rev. Sociol. 26 (2000) 611–639. https://www.jstor.org/stable/223459.

[82] A. Ghaziani, D. Baldassari, Cultural anchors and the organisation of differences: A multi-method analysis of LGBT marches on Washington, Am. Sociol. Rev. 76 (2) (2011) 179–206, https://doi.org/10.1177/0003122411401252.
[83] White House, The All-of-the-Above Energy Strategy as a Path to Sustainable Economic Growth, Retrieved September 19, 2025, https://obamawhitehouse.archives.gov/sites/default/files/docs/aota_energy_strategy_as_a_path_to_sustainable_economic_growth.pdf, 2014.
[84] P. Magtulis, N. Groom, J. Renshaw, M. Warburton, Biden's oil boom: How fossil fuels thrived despite the White House's climate policies, Reuters (2024). Retrieved September 19, 2025, https://www.reuters.com/graphics/USA-BIDEN/OIL/lgpdngrgkpo/.
[85] European Commission, REPowerEU: Affordable, Secure and Sustainable Energy for Europe, Retrieved September 19, 2025, https://commission.europa.eu/topics/energy/repowereu_en, 2022.
[86] IEA, Russia's War on Ukraine: Analysing the Impacts on Energy Markets and Energy Security, Retrieved September 19, 2025, https://www.iea.org/topics/russias-war-on-ukraine, 2025.
[87] A.C. Luschini, E.E. Rego, N. Montebello, How did the Russia-Ukraine war impact energy imports and electricity generation? A comparative analysis between Germany and the United Kingdom, Electr. J. 37 (3) (2024) 107396, https://doi.org/10.1016/j.tej.2024.107396.
[88] J.I. Allan, J. Hadden, Exploring the framing power of NGOs in global climate politics, Environ. Polit. 26 (4) (2017) 600–620, https://doi.org/10.1080/09644016.2017.1319017.
[89] F.G.N. Li, S. Pye, Uncertainty, politics, and technology: Expert perceptions on energy transitions in the United Kingdom, Energy Res. Soc. Sci. 37 (2018) 122–132, https://doi.org/10.1016/j.erss.2017.10.003.
[90] S. Avila, Environmental justice and the expanding geography of wind power conflicts, Sustain. Sci. 13 (2018) 599–616, https://doi.org/10.1007/s11625-018-0547-4.
[91] S. Batel, P. Devine-Wright, Energy colonialism and the role of the global in local responses to new energy infrastructures in the UK: A critical and exploratory empirical analysis, Antipode 49 (1) (2017) 3–22, https://doi.org/10.1111/anti.12261.
[92] S. Batel, S. Küpers, Politicizing hydroelectric power plants in Portugal: Spatio-temporal injustices and psychosocial impacts of renewable energy colonialism in the Global North, Globalizations 20 (6) (2022) 887–906, https://doi.org/10.1080/14747731.2022.2070110.
[93] V.C. Broto, Innovation territories and energy transitions: Energy, water and modernity in Spain, 1939-1975, J. Environ. Policy Plan. 18 (5) (2016) 712–729, https://doi.org/10.1080/1523908X.2015.1075195.
[94] N. Klein, On Fire: The Burning Case for a Green New Deal, Knopf Canada, Toronto, 2019.
[95] J. Loginova, M. Landauer, J. Joona, R. Datta, T. Joona, Enabling Indigenous-centred decision-making for a just energy transition? Lessons from community consultation and consent in the circumpolar Arctic, Energy Res. Soc. Sci. 120 (2025) 103928, https://doi.org/10.1016/j.erss.2025.103928.
[96] D. McCauley, R. Heffron, M. Pavlenko, R. R. Rehner, R. Holmes, Energy justice in the Arctic: Implications for energy infrastructural development in the Arctic, Energy Res. Soc. Sci. 16 (2016) 141–146, https://doi.org/10.1016/j.erss.2016.03.019.
[97] J. Murphy, A. Smith, Understanding transition–periphery dynamics: renewable energy in the highlands and islands of Scotland, Environ. Plan. A Econ. Space 45 (3) (2013) 691–709, https://doi.org/10.1068/a45190.
[98] R.C. Sayan, Urban/rural division in environmental justice frameworks: Revealing modernity-urbanization nexus in Turkey's small-scale hydropower development, Local Environ. 22 (12) (2017) 1510–1525, https://doi.org/10.1080/13549839.2017.1368465.
[99] C. Zografos, J. Martínez-Alier, The politics of landscape value: a case study of wind farm conflict in rural Catalonia, Environ. Plann. A Econ. Space 41 (7) (2009) 1726–1744, https://doi.org/10.1068/a41208.
[100] R.S. Nilson, R.C. Stedman, Are big and small solar separate things? The importance of scale in public support for solar energy development in upstate New York, Energy Res. Soc. Sci. 86 (2022) 102449, https://doi.org/10.1016/j.erss.2021.102449.
[101] L. Baker, P. Newell, J. Phillips, The political economy of energy transitions: The case of South Africa, New Polit. Econ. 19 (6) (2014) 791–818, https://doi.org/10.1080/13563467.2013.849674.
[102] W.K. Carroll, Refusing Ecocide: From Fossil Capitalism to a Liveable World, Routledge, 2025.
[103] W.K. Carroll, N. Graham, M. Shakespear, Foundations, ENGOs, clean growth networks and the integral state, Can. J. Sociol. 45 (2) (2020) 109–142.
[104] W.K. Carroll, N. Graham, M. Shakespear, Mapping the environmental field: Networks of foundations, ENGOs and think tanks, Can. Rev. Sociol. 58 (3) (2021) 284–305, https://doi.org/10.1111/cars.12349.
[105] M. Shakespear, Renewed power to the people? The political ecology of Canadian energy transitions. MA thesis: University of Victoria. http://hdl.handle.net/1828/12097, 2020.
[106] J.M. Klinger, Rare Earth Frontiers: From Terrestrial Subsoils to Lunar Landscapes, Cornell University Press, Ithaca, NY, 2017. https://www.jstor.org/stable/10.7591/j.ctt1w0dd6d.
[107] D. Mulvaney, Solar Power: Innovation, Sustainability, and Environmental Justice, University of California Press, Berkeley, 2019, https://doi.org/10.2307/j.ctvd1c6zh.
[108] M. Shakespear, Renewable energy as a panacea? Examining ecological modernization and ecologically unequal exchange processes in global wind and solar power systems. Undergraduate Thesis: University of Guelph. http://hdl.handle.net/10214/13535, 2018.
[109] A. Roosvall, M. Tegelberg, Media and transnational climate justice: Indigenous activism and climate politics, Peter Lang, New York, 2018.