HYDROPOWER IN THE NEWS: A QUALITATIVE CONTENT ANALYSIS OF US HYDROPOWER IN NEWSPAPERS

By

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ABSTRACT

Despite hydropower's long and significant history within the US energy system, past research has neglected to examine the ways in which news media have reported the history of that energy sector. The present study offers a qualitative content analysis of news articles covering the development of domestic hydropower in two major national newspapers, the New York Times and the Los Angeles Times, from 1923 to 2022. Hydropower experienced a significant rise and fall in significance within the American energy sector, going from accounting for 40% of electrical generation in the country in 1940, to just 6.3% of total U.S. utility-scale electricity generation in 2021. The research illustrates how these newspapers have covered the rise and fall of hydropower's significance through an energy justice framework. It highlights how the way media have presented news about hydropower has changed over time, and how different aspects of the energy justice principles became more apparent over time through that transformation. The findings suggest that reporting on the energy system positions different energy sources, in particular coal and hydropower, as both complements to and in competition with each other within the larger energy system, reflecting the complexity of reporting on systems at different levels. In addition, there has been a transformation in the content of the news articles around hydropower over time, showing that at the beginning the main concern was availability of energy, but over time other energy justice principles, such as sustainability and responsibility, emerged as priorities. Finally, I found that narratives of progress in the West Coast were uniquely used to connect hydropower to the foundational identity of the region. The implications of this research go beyond hydropower— offering important lessons for other energy sources on how energy justice and media coverage impacts energy development and community acceptance of a given energy system.

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INTRODUCTION

Hydropower has a long history dating back to the 1880s in the United States as an energy source. The boom for hydropower dam construction in the United States was between the 1920s and 40s during which time hydropower more than tripled capacity and grew to account for 40% of the country's electrical generation (U.S. Department of Energy, n.d.). Since the 1970s it has been in a period of decline (Bauer, 2020). In 2019, annual hydropower generation was exceeded by wind generation, and as of 2021, it accounts for just 6.3% of total U.S. utility-scale electricity generation (U.S. Energy Information Administration, 2022). However, in March of 2023, the Biden-Harris Administration announced an investment of upwards of $200 million to modernize and expand hydropower in the country (U.S. Department of Energy, 2023). This infrastructure investment is "focused on maintaining and enhancing hydroelectric facilities to ensure generators continue to provide clean power, while improving dam safety and reducing environmental impacts" (U.S. Department of Energy, 2023). At the same time, according to the International Energy Agency (IEA), hydropower plays a key role in contemporary renewable energy transition policies as "an essential foundation for transitions" in part because it plays a load-balancing role compared to intermittent renewable energy sources such as solar and wind (IEA, 2021). Hydropower has been touted as a key to the green energy transition because it is seen as "clean" and can play this load-balancing role, prompting these ongoing federal investments. This historic recommitment to hydropower comes at a time when domestic hydropower is in decline, with aging technologies and infrastructure (O'Connor et al., 2015), historic drought that calls into question longstanding water rights agreements (Flavelle, 2023), evidence of how hydropower negatively impacts river flows and biodiversity, and an increasing body of literature that questions its standing as a 'clean' energy (Almeida et al., 2019; de Sousa Brandão et al., 2019; Moran et al., 2018.

The way media portrays news may shape public opinion and influence policy around a particular subject. Newspapers and television are conveyers of information about scientific developments, energy systems and technologies, and play a part in constructing public understanding of a system (Thompson 2005). The news media plays an important role in understanding the nuances in hydropower's current standing in the American energy sector, both by constructing

narratives through public information dissemination and reflecting public sentiment about hydropower. This media representation is not static, and the changes in narrative over time highlight our evolving understanding of hydropower as a technology. Despite this interesting intersection and its history of expansion and decline, a comprehensive analysis of how national newspapers portrayed domestic hydropower has not been done, and this thesis intends to fill this gap by conducting a qualitative content analysis of news articles covering the development of domestic hydropower in two major national newspapers, the New York Times and the Los Angeles Times, from 1923 to 2022. This study will fill a gap not only for the United States by examining shifts in narrative over time but also internationally since only a handful of studies have done a content analysis of news about hydropower (Mourao et al., 2022; Wu et al., 2017). Additionally, this study aims to bring an energy justice lens to analysis of energy media narratives.

Research on renewable energy media coverage has been conducted in other countries and content analysis of American news coverage of energy types is not new (Pelkonen & Tapaninen, 2012). This approach has been applied to a variety of energy source coverage in the US such as fracking, biofuel, wind, and solar, among others (Berardo et al. 2020; Cunningham 2019; Gearhart et al. 2019; Kim et al. 2014). However, not only is hydropower missing from this type of analysis, but in general, so are more established energy generation sources like coal. Recent research shows how media in the Global South has carefully curated the narratives around hydropower to encourage the current boom in development. Two studies have done longitudinal analyses of the way newspapers portray hydropower (Mourao et al., 2022; Wu et al., 2017). Mourao et al. (2022), found based on a content analysis of new articles published in Brazilian newspapers (67% of the energy in Brazil comes from hydropower) from 1997 to 2020, that media favorably portray the discourse of the government and of construction companies, and avoids topics such as risks or negative impacts caused by dams (Mourao et al., 2022). Wu et al (2017) studied the news published in eight newspapers in the U.S., UK, Singapore, and Australia about the construction of the Three Gorges Dam in China over the period 1982- 2015, finding that coverage focused on social and environmental topics, and tended to have a negative tone. In contrast, however, in the United States, we do not have a clear picture of how

media are talking about hydropower. Various studies have examined the evolution of policy and regulatory licensing processes for hydropower over the 20th century, and have found an increased focus on risks and impacts, over time, which led to a decrease in large-scale hydropower construction (Amos, 2014; Bauer, 2020; Cecala & Endres, 2019;).

As a theoretical framework, energy justice allows for a wholistic examination of the energy system (McCauley et al., 2013; Heffron & McCauley, 2017). Applying an energy justice lens to energy news media offers insights into the evolution of societal understandings of energy impacts and acceptance or rejection of these impacts, as well as of social priorities.

This qualitative content analysis of hydropower news articles in two major American newspapers from 1923 to 2022, a period over which domestic hydropower experienced a rise and fall in its social acceptance, has two purposes. First, it describes the topics of coverage surrounding domestic hydropower in US news media to better understand the history of hydropower and of the American energy system. Specifically, by focusing on a long-time span of analysis this work seeks to address the evolution of topics covered. The second purpose is to look at the transformation of the systems through the lens of energy justice principles. The energy justice framework offers insights into how environmental justice concerns came to be represented in the context of energy.

This research aims to fill gaps in our historical understanding of hydropower by addressing the following research questions:

> RQ1: How have mainstream American newspapers covered hydropower in the US over time and are there differences between The New York Times and The Los Angeles Times in this coverage?
>
> RQ2: How has news coverage of hydropower transformed and represented energy justice principles over time?

This thesis contributes to our understanding of how hydropower has existed in the American popular imaginary. Part of what we learn is that American hydropower has always stood at the intersection of competing narratives around energy, justice, and the environment. Furthermore, that it is unique because it can stand at many opposing sides of the same issue at once- it runs on what is both an abundant, renewable resource and a precious, evaporating one, it is both a

cheap energy that expanded rural access to electricity and the cause of ongoing harmful displacement of marginalized peoples, it is at once ‘clean’ and not ‘clean’. These contradictions are all a part of the evolving media narratives of hydropower tracked over time and provide insight into the intricacies of the American energy system, development policies, and justice priorities.

This thesis takes the following format, first in section 2 I present a brief history of American hydropower to situate the larger political and social context, then in section 3, I provide a literature review of similar content analyses of news around American energy, and section 4 contains the theoretical framework of energy justice. Section 5 presents the methods and section 6 of this document contains the results. Section 7 is a three-part discussion which expands on findings that represent larger themes in coverage. Lastly, I end with a conclusion in section 8.

A BRIEF HISTORY OF HYDROPOWER IN THE UNITED STATES

Period of Expansion

Hydropower turbine technology can be traced back to as early as the mid-1700s in France, with roots in water irrigation and grain mills that used simple mechanisms to harness the momentum from water (U.S. Department of Energy, n.d.; Warren, 2013). The first instance of water turbine technology being used for electricity generation in the United States was in 1880 in Grand Rapids, Michigan (U.S. Department of Energy, n.d.; Warren, 2013). In 1882, the first hydropower plant began operation in the United States in California (Warren, 2013). By 1893, advances in alternating current technology allowed the first commercial installation of a hydropower plant in the country (U.S. Department of Energy, n.d.). After this, hydropower dams were being built with the sole purpose of generating electricity as opposed to former versions that also functioned as grain mills (Warren, 2013; Bauer, 2020). Small and medium-sized hydropower dams were built with greater frequency in the next 50 years from about 1880 to 1930 (Bauer, 2020). The US Department of Energy defines small hydroelectric power plants "as projects that generate between 100 kilowatts and 10 MW" and large hydropower facilities as those "that have a capacity of more than 30 megawatts (MW)" with a mid-range existing between those parameters (U.S. Department of Energy, n.d.). However, the plants built during this time were usually limited in their capacity to store river flow and thus had only a limited capacity to generate energy for the region where they were built (Bauer, 2020).

By the early 1900s, hydropower accounted for more than 40% of the total supply of electricity in the country (Warren, 2013). Hydropower played an important part in the formative decades of electric power development and its influence only increased in the sector throughout the 1920s and 30s (Moran et al., 2018; Bauer, 2020). By the 1920s, most American cities were electrified, and by 1930, nearly nine in 10 urban households had access to electricity (Sablik, 2020). However, rural electrification lagged and went on to spur infrastructure efforts under the New Deal such as the Tennessee Valley Authority (Bauer, 2020; Sablik, 2020).

The first federal policy to specifically regulate hydropower at a national level emerged in 1920 with the Federal Water Power Act (FWPA) that regulated hydropower dam development; before which, licenses for dam construction were controlled at a state level (Cecala & Endres, 2019;

Hooker, 2014; Warren, 2013). This act sought to coordinate and encourage hydropower dam development at a national level (Federal Water Power Act, 1920; Amos, 2014). The FWPA also included provisions for other uses of rivers besides power, such as recreation and aesthetic, even going so far as to include an amendment in 1921 prohibiting hydropower projects in national parks and monuments without express authorization from the newly created Federal Power Commission (FPC) (Hooker, 2014). Under this act, the FPC was created to license hydropower dam construction and to oversee regulation (Federal Water Power Act, 1920; Hooker, 2014). At a national level construction was starting to be seen as detrimental to the aesthetics of the river, as well as disruptive to public uses of water, such as for recreational value (Hooker, 2014). Regionally, there were also concerns around the impacts of hydropower on fish populations, especially to the salmon fishing industries of the West Coast (Neuberger, 1937). Though small and medium sized dam construction continued throughout this time, interest in preserving the value of natural settings for the public grew, which started to exacerbate tensions between public and private usage of water (Hooker, 2014).

In 1931, construction of the Hoover Dam began on the Colorado River—at that time, it was the world's first large, multi-purpose dam and storage reservoir (Bauer, 2020; Warren, 2013). The Hoover Dam would go on to generate an average of 4 billion kwh of electricity annually and remains one of the most famous hydroelectric projects in the world (U.S. Department of Energy, n.d.; Warren, 2013). Throughout and after the 1930s there was a boom in development as the federal government built hundreds of large dams (Bauer, 2020; Moran et al, 2018). Even so, throughout this time hydropower slipped in relative importance as other parts of the energy sector, such as coal, grew in prominence at a faster rate (Bauer, 2020). In 1935, the Federal Water Power Act was amended and renamed the Federal Power Act (FPA) and was given more powers beyond federal dam regulation to govern the construction and regulation of all non-federal hydroelectric projects, especially small and medium sized dams (Cecala & Endres, 2019; Federal Power Act, 1935). Under this amendment, all non-federal dams proposed, required a license to operate with a term of 50 years or less, which is the estimated 'lifespan' of a dam before retrofitting is needed (Cecala & Endres, 2019; Federal Power Act, 1935; Poff & Hart, 2002; Skillen, 2015). The amendment also included existing dams, for that reason those also had

to apply for a license to continue operation.

Beginning in 1933 New Deal policies sped up and prioritized large-scale water development, this in combination with wartime industrial efforts during World War Two, that required a lot of electricity to meet increased production demands, led to a rapid spread of hydropower projects across the country throughout the 1940s and 50s (Bauer, 2020; Cohn et al., 2020; U.S. Department of Energy, n.d.). As a part of New Deal policies, hydropower was instrumental in providing electricity to rural parts of the country (Bauer, 2020). After the war ended in 1945, regional power grids across the US expanded while generation capacity continued to grow (Bauer, 2020; Cohn et al., 2020). This push greatly expanded the reach of the Federal government in the electricity sector, though privately-owned electricity generation still made up the dominant part of the sector (Bauer, 2020). National hydropower generating capacity grew 5% per year from 1945 to the early 1970s under this mixed private and public power system (Bauer, 2020; Warren, 2013). This was especially driven by intensive hydropower development in the Western US (Teisch, 2001). However, proportionally, hydropower's contribution to the energy sector continued to decline, going from making up 35% of the total energy sector in 1946 to only 16% in 1970, while fossil fuels and nuclear power quickly expanded their reach and influence (see Figure 1) (Bauer, 2020). This was due to the rapid expansion of fossil fuels and nuclear energy, which dwarfed hydropower expansion at the time. A steady decline in new construction through to 1990, and a proportional increase in other energy sources, left hydropower's share of the total energy sector at about 10%, around which it hovers today (Bauer, 2020). Today, nearly 70% of hydropower dams in North America are 40 years or older (see Figure 2 for a current national map of hydropower projects), and hydropower proponents are making significant pushes for major refurbishment projects to increase efficiency (IEA, 2021). The primary argument to maintain and expand American hydropower capacity currently focuses on the role it can play in grid flexibility and reliability, and energy storage for renewables (IEA, 2021). Even so, significant social and policy barriers exist that make it highly unlikely that hydropower will regain proportional prominence in the energy system, with other renewables already overtaking it within the American energy mix (IEA, 2021; U.S. Department of Energy, n.d.).

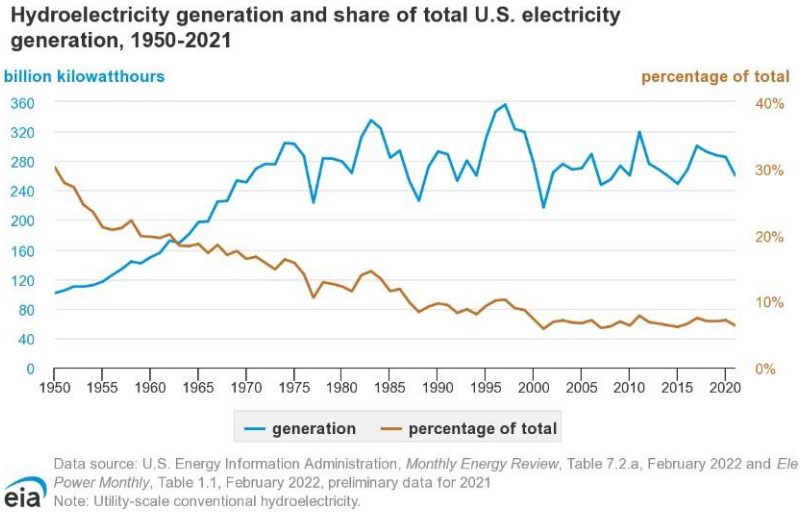


Figure 1 Hydroelectricity generation and share of total US electricity generation (1950-2021)

Figure 2 National Map of Hydropower Projects in 2020 by the Oakridge National Laboratory

(Samu et al., 2020)

Period of Contraction, Dismantling, and Contention for Water Usage

The release of Rachel Carson's *Silent Spring* in 1962 was highly influential in the American environmental movement, as it has been credited with increasing concern about the environment in the US, helping to give the grassroots movement mainstream traction (Kuzmiak, 1991; US Fish and Wildlife Service, n.d.). Anti-dam movements were already underway at the time, with a notable case in 1956 when the Sierra Club effectively lobbied Congress to block the construction of the Echo Park Dam at the Dinosaur National Monument in Utah (Harvey, 1995). This growing movement in the 1960s and 70s, coupled with the boom of dam construction in the preceding years, led to increased public scrutiny of hydropower dams as the public became more skeptical of the ecosystem tradeoffs for this energy source (Bauer, 2020; Cecala & Endres, 2019; Mayeda & Boyd, 2020). Under this scrutiny and the emergence of anti-dam campaigns to promote government action, greater attention was brought to the social and environmental impacts of hydropower dams in their construction and operation (Cecala & Endres, 2019). Also of note, in 1966, the National Historic Preservation Act was passed giving every state and US territory a State Historic Preservation Office with the power to determine and protect historically and culturally valuable areas and resources (Aldrovandi et al., 2021). These offices conduct comprehensive historical and cultural surveys and carefully consider the impacts that large renewable energy projects might have on those sites (Aldrovandi et al., 2021). Thus, the larger cultural impacts of hydropower were coming into focus at this time, as well as the environmental concerns.

As part of the federal response to the growing environmental movement, The National Wild and Scenic Rivers System Act was passed in 1968 to preserve certain rivers with great natural, cultural, and recreational value, and the National Environmental Policy Act (NEPA) was introduced in 1969 (Amos, 2014; Cecala & Endres, 2019; rivers.gov, n.d.; Song et al., 2018). NEPA marked a shift away from project-oriented federal policies, towards national environmental policies, as it required environmental impacts assessments (EIAs) and evaluations of the social and economic impacts of a project to be conducted prior to approval (Cecala & Endres, 2019;

Uría-Martínez et al., 2020). Formerly, the licensing process through the FPA was opaque and had a track record of issuing licenses to the detriment of ecosystems and people despite provisions that were meant to protect those aspects (Hooker, 2014). An important aspect of NEPA, and of EIAs, is that it ensures public scrutiny of projects by requiring detailed statements of the environmental impacts of all federal action to be publicly documented (Warren, 2013). This was not explicitly provisioned for in previous legislation around hydropower, and it became an important tool for opposition as public opinion of hydropower was beginning to sour (Cecala & Endres, 2019). In 1974, The Energy Supply and Environmental Coordination Act was introduced in the first attempt to consider energy needs in balance with environmental concerns such as air pollution (The Energy Supply and Environmental Coordination Act, 1974), and even though this did not impact hydropower directly—as opposed to coal—it is the first instance where we see the generation of energy being explicitly linked to environmental concerns. In addition, the Federal Energy Regulatory Commission (FERC) was created in 1977 as a replacement for the FPC, to regulate energy pricing (Amos, 2014; Hooker, 2014).

After a series of oil shortages throughout the 1970s spurred by conflict in the Middle East that made the US's dependence on foreign oil very apparent, Congress enacted the Public Utility Regulatory Policies Act (PURPA) in 1978 (Amos, 2014; Cecala & Endres, 2019). PURPA was enacted, in part, to increase domestic energy production and energy supply to be less susceptible to further energy shocks (Amos, 2014). PURPA caused a brief boost in hydropower dam construction in the 1980s and it included provisions exempting small-scale hydropower development from FERC regulation which incentivized private development (Bauer, 2020; Warren, 2013). This ended up leading to greater deregulation in the energy sector which had wide-reaching implications for the private electricity sector (Bauer, 2020). In a regulated energy market, a utility owns and operates electricity generation or purchasing and distribution (EPA, 2022). So, in a deregulated market, utilities are only responsible for grid interconnections and billing users, which is meant to increase competition by allowing retail electricity suppliers to buy and sell electricity to consumers (EPA, 2022). Concurrently, in 1978, the Supreme Court stopped the construction of the Tellico Dam, in the case *Tennessee Valley Authority vs* Hill, by invoking the Endangered Species Act (ESA), upholding the rights of an endangered species over

the argument for expansion (U.S. Department of Justice, 2015). However, in response to this decision, in 1979 Congress amended the ESA in order to allow an exemption for the Tellico Dam (U.S. Department of Justice, 2015). This case demonstrates the complex relationship the US has with dam projects, because although the Tennessee Valley Authority is considered a model of rural electrification project that is credited with modernizing the Tennessee Valley, it has also been criticized for its wide-reaching use of eminent domain and for displacing residents (McDonald & Muldowny, 2001). Though many small hydropower projects were built during this time in the 1980s, the total energy generation capacity was small, and many applications for small-scale hydropower were rejected or abandoned due to licensing requirements (Hooker, 2014). It became clear that the tides of public opinion had irreversibly turned against hydropower and dams in the United States (Hooker, 2014; Warren, 2013).

Since the 1970s, in response to social opposition and rising costs of upkeep, dams have been decommissioned in increasing numbers oftentimes "because they have become unsafe or inefficient, or otherwise outlived their usefulness" (O'Connor et al., 2015, p 496). This social opposition was fueled by the more widespread understanding of the environmental impacts of dams and the costs of population displacement at a local level (Cecala & Endres, 2019; Mayeda & Boyd, 2020).

As social opposition towards new dam construction continued to grow, and partially as a response to the dam construction encouraged under PURPA, Congress enacted the Electric Consumers Protection Act (ECPA) in 1986 (Hooker, 2014; Song et al., 2018; Warren, 2013). This amendment to the FPA added environmental protection provisions, requiring the FERC to ensure that projects included considerations for fish and wildlife (Hooker, 2014). As well, the ECPA required the FERC to consider recommendations of federal and state agencies as well as Native tribes in affected areas (Cecala & Endres, 2019; Hooker, 2014; Uría-Martínez et al., 2020). Though it allowed more public scrutiny and required a more holistic consideration in the licensing process, it was slow to take effect (Cecala & Endres, 2019). This amended FPA set the stage for dam decommission and removal in the US and in 1994, the FERC issued a policy statement that required projects that were not relicensed after the expiration of their original 50-year licenses, to be decommissioned (Amos, 2014; Uría-Martínez et al., 2020). Re-licensing a

dam is often an expensive and difficult process, as there are extensive requirements to keep old dams up to date with environmental regulations. The licensing process for dams can be long and expensive, with FERC taking longer on more complex projects- the process can take upwards of six years. In addition, projects that are seeking relicensing that received their original license before the passage of NEPA require even more extensive review to comply with environmental requirements (Aldrovandi et al., 2021; FERC, 2023). The FPA offers little guidance on how to decommission a dam, putting the financial burden on private operators who do not always consider this cost in advance, leading to potentially risky practices in the decommissioning process (Amos, 2014; Cecala & Endres, 2019). The cost of repairing a small dam to be relicensed can be steep compared to decommissioning it and both fall entirely on the dam operator. There continue to be advances in the criteria for determining dam monitoring and relicensing guided by numerical and physical modeling which has important implications for the licensing and decommissioning process going forward (O'Connor et al., 2015; Song, 2020). Since 2006 more than 60 dams per year are being removed in the US, though most of those removed have been no more than 5 meters tall (see Figure 3 for a map of dams dismantled per State in the US) (Moran et al., 2018; Skillen, 2015). Given the 50-year terms on licenses, this trend can be expected to continue, since as of 2011, 90% of hydropower projects were thirty-four or older (Warren, 2013). As well, the Western US, which accounts for 50% of the national total of hydropower plants, has run out of water supply to be dammed (Amos, 2014; Bauer, 2020; Taylor & Collette, 2020). This, in conjunction with increasingly severe effects of climate change, such as drought, has caused the region to shift towards projects that focus on water reallocation versus development (Amos, 2014; Taylor & Collette, 2020). This came to a head in California when in 2000 and 2001 the state faced rolling blackouts prompted by severe drought and a deregulated energy market (Smilinich & Dias, 2022). In the face of ongoing drought, these questions of water usage have exacerbated the need for conservation. These efforts aim to revisit existing allocations of water across Western states, with particular emphasis on where and how water from significant sources, like the Colorado River Basin, is being used across the region (Flavelle, 2023). This has led to signification tensions between states for water and has increased scrutiny of federal water regulation (Flavelle, 2023).

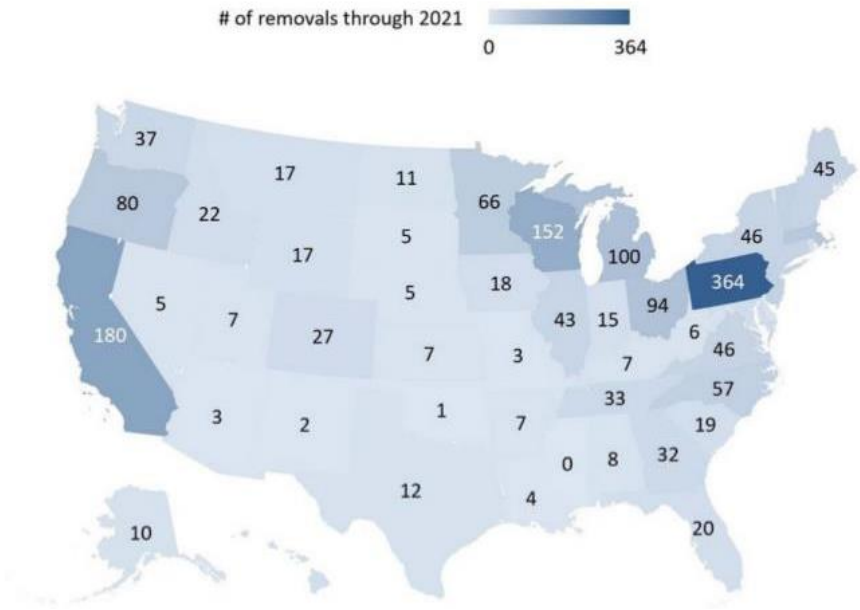


Figure 3 Map of number of dams removed by state from 1912 through 2021 by American Rivers

Examples of Recent Cases of Rejection in New England

Several proposed hydropower projects have been rejected in New England in recent years, however, the primary objections seem to revolve not around dam concerns, but primarily with issues with power lines. That is not to say that concerns around river damming are non-existent, only that the primary focus of these particular complaints reflects other concerns. In 2011, the Northern Pass project planned to run the lines carrying Canadian hydropower from Quebec to the New England power grid through New Hampshire with the Northern Pass proposal, which would require the construction of 192 miles of power lines (NHPR, 2019). The Northern pass faced fierce opposition state-wide, with opponents claiming that the jobs from the project would be temporary while the impact on the states' forestland would be irreparable- causing damage to both the tourism industry as well as to property values (NHPR, 2019). Though alternate routes were proposed, ultimately, permits were denied in 2018, and upheld by a court decision in 2019 (NHPR, 2019). The New England Clean Energy Connect (NECEC) project,

proposed in 2017, intended to transport Canadian hydropower through Maine in order to provide energy to Massachusetts (NECEC, n.d.). This project would lock in a 20-year contract and provide Massachusetts with 20% of its' electric power (Lohan, 2020; NECEC, n.d.). Initially, the 200 miles of transmission lines were proposed to cut through Maine in the Central Maine Power (CMP) corridor (Natural Resources Council of Maine, 2021). However, it would cut through Maine's North Woods, which caused intense public opposition due to the impacts that deforestation would have on both the aesthetic and ecology of the area (Uteuova, 2021). In response to this public push-back, an alternative was proposed to bury the lines (Uteuova, 2021). There was also considerable controversy around the lack of Indigenous input and ownership of the hydropower plants in Canada (Uteuova, 2021). Ultimately, after a contentious battle for votes, the CMP corridor was halted because of the successful passage of a law to terminate its' construction and therefore completion (Natural Resources Council of Maine, 2021). This issue of energy transportation—from where it can be produced, to where it can be consumed—is of course prevalent across forms of renewable energy and represents one of the central challenges of the transition to renewables. As hydropower faces many other challenges with regards to acceptance and regulation, transmission will continue to be a central concern for its' longevity in the US.

LITERATURE REVIEW: CONTENT ANALYSES OF US NEWS COVERAGE OF ENERGY

Several studies have looked at domestic news coverage in the US of different forms of energy such as fracking, nuclear, and renewable energies like solar and wind. These articles approach their analyses of news articles in a variety of ways to, for example, asses the agenda-setting function of energy reporting (Blair et al., 2015), analyze media narratives surrounding an energy type (Gearhart et al., 2019), and understand emergent topics in coverage (Cunningham, 2019). However, a gap remains for this type of media analysis among more established forms of energy such as coal and hydropower. This is perhaps because their longstanding status as energy producers makes them fade into the background of news coverage, but they are no less worthy of examination through this novel lens. Furthermore, it is exactly that longstanding status that can make them important areas of study. The existing studies on other energy generation provide valuable insights into the greater landscape of energy news in the US and point to broader themes in energy and climate coverage. The research that has looked at domestic news coverage of energy in the US reveals common topics in coverage, how these change over time, and regional differences in reporting that are often impacted by political affiliations of an outlet, public opinion in the region in which the outlet publishes, and economic dependence on that form of energy production in the region. These findings serve as a reference point not only to examine larger energy reporting trends, but also to help guide the development of my Categories Codebook.

Journalists reporting on energy both shape the topics of interest and are responding to public interest (Berardo et al. 2020; Blair et al., 2015; Hoffman & Slater, 2007; Nisbet, 2009;). Blair et al. (2016) asserts that “media portrayal of controversial natural resource issues, such as hydraulic fracturing, can influence public opinion and policymaking by emphasizing different benefits and the risks associated with an issue.” (p. 880). Many articles that examined energy reporting looked at how topics of coverage were used for an agenda-setting function, and how they were impacted by local contexts. Some topics of coverage that consistently came up in this literature

review include technical, economic, environmental, health and safety, political, and aesthetic or cultural (Cunningham, 2019; Delshad, 2017; Gearhart et al., 2019; Kim et al., 2014; Olive & Berardo et al., 2020; Stephens et al., 2009). These emergent topics are impacted by framing "defined as the selective highlighting of certain aspects, issues, or events that can foster connections and lead to the promotion of a certain evaluation, interpretation, or resolution" (Gearhart et al., 2019, p. 946). In their analysis of gas development coverage in the affected region of the Marcellus Shale in the Appalachian Bason, Evensen et al. (2014) conducted interviews with journalists covering fracking, that revealed that local interests, history, and current context heavily impacted reporting, both in what topics they covered, and how they covered them in order to best represent local public interest. Examining what topics of coverage emerge thus provides a powerful way to assess changes in public interest and opinion.

Among the previously stated topics that emerged, energy was consistently found to be covered as an environmental topic, (Gearhart et al., 2019; Kim et al., 2014; Olive & Delshad, 2017) with analyses finding stories focusing on the environmental impacts of energy projects (Cunningham, 2019), and potential risks (Berardo et al., 2020) as well as benefits the projects may have such as economic and health (Stephens et al., 2009). Stephens et al. (2009) found a steady increase in the frequency of newspaper articles about wind power as there was increased relevance and interest in renewable energy technologies after 2000 with this increased interest paralleling an increase in national awareness of climate change. However, looking at a longer timeframe, Gearhart et al. (2019) found in their longitudinal analysis of wind coverage that over time, the topics and the quantity of coverage on wind energy decreased after the initial novelty of wind wore off. Coverage of wind evolved from including wide ranging topics such as turbine technology and environmental impacts to a narrower focus on policy and economic issues as the quantity of coverage decreased (Gearhart et al. 2019). Perhaps contradictorily, this was during a time of historic investment and development in the wind industry, so as wind was rapidly expanding across the country, the reporting was found to lack the depth necessary to enhance public understanding (Gearhart et al., 2019). This demonstrates an evolution of interest over time both for the public and for journalists and their news outlets, as well as how regional newspaper coverage may differ from national TV coverage. It also shows the ways in which

topics can co-exist in articles as a journalist narrows down the scope of their reporting (DeVreese, 2005; Nisbet, 2009). These changes illustrate how coverage changed as familiarity increased, as the media treats an emerging energy technology differently than a familiar, better-established one.

Topics of coverage can serve as a means to assess the risks and benefits of an energy type, but often times these topics exist in competition with each other as they represent competing interests vis a vis the same energy source (Blair et al. 2016; DeVreese, 2005; Stephens et al., 2009). Coverage of fracking, for example, was found to focus on water quality, ecosystem and wildlife maintenance, and public health, with competing claims between economic benefits and environmental risks (Berardo et al., 2020; Evensen et al., 2014; Olive & Delshad, 2017). Ethanol is often talked about in terms of policy, instead of as a technological or economic topic, which Kim et al. (2014) posit is likely due to coverage of emerging legislation and regulation in the timeframe of analysis.

It is important to consider the ever-changing political landscape in the US as well, and how administration changes can impact policy approaches to energy and the reporting of these issues in the news (Schneider & Peeples, 2018). Schneider & Peeples (2018) for example, found that the Trump administration energy policy often referred to “energy dominance”, a departure from “energy independence” rhetoric from previous administrations to appeal to their conservative base. However, despite this intentional shift at the federal administration level, this shift in language was not necessarily reflected by larger reporting language changes because journalists felt the message was uninformed (Schneider & Peeples, 2018).

Consistently, longitudinal analyses found changes in energy coverage over time. Cunningham (2019) found that coverage of fracking became more industry-oriented and tended to cover controversy and community contamination less over time. Coverage of risk may lessen over time, especially when competing with economic benefits to communities and issues of energy independence (Berardo et al., 2020; Cunningham, 2019). Changes in coverage moving away from environmental and public health concerns and towards economic issues are consistent with findings by Berardo et al (2020) that found that environmental risks of fracking received a lot of attention, but heavily competed with coverage about economic opportunities and

benefits. It's important to note that since energy reporting has strong ties to climate change reporting, it is susceptible to some of the same downfalls such as false balance, private interest, and lack of nuanced coverage (Antilla, 2005; Lewandowsky, 2021). Less consistent news coverage of climate issues, and of energy as an environmental topic, has been found to inhibit the public's ability to hold governments and other actors accountable for their promises and actions (Karlsson-Vinkhuyzen et al., 2017). Furthermore, familiarity with climate change as a concept does not necessarily lead to more nuanced reporting or depth of knowledge for the public (Gearhart et al., 2019; Karlsson-Vinkhuyzen et al., 2017; Lewandowsky, 2021). Gearhart et al. (2019) found that over time, the scope of reporting on wind energy narrowed, lacked depth, and did not focus on issues that would enhance public understanding of the technology or the renewable energy landscape of the US. All together, these show that the quantity and quality of reporting often changes over time, with less variety of topics applied to reporting on an energy type and less attention given to technologies as they become more familiar.

These changes over time are also intersected by regional considerations and are often susceptible to local influences such as political leanings. Within this lies an important underlying question about the connection between economic incentives and what is published, especially in relation to the owners of news outlets and other actors with financial stake in an energy type. Kim et al. (2014) found that there were tonal shifts in coverage around ethanol that were regionally unique and dependent on how biofuels were impacting the local economy and energy prices. Similarly, Stephens et al. (2009) found that differences in regional topics and balance of coverage often mirrored regional concerns. These regional changes have also been found to focus on the more tangible aspects at a local level, such as how a proposed project might impact a community (Evensen et al., 2014; Berardo et al., 2020). Berardo et al. (2020), Olive & Deshad (2017), and Evensen et al. (2014) found that coverage of fracking was highly variable across states and regions, with economic benefits highlighted in pro-fracking regions while environmental and public health risks are more present in anti-fracking regions. Given the size of the United States, regional differences are to be expected and this regional context is important to consider in analysis. Regional political leaning, and the political leanings of the news outlet also have a strong impact on coverage (Berardo et al., 2020; Evensen et al., 2014;

Feldman et al., 2012; Kim et al., 2014; Schneider & Peeples, 2018; Wieble & Heikkila, 2016). Research has found differences in coverage of climate change topics based on political affiliation, such that it can fracture audiences along ideological lines (Feldman et al., 2012). Since energy is a topic that can be covered through an environmental lens, it is thus susceptible to these same divides and reception by audiences (Berardo et al., 2020; Evensen et al., 2014; Kim et al., 2014; Schneider & Peeples, 2018; Stephens et al., 2009).

THEORETICAL FRAMEWORK: ENERGY JUSTICE

The study of energy has historically been positioned as a technological and economic phenomenon, largely ignoring the social dimensions of energy (Miller et al., 2015; Sovacool, 2014). A central aspect of energy justice is the assumption that energy (from its generation to its consumption) has a foundational human element that makes it a complex social science problem (Sovacool, 2014; Sovacool & Dworkin, 2016). It is only more recently that calls for approaching energy as a larger socio-energy system have arisen (Miller et al., 2015; Sovacool, 2014). The Energy Justice Framework is "heavily indebted to theories of sociotechnical systems: interconnected, integrated systems that link social, economic, and political dynamics to the design and operation of technological systems" (Miller et al., 2015). This socio-energy systems framework allows us to approach energy through a social science lens and make policy recommendations (Miller et al., 2015). Thinking of energy as a larger system and recognizing the myriad ways that aspects of justice impact actors within the system lays the foundation upon which energy justice is conceived. I chose this framework to examine hydropower reporting because it allows for a holistic systems view of energy that includes different aspects of energy systems including its positive and negative externalities, but also how different actors are positively and negatively impacted in the system, while providing conceptual focus around my research questions. It also provides a lens through which to explore the transformations in the way the media presents news about hydropower over time, and how different aspects of the framework will become more apparent in the media over time as society demands more than just energy from the system (Bidwell & Sovacool, 2023).

A common definition has arisen across the literature in which energy justice is defined as "a global energy system that fairly disseminates both the benefits and costs of energy services, and one that contributes to more representative and impartial energy decision-making" (Sovacool et al., 2016). From the first academic consideration of energy justice, there has been an emphasis on practical application at a systems level (McCauley et al., 2013; Jenkins et al., 2016; Heffron & McCauley, 2017). Energy justice goes beyond being just an analytical or conceptual tool, it is also a decision-making tool that can assist energy planners at every level of the energy system (Heffron & McCauley, 2017; Sovacool et al., 2017). Bidwell & Sovacool (2023) argue that in the

process of a clean energy transition, tensions between different justice perspectives and desired degree of change have emerged. They give as an example the inherent tensions between the goal of transitioning our energy system towards renewables, thus keeping elements of the existing system, and the goal of fundamentally transforming the energy system around justice. Thus, the application of an energy justice lens does not necessarily entail a common agenda for decision-making.

The emergence of energy justice as a concept in academic literature is tied to a 2013 article by McCauley et al., in which three core tenets are presented as the foundation for energy justice (Heffron & McCauley, 2017; Jenkins et al., 2016). They are heavily tied to Rawls' (p. 3, 1999) distributive justice, in which he conceives of justice as fairness:

> "Justice is the first virtue of social institutions, as truth is of systems of thought. A theory however elegant and economical, must be rejected if it is untrue; likewise, laws and institutions no matter how efficient and well-arranged, must be reformed or abolished if they are unjust. Each person possesses an inviolability founded on justice that even the welfare of society as a whole cannot override."

Energy justice has strong ties to environmental and climate justice, and is said to possess the same basic philosophies, but with a focus on energy access, policy, and systems (McCauley, 2013). Energy justice, then, was built initially around the three core tenets of distributional justice, procedural justice, and recognition justice "to address 'the unequal distribution of ills'...within the context of global and local pressures" (McCauley et al., 2013). Distributional justice is concerned with how benefits and burdens are distributed and the intersection of that distribution with various identities and circumstances such as race, income, and gender (McCauley et al., 2013; Jenkins et al., 2016; Sovacool et al., 2016). McCauley et al. (2013) claim that distributional justice manifests through the inherently spatial nature of energy siting and access. These energy projects bring along with them environmental hazards to those in physical proximity to an energy project, while the benefits of that same project can be reaped at a safe distance, resulting in the aforementioned 'unequal distribution of ills' (McCauley et al., 2013; Jenkins et al., 2016; Sovacool et al., 2016; Sovacool et al., 2017). Distributional justice is thus intertwined with procedural justice, which is concerned with access to decision-making

processes (Jenkins et al., 2016). In order to properly address concerns of distributional justice, communities and stakeholders must have equitable access to decision-making procedures in government and industry (McCauley et al., 2013). True procedural justice, and by extension distributional justice, also requires recognition justice which aims to have individuals from all backgrounds fairly represented and heard, beyond just tolerated, in decision-making spaces (McCauley et al., 2013; Jenkins et al., 2016; Sovacool et al., 2016; Sovacool et al., 2017). These three tenets work in tandem in allowing actors autonomy and decision-making power towards the goal of just implementation and access to energy. Thus, these three core tenets originally proposed for an energy justice framework support each other and extend their conceptions of justice throughout all facets of the energy system. More recently, Heffron and McCauley (2017) included restorative justice as an additional component to the framework, with the aim of repairing environmental and societal harm caused by energy projects. This addition demonstrates the aim of energy justice to address energy as a wholistic system.

As the concept of energy justice has evolved, those tenets laid out by McCauley were then expanded by Sovacool & Dworkin (2015) to encompass eight core principles: availability, affordability, due process, transparency and accountability, sustainability, intragenerational equity, intergenerational equity, and responsibility, which were later made ten with the addition of resistance and intersectionality (Heffron & McCauley, 2017; Sovacool et al., 2017) (see Table 1). Sovacool & Dworkin (2015) claim that these energy justice concepts can serve as a conceptual tool for philosophers, an analytical tool for researchers, and a decision-making tool for energy planners and consumers. They argue that these principles can help guide our understanding of the complex and expansive problems that define our modern-day energy system (Sovacool & Dworkin, 2015).

Table 1 The ten principles of Energy Justice. Adapted from Sovacool et al. (2017)

No.	Principle	Description
1	Availability	People deserve sufficient energy resources of high quality (suitable to meet their end uses)
2	Affordability	All people, including the poor, should pay no more than 10% of their income for energy services
3	Due process	Countries should respect the due process and human rights in their production and use of energy
4	Transparency and Accountability	All people should have access to high quality information about energy and the environment and fair, transparent, and accountable forms of energy decision-making
5	Sustainability	Energy resources should be depleted with consideration for savings, community development, and precaution
6	Intragenerational Equity	All people have a right to fairly access energy services
7	Intergenerational Equity	Future generations have a right to enjoy a good life undisturbed by the damage our energy systems inflict on the world today
8	Responsibility	All actors have a responsibility to protect the natural environment and minimize energy-related environmental threats
9	Resistance	Energy injustices must be actively, deliberately opposed
10	Intersectionality	Expanding the idea of recognitional justice to encapsulate new and evolving identities in modern societies, as well as acknowledging how the realization of energy justice is linked to other forms of justice e.g., socio-economic, political, and environmental

Availability encompasses both the ability of an energy system to produce and distribute energy, and investment in energy infrastructure to ensure that energy production and access can

remain consistent (Heffron & McCauley, 2017; Sovacool & Dworkin, 2015). Affordability is about maintaining energy prices accessible and consistent such that they don't over-burden consumers (Sovacool & Dworkin, 2015). Due process ensures respect for communities and the environment in the decision-making process for energy projects that might impact them (Sovacool et al., 2017). Transparency and accountability, also called good governance (Sovacool & Dworkin, 2015), insists on open and equal access to information so that actors in the energy system can be held accountable, which also helps ensure due process (Jenkins et al., 2016; Heffron & McCauley, 2017, Sovacool et al., 2017). Sustainability is about the use of natural resources and asks that energy project decision-makers make responsible choices to ensure the long-term viability of natural resources and to consider their impact on future generations (Sovacool et al., 2017). Directly related to distributive justice, intragenerational equity argues that all people should have a right to access the benefits of energy services, without unduly being burdened by the ills of their production (Jenkins et al., 2016; McCauley et al., 2013; Sovacool & Dworkin, 2015; Sovacool et al., 2017). Further expanding on distributive justice, intergenerational equity seeks to consider how benefits and burdens are distributed across time such that future generations can enjoy a good quality of life (McCauley et al., 2013; Sovacool & Dworkin, 2015). The last of the original eight principles is responsibility, which calls upon all actors to minimize negative externalities of energy production and distribution so to protect the environment and natural resources (Heffron & McCauley, 2017; Sovacool & Dworkin, 2015). All together, these eight principles fine-tune those core tenets laid out by McCauley et al. (2013), while still relying on the philosophical underpinnings of distributive, procedural, and recognition justice.

Recently, the shortcomings of the energy justice framework have been examined and expanded to better encompass restorative justice, non-western approaches to ethics, non-human concerns, and cross-scalar issues of justice (Sovacool et al., 2017). Sovacool et al. (2017) therefore propose the addition of two more principles: resistance and intersectionality. Resistance refers to the active opposition of injustice, which centers the importance of practice and invokes ideals of citizen and group resistance (Sovacool et al., 2017). This idea of citizen resistance and its ties to energy justice are debated in the literature, with Jenkins (2018)

claiming that energy justice is different from climate justice and environmental justice precisely because it has a “non-anti-establishment past”. However, the principle of intersectionality argues that energy justice does not exist in isolation from other relevant social issues, revealing a tension between whether or not energy justice has this “non-anti-establishment past” (Sovacool et al., 2017).

METHODS

Data Collection, Cleaning, and Sampling

I chose to look at two national circulation newspapers, the Los Angeles Times (LAT) and the New York Times (NYT), from 1923- 2022. These papers were chosen for their wide circulation, historically trusted journalistic reputations, regional diversity, and availability within the databases I had access to. In addition, given the size of the United States and the history of hydropower presented above, regional differences in coverage are to be expected and this regional context is important to consider in analysis.

Though my analysis is not focused on examining hydropower coverage at a granular regional level, I did keep in mind geographic diversity in my newspaper selection, opting for papers based on opposite coasts. I chose to use ProQuest as the database for my search because of the availability of articles within the timeframe of the analysis. The timeframe of analysis was chosen to encompass the rise and fall of hydropower development in the country, as detailed in earlier sections, and because sufficient newspaper data was available from both chosen newspapers. Most of the articles were available as scanned PDFs, which would go on to inform some of my coding decisions, outlined below.

With that in mind, based on my research questions, I began by testing different search terms in the ProQuest databases to see how many relevant results they rendered. After each search, I manually looked through the article titles and short descriptions to determine if they met my criteria for relevancy. I determined relevancy based on if the articles were about hydropower dams located within the United States or more generally about the larger hydropower industry in the country. Articles not contained within those criteria were deemed outside of the scope of analysis. My original terms were “hydropower OR hydro-power OR hydroelectric OR hydro-electric OR dam” anywhere in the article, which yielded 198,719 results in the NYT and 213,722 results in the LAT, many of which were outside the scope of this analysis. Specifically, these search terms yielded many articles about non-powered dams and international issues. As well, searching for those terms anywhere in the article was bringing up results that only mentioned hydropower in passing, for example in a list of energy types, in which the focus of the article was unrelated to hydropower specifically. After consulting with my committee, a database

expert, and a historical research expert, I decided to limit my search to only articles with those terms in the title. By limiting the search to terms in the title, I retrieved 5,023 results in the NYT and 8,614 results in the LAT, and the scope of articles more closely matched my relevancy criteria based around my research questions and analysis goals. I found that most of the articles being yielded in the search were coming from the term "dam". This was a possible concern because I was only interested in powered dams, so I took a closer look at those articles that "dam" specifically was bringing up. To determine this, I downloaded the complete excel list of the articles yielded from a search with and without "dam" from the NYT and the LAT and looked just at the articles yielded from "dam". Looking through those articles revealed two major trends, firstly articles with a line break for damage (dam-age) in the title were being included and were often completely unrelated, for example "Fire Arouses 800 in Hotel St. George: Brooklyn Blaze Confined to Two Rooms After Nurse Had Discovered It. Score Leave by Fire-Escape Hundreds of Gallons of Water Poured into Building Dam-age $10,000" (1923). Secondly, though "dam" was capturing articles about some powered dams, such the Hoover Dam, many articles about non-powered dams and of other types of dams, such as earth-filled, were being included, which is outside the scope of this analysis. For example, the article "Little Niagara at Croton: A Billion Gallons a Day Flow Over Cornell Dam" (1923) about the Cornell Dam which forms the New Croton Reservoir and is non-powered. Ultimately, I decided to exclude the search term "dam" to better suit the scope of this analysis. Therefore, the final search terms were "hydropower OR hydro-power OR hydroelectric OR hydro-electric" in the title of the document. I recognize that this decision may have cut out some relevant articles, but it also helped to focus on hydropower as the guiding center of my research questions.

In May 2021, the refined search yielded 643 articles from the NYT, and 235 articles from the LAT from 1923-2022. Of those articles, I was only interested in coding those that were about American hydropower, so I cleaned the data of any articles about foreign hydropower, and I also took out any articles that were obituaries or letters to the editor, which left me with a total of 396 articles from the NYT, and 142 articles from the LAT.

Once the articles were chosen, excluding articles outside the scope of analysis, I determined that I could code the remaining articles without sampling. The decision not to sample was two-

fold; the first reason was because I was not satisfied with any systematic sampling schemes that I could find from similar content analysis research because they were not appropriate for the long timeframe of my data, and the second reason was that I felt that if I sampled, I might miss out on key historical patterns and would therefore not be able to adequately answer my research questions.

Codebook Development

I developed two codebooks based on literature reviews of energy media content analyses and energy justice titled "Categories" and "Energy Justice" Codebook respectively. The Categories Codebook aimed to answer my research question of what the media coverage of hydropower has looked like in the United States and is composed of descriptive codes, it was developed with a mixed inductive and deductive approach. It initially contained 10 codes derived from my literature review of content analysis of media around other energy types (Berardo et al. 2020; Cunningham 2019; Gearhart et al. 2019; Kim et al. 2014) and my previous research into the history of US hydropower (Bauer, 2020). This codebook includes such codes as safety concerns, cost of hydropower development, and governmental issues surrounding hydropower, among others (see Appendix A for full codebook). In order to be sure that these codes were applicable and appropriate for hydropower news coverage, I took a random sample of 10 articles from the LAT data and coded them using this codebook to determine if more codes would emerge. Through this process, several themes became apparent that required new codes, so I added these to the existing codebook. I also found that the code for cost of energy was not distinct from the code for the Energy Justice principle of Affordability, therefore I took it out of the Categories Codebook. During this sample coding, nine more inductive codes were added that were specific to hydropower news. These new codes accounted for comparisons to other energy technologies, displacement of people for hydropower development, and hydropower/energy as a key to progress, among other emergent themes.

The Energy Justice Codebook was developed deductively based on Sovacool & Dworkin's (2016) energy justice principles which I operationalized into 10 distinct codes. Those principles are Affordability, Availability, Due Process, Transparency and Accountability, Sustainability, Intergenerational Equity, Intragenerational Equity, Responsibility, Resistance, and

Intersectionality (see Appendix B for code definitions). I chose to use Sovacool & Dworkin's principles over other energy justice frameworks because they offered more granularity in the coding process and opportunity to examine trends and the transformation of the industry over time. Specifically, by having 10 energy justice principles as codes, I was able to look at the co-occurrence of those codes over time in a way that would not have been as nuanced had I adopted Heffron & McCauley's (2017) core tenets.

Because of the intertwined nature of the energy justice principles, the Energy Justice Codebook has inclusion and exclusion criteria for each code, to make sure they are each distinct from each other in order to make the coding process as uniform as possible across articles. There is naturally some overlap in the Energy Justice principles, such as that of Sustainability and Responsibility. They are both concerned with environmental impacts of decision-making by actors within the energy system, but Sustainability is focused on the long-term viability of natural resources and Responsibility is focused on minimizing negative externalities. Therefore, in the codebook mentions of fishways, a way of minimizing negative externalities, are excluded from the Sustainability code while being included in the Responsibility code. (See Appendix A for full codebooks.)

Coding

I began coding in June 2022 with articles from the LAT, and all LAT articles were completed by August 2022. After this, in August 2022, I began coding the NYT articles and concluded in December 2022. I coded in MaxQDA, which I chose because it was best suited to work with scanned documents. My unit of analysis was sentences in the articles. I tagged all of the articles with the Variables function in MaxQDA to include their outlet (NYT or LAT), date of publication, name of dam (if named in the article), size of dam (if dam was named in the article), and location of the story which includes either the location of a dam if it is named in the story or location of the hydropower issue for example, if it's about a law going into effect in Oregon the article location would be tagged as Oregon (if specified in the article). Articles that mentioned more than one location in a region were tagged as that region (ex. Pacific Northwest, East Coast), and those that were not specific to one state or region were tagged as "All Over US". Throughout the process of coding, I kept a detailed spreadsheet record that cross-referenced

the article title, date of publishing, as well as my notes which were short descriptions of the article's content. I kept notes on the content of the articles to serve as a searchable index of all my data, I did this because the majority of my data were scanned documents, which limited my ability to easily find articles based on their content. For example, for the article "Delaware River Dam Opposed by the City: New York Protests that Hydroelectric Development Would Imperil its Water Supply" (Special to the New York Times, 1935) my descriptive notes were: "A dam on the upper Delaware River to develop hydropower plants is opposed by New York City, Philadelphia, and a number of other cities downstream on the basis that these dams would endanger their water supply into the future". My descriptive notes on the article allow me to quickly search and assess whether an article might be relevant in my analysis. In addition, I have analytic memos for all the articles that were analytically important that came up for me during coding (Vanover et al., 2022). My analytic memos were a tool for me to track emergent themes and patterns that I was noticing in coverage. For example, for the above-mentioned article, the accompanying memo was "intersection of power availability with water rights, access to water, geographic complications". This memo later served as a touchpoint for developing a larger analytic memo and helped me know that this article could serve as a piece of supporting evidence.

I also kept a spreadsheet of reported dam decommissions with details on the dam including the year of decommission, location of dam (state), reason for decommissioning (if stated in the article), and list of articles that mention the decommission. I did this because I wanted to have the option of looking at the patterns of decommissioning over time, but ultimately there was not significantly interesting data on reports of dam decommissions. I did not keep track of articles on dams being built because there were many articles that mentioned proposed dams, but there was not a consistent way to track the completion of those dams.

In another spreadsheet, I kept a record of larger patterns across the data that I was noticing while coding. This spreadsheet includes the date of the observation, a detailed descriptive memo about the observation, related codes (if any), and a record of what articles had been coded so far. These were not specific to an article like the memos in the first spreadsheet with all the articles titles and descriptions, they were developed based on those article-specific memos to assess larger patterns. These were later elaborated into longer analytic memos for the

course TE938 Qualitative Data Analysis based on the framework for analytic memo writing from Vanover et al., 2022. These memos varied in content- some were about specific codes, others were about the co-occurrence of codes, and others still were about patterns over time. Some of these were later further developed into my discussion sections.

Throughout the coding process, I was concerned with maintaining reliability, especially since I was the sole coder. Manually taking these notes and reflecting on each article also made me slow down to ensure I was not speeding through the coding process (Saldaña, 2016). To further ensure reliability throughout the coding process, I regularly consulted my codebooks, memos, and had meetings with my advisor and peers to assess themes that were emerging across the data, and to stay consistent in my applied codes (Tracy, 2010). I also regularly went back to look through formerly coded articles to make sure that my coding on those was consistent with how I was currently coding. This was an iterative process that helped me to review the data and reflect on my process as a researcher.

RESULTS

Article Frequency Over Time

A total of 538 articles were included in this analysis, retrieved from the ProQuest databases. The rate of articles published per year that were included in my analysis is shown below in Figure 5.

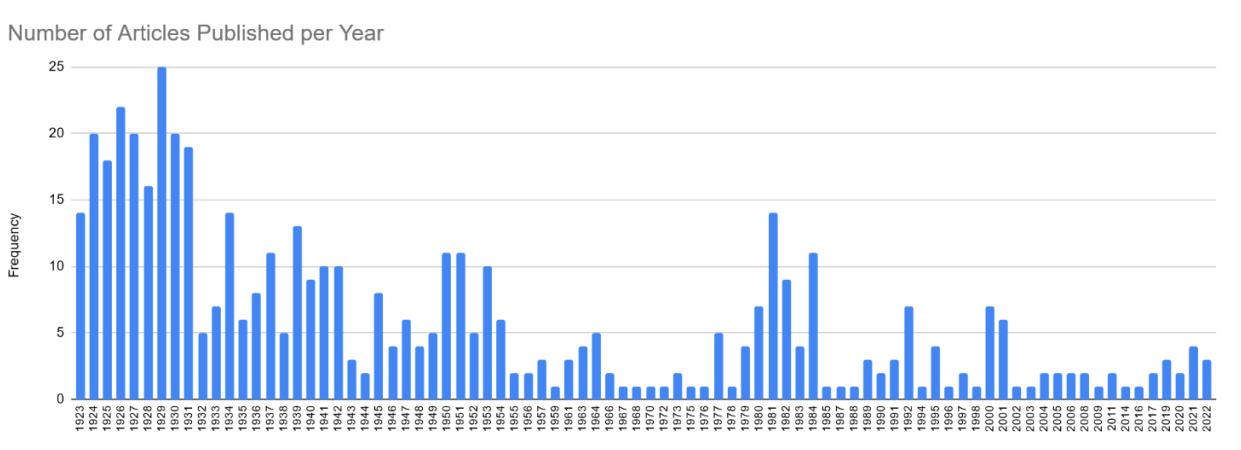


Figure 4 Number of Articles Published per Year Included in Analysis

As shown in Figure 4, the rate of publishing closely mirrors the history of hydropower in the country as outlined in the literature review, thus there is a boom in the 1930s followed by a period of decline. From 1923 to 1931, the Los Angeles Times and the New York Times published together a total of 174 articles included in my analysis. Reporting continues at a reduced, but significant, rate throughout the 1930s and 40s as New Deal and World War II projects continued development, but notably started to taper at the end of the 1940s. In the early 1950s there are a series of articles in the NYT about the politics surrounding the proposed development of the St. Lawrence River on the East Coast, and several US Securities and Exchange Commission (SEC) filings of hydropower companies that prompt a small spike in articles. However, by 1954 the number of articles has slowed to a steady trickle that continues through to the mid-1970s. This mirrors the history wherein hydropower waned significantly in popularity with the American public. There is a spike in articles from 1977-1984, around the time that PURPA was passed. The reporting at this time focused largely on the impact of the energy crisis on New York households, the potential of hydropower to combat the crisis, and the rush of investors to file for small-scale hydropower development permits to capitalize off the situation. This reporting was concentrated in the NYT, while in the LAT articles at this time were similarly focused on a

push for small-scale hydropower development on the West Coast, but less so on the energy crisis. However, that interest in hydropower is not sustained, due primarily to the high cost and long wait times associated with environmental licensing, and many of the permits filed for development never materialized into dams. Throughout the 1990s, articles focused increasingly on changing environmental conditions and drought, environmental regulations, and formal institutional opposition to dams with coverage of court cases and FERC filings. In 2000 and 2001, there is a small spike in articles primarily from the LAT, focused on the large-scale blackouts in 2000 in California which were caused by a confluence of drought, legislative deregulation of the energy sector, and market manipulation by energy companies. From 2002 to 2022, articles mainly focused on increased drought, some, largely unsuccessful, political pushes around revitalizing the hydropower, and the precarious nature of the American hydropower industry in the 21st century.

Code Frequency

All the final codes in both codebooks were used at least once throughout the coding process. Table 2 shows the number of times codes were used throughout the entire dataset, separated by codebook (blue: Categories Codebook, green: Energy Justice Codebook). All articles were coded with both codebooks simultaneously, some articles included codes from both codebooks, and some articles included solely codes from one codebook.

Table 2 Codes, definitions, and their frequency of use throughout the dataset

Code	Definition	Frequency
GOV	Government Involvement: talks about laws around a project, regulation agencies, or a political issue around a project (ex. politician pushing a project)	383
COST	Cost: mentions costs (ex. of a new project)	302
TECH	Technology: talks about technology directly related to the functioning of a hydropower dam such as a turbine	278
ECONPOS	Economic Benefit: mentions increase in jobs, and/or positive economic effect of hydropower	194

Table 2 (cont'd)

GRID	Grid: talks about how hydropower is connected to the grid, logistical issues with the grid, grid technology	170
COMP	Comparison: compares hydropower to other energy type	140
PROGRESS	Progress: mentions electrification/energy as modernization and/or progress	95
ECO	Ecosystem Impact: mentions negative impacts of hydropower on ecosystems (ex. fishways) or the environment	84
ECHANGE	Environmental Change: describes an environmental change that has impacted hydropower (ex. drought, natural disaster etc.)	76
GREEN	Hydropower as "Green" Energy: mentions positive impact of hydropower on the environment (ex. fewer emissions, "green/clean")	61
SOCIALPOS	Positive Social: increase in positive social outcomes for the community such as safety and education, as well as increase in recreational uses of water	61
MAINTAIN	Maintenance: maintenance and upgrade of dams, including fish ladders	54
SOCIALNEG	Negative Social: increase in worse social outcomes for the community, such as interference with recreational uses of water	32
SAFETY	Safety: talks about physical safety concerns around a hydropower project (ex. dam bursting) includes displacement due to crisis (ex. Breach)	31
SHUT	Shut Down: talks about a plant being shut down or decommissioned	24
BEAUT	Beauty: talks about the aesthetic of the hydropower project	20

	or impact on aesthetic of rivers/landscape	

Table 2 (cont'd)

DISPLACE	Displacement: describes people being displaced because of hydropower siting	12
HEALTH	Health and Wellbeing: talks about impacts of hydropower on human health and/or of community	9
DUE	Due Process: community input and institutional procedure on projects (did people know this project was happening? is opposition included in considerations? are there official ways for communities to air grievances? are people being displaced? is there a process that people can get involved in?) includes regulatory procedures	147
RESIST	Resistance: opposition to project (ex. protest for siting/relocation; lobbying group that is against hydropower)	118
AFFORD	Affordability: Talks about affordability of energy, includes changes in energy prices (lower and higher), inconsistencies in pricing	112
AVAIL	Availability: talks about energy available due to hydropower, how it will impact electrification (ex. providing energy to rural community), issues with consistent energy (ex. Taking down a dam)	99
ACCOUNT	Transparency and Accountability: is there open access to information available to the community such that they can hold the project and or government accountable (who is profiting from the project, where is the project going to be)	68
RESP	Responsibility: Talks about steps being taken to minimize negative impacts on the environment, taking responsibility for the impacts of the project, mitigation efforts (ex. fishways,	67

	changing site)	

Table 2 (cont'd)

INTERSECT	Intersectionality: mentions another social cause (ex. labor strikes for workers' rights in coal, indigenous rights)	59
SUSTAIN	Sustainability: talks about the long-term viability of/impact on natural resources (are they considering drought? Are they talking about this like a never-ending solution?)	41
INTER	Intergenerational Equity: Talks about if this project impact future (ex. project allowing future generations access to electricity)	24
INTRA	Intragenerational Equity: talks about if this project unduly burdens some people (ex. rural area siting for urban energy, farmers)	8

Most Common Codes- Logistical Coverage

The top three most common codes are GOV, COST, and TECH. They are all from the Categories Codebook and represent the most common type of coverage associated with hydropower. I deem these codes as logistical coverage. That is to say that they touch on detailed and concrete logistical realities of a project. This is the most common type of coverage of hydropower in both newspapers, and the nature of this coverage remains consistent over time because of the logistical nature of the topics. The GOV code involves both the legislative processes involved in the licensing of a project as well as a governmental body, like the FPC or FERC, and getting that approval is a technical process. An example of this code is: "The Federal Power Commission authorized today a fifty-year license to Niagara Mohawk Corporation, Syracuse, N.Y." (F.P.C Authorizes, 1950). The COST associated with the project is similarly a concrete logistical reality, an example of this code is: "The cost is estimated at $1.3 billion, almost three times that of the Hell's Canyon hydroelectric dam on the Oregon-Idaho border." (Davies, 1963). As is the

technology required to run a hydropower dam, coded by TECH, an example of this code is: “The three turbine generators, each rated at 1,000 kilowatts, will be harnessing the energy of the water as it flows through the gatehouse at the rate of 420 million to 660 million gallons a day.” (Hudson, 1982).

The fourth most common code, ECONPOS, which is when hydropower was covered as economically positive, does not fit as neatly into this characterization as logistical coverage. Though it is related, because it addresses the economic impacts of a project, it is often not in as concrete or technical of language. For example, this segment would be coded as ECONPOS: "Pump-storage hydropower plants like this one are becoming the hottest commodity in the power business."(Revenue Streams from an Old Source, 1998). It alludes to the favorable economic conditions of a hydropower plant, which might factor into the logistical considerations for development, but does not constitute concrete details. The fifth and sixth most common codes, GRID and DUE, are also both related to logistical concerns. GRID refers to coverage of the energy grid, such as how power from a project will be distributed. DUE refers to the energy justice principle of Due Process, in which institutional procedures are put into place so that people have fair rights within institutional systems, an example of this code is “Yesterday's hearing, sponsored by Assemblyman William B. Hoyt, a Buffalo Democrat, and State Senator Franz S Leichter, a Manhattan Democrat, was one of the first in what is expected to be a lengthy series of public forums to examine the contracts in coming months." (Verhovek, 1991).

As can be seen in Figure 5, there is variation in the appearance of these codes over time, with peaks corresponding to peaks in development or interest in development (1920s-30s, 1979-1985) and around proposed or recently passed legislation (1930s, 1980s) or consequences of passed legislation (2000-2001).

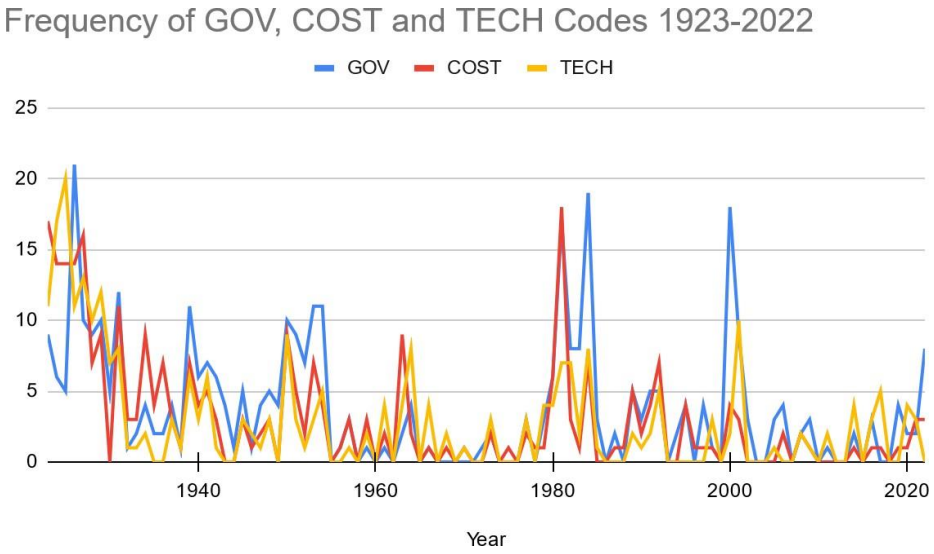


Figure 5 Frequency of GOV, COST, and TECH Code Usage Over Time

Table 3 depicts the most frequent code co-occurrences for each of the preceding codes, GOV, COST, and TECH. Co-occurrences are counted at the article level, and refer to the number of articles in which both codes are present. This is useful because it illustrates how different articles discuss various topics in their coverage. The logistical concerns laid out above tend to co-occur in documents, indicating that they are often paired together to describe a project in development or looking to be developed, or to provide contextual richness to a larger issue.

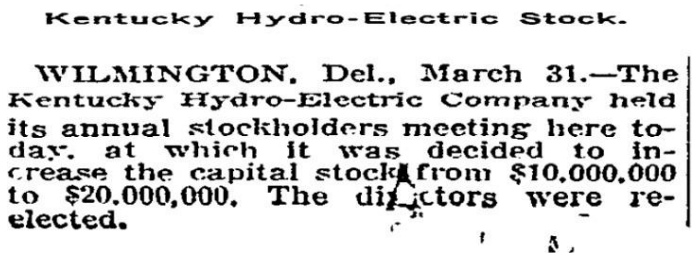
Table 3 Most frequent co-occurrences

Code: GOV	**Frequency**	**Code: COST**	**Frequency**	**Code: TECH**	**Frequency**
DUE	42	TECH	49	COST	49
COST	38	GOV	38	GOV	30
TECH	30	ECONPOS	20	GRID	22
COMP	28	GRID	18	ECONPOS	17
AFFORD	27	DUE	18	AVAIL	17

Financial earnings reports

A significant number of the articles from the New York Times are financial earnings reports from various hydroelectric companies (see Figure 6). These are mostly short paragraphs describing the earnings reported by the company in that quarter. From 1923-1961, when the last of these

articles appears, 130 articles in the NYT of the total 291 (44.67%) in that time are about the financial earnings of a hydroelectric company. In contrast, the LAT has significantly fewer articles on the financial earnings of hydroelectric companies, with only six appearing from 1923-1961, with the last of those appearing in 1942, out of a total 52 (11.5%) published during that timeframe.



Kentucky Hydro-Electric Stock.

WILMINGTON, Del., March 31.—The Kentucky Hydro-Electric Company held its annual stockholders meeting here today, at which it was decided to increase the capital stock from $10,000,000 to $20,000,000. The directors were re-elected.

Figure 6 Screenshot of article from the New York Times "Kentucky Hydro-Electric Stock" (1925)

Energy Justice Codes Over Time

Energy Justice codes were used throughout the period of coverage (see Figure 7), but as expected from the literature review not all topics were always prevalent. Leading up to the boom of development throughout the 1920s, there was a spike in the Due Process (DUE) code as projects were proposed. The Resistance (RESIST) and Affordability (AFFORD) codes also spiked at this time, primarily due to concerns expressed around project proposals, and cost of energy. Going into the 1930s, the boom of development, there was a spike in Availability (AVAIL) codes as developments went forward on the promise of more energy. Also present during this period are Responsibility (RESP) and Resistance codes. Throughout the 1940s into the 1950s, Due Process and Resistance continued to spike, which is widely attributable to post-war policies and a backlash to federal spending. Through the 1960s and 1970s, the rate of published articles dipped significantly, and Availability was consistently coded, and Resistance spiked again in the late 1960s, spurred by the environmental movement. In the 1980s, the energy crisis in the Middle East spurred spikes in the codes Affordability and Due Process as the price of energy became a major concern and applications for small-scale hydropower projects skyrocketed at this time. There is a steady increase in Sustainability (SUSTAIN) throughout the period of analysis, starting especially in the 1980s. There is another spike in the early 1990s, primarily

around the issue of Indigenous resistance to a project that involved New York lawmakers, which led to many Intersectionality (INTERSECT) and Due Process codes. Through the 1990s into the 2000s, Responsibility is a common code, spiking alongside Availability in 2000. This is due to the rise in concerns over drought and salmon populations in the west. We see a similar spike of Responsibility alongside Availability in the late 2010s into 2020 when these same questions of balancing energy availability with responsibility for minimizing environmental impact come up.

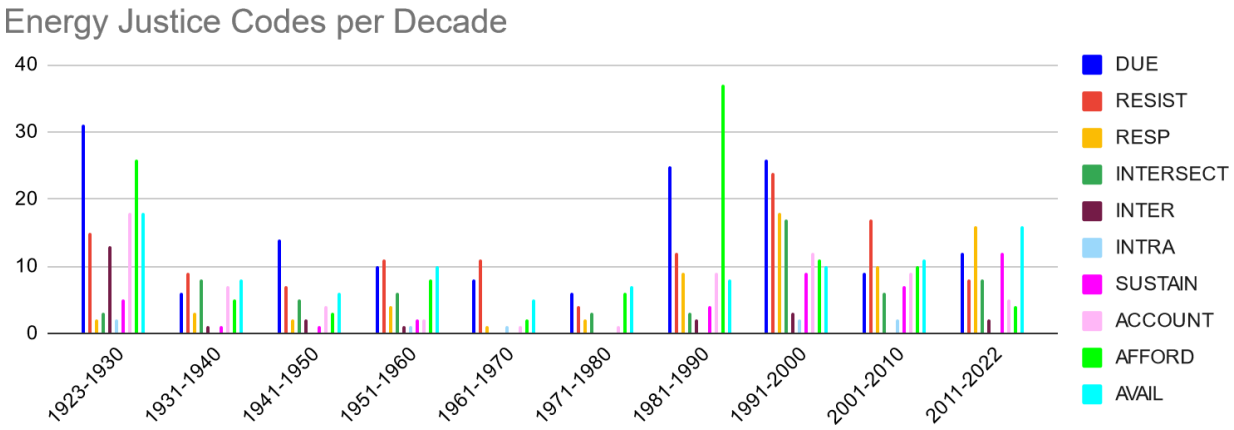


Figure 7 Frequency of all energy justice codes over time, by decade

The most commonly used Energy Justice code was Due Process (DUE), with the following most common co-occurrences in documents in Figure 8.

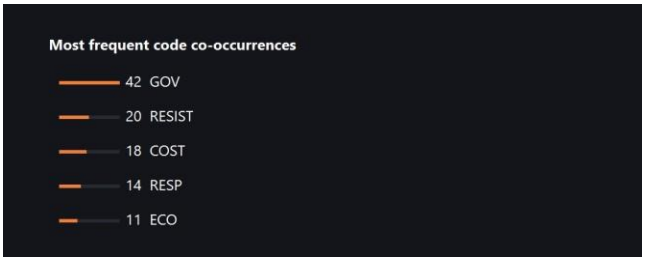
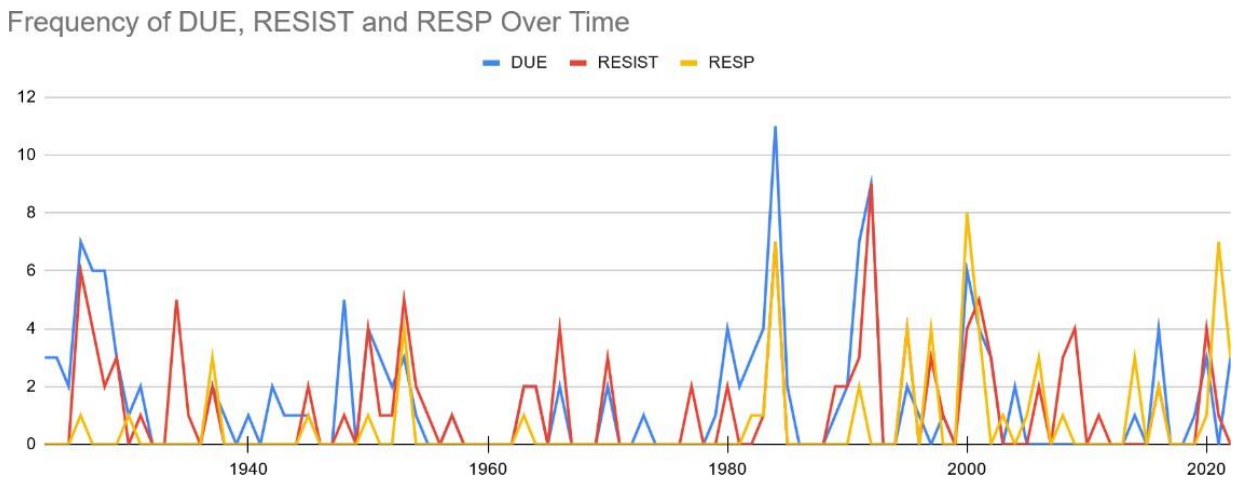


Figure 8 Most frequent code co-occurrences for code DUE

The co-occurrence with codes GOV and COST aligns with the above-mentioned emphasis on logistical coverage. That is because Due Process is often a technical process of hearings and forums covering issues like the cost of a project and fueled by government regulations, agencies, or politicians. The co-occurrence with the Energy Justice codes Resistance (RESIST)

and Responsibility (RESP) over time aligns with the discussion about how over time Due Process was used as a tool of resistance against hydropower developments. In Figure 9, we can see that these codes tend to spike at similar times, supporting their co-occurrence.

Figure 9 Frequency of DUE, RESIST, and RESP codes over time



DISCUSSION

Rationale for Discussion

The following discussion qualitatively explores three results that emerged from the study. The first two respond to research question one, how hydropower is covered in news media in the United States. The first result shows how hydropower and coal coverage exist in competition and complementarity with each other within energy system reporting. The second one explores how hydropower reporting in the West uniquely ties hydropower to narratives of Western progress, especially in the LAT. The third result addresses research question two, how hydropower news has represented different aspects of the energy justice principles over time. This third result explores how the evolution of energy justice principles relates to justifications for large-scale hydropower development.

These three results show a strong throughline between them that best captures the larger story of hydropower reporting. That throughline is that there has been a fundamental shift tracked in news media in the way that hydropower exists within the American energy system and popular imaginary—going from being a radically transformational technology to a representation of the clunky and harmful technologies of the past. This transition was brought on largely by the incremental increase in understanding of the full impacts of hydropower, but also by the aging of its technology over time as compared to newer renewables. Bidwell & Sovacool (2023) describe a spectrum of extrinsic to intrinsic justice perspectives and incremental to transformative degrees of change from which four agendas for energy systems research and policy emerge: business as usual, reengineering, energy democracy, and just transitions. As I've studied its long history, it seems that hydropower has been represented in news media as championing each of these four agendas in its own way.

Hydropower in Relation to Coal- Examining the Energy System at Multiple Scales

Hydropower and coal, otherwise known as steam power, have long co-existed within the American energy system (see Figure 10 and 11 for a breakdown of US energy production sources).

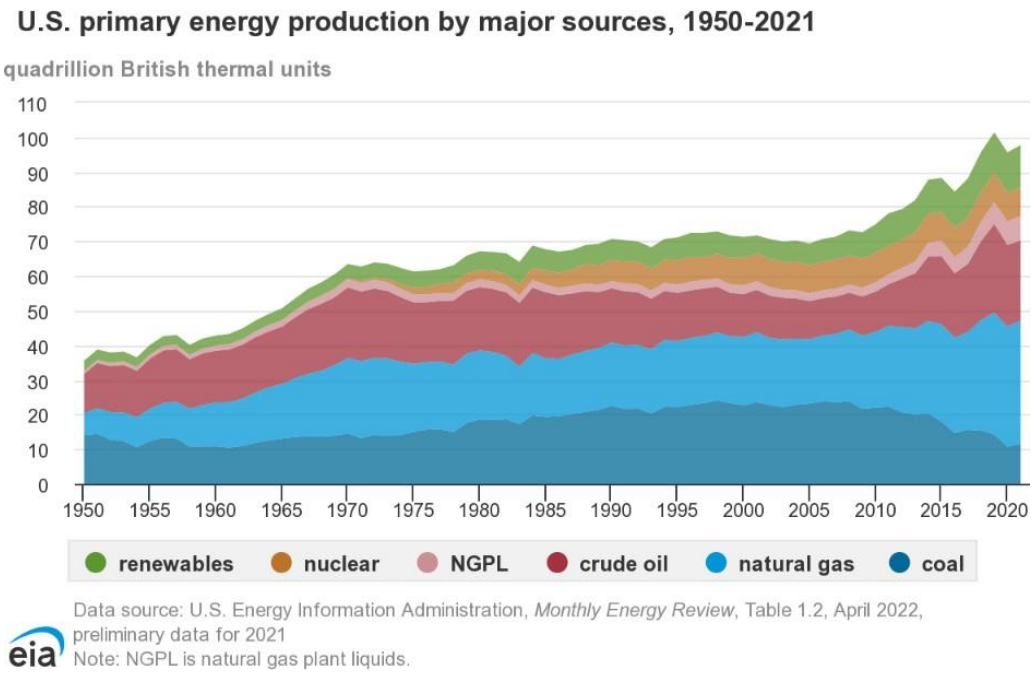
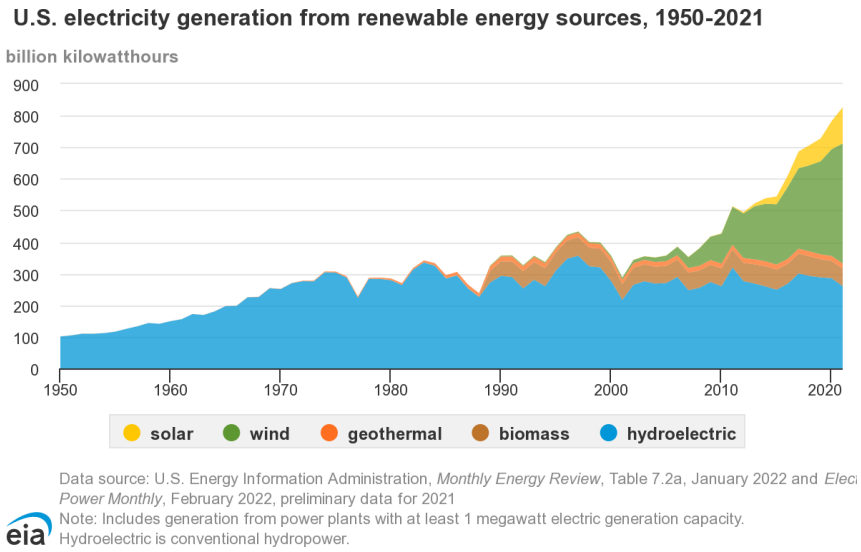


Figure 10 US energy production by source, EIA

Figure 11 US electricity generation breakdown of renewable energy sources, EIA



However, reporting on these legacy energy sources is understudied within the American context. This gap in understanding misses out on the long history of reporting on the American energy system and the complicated energy market. This analysis offers insights into how scale impacts these seemingly incompatible but simultaneous modes of reporting on the energy

system, especially in the early days of hydropower. By different scales of reporting, I mean that when the narrative is at the aggregate national level, coal and hydropower are in competition for shares of the energy market. Whereas when reporting is focusing on a local or project level, the narrative tends to be much more focused on complementarity of coal and hydropower together.

There are two scales of focus that are present in articles that feature hydropower and coal. On a larger systems scale, hydropower and coal are in direct competition with each other for a share of the energy market. We see this as early as 1923 when coal worker labor strikes are said to have been undermined by the growing prominence of hydropower:

> "Remarkable strides in the development of hydro-electric power in this State, power experts say, have so greatly reduced the need for coal that a soft-coal strike could not seriously cripple New York's industrial plants." (Big Plants Turn, 1923)

These labor concerns in the coal industry are therefore seen as an opportunity for hydropower to accelerate its growth and increase their share in the US energy market. This reflects the direct competition between the two for a share of the energy market.

> "The necessity for furthering hydro-electric development so that an adequate source of power might be available to supplement and gradually replace the power obtained from coal is pointed out by the New York State Water Power Commission in its annual report for 1922." ("Would Replace Coal", 1923)

Competition in the 1920s was further driven by concerns around the long-term viability of the raw natural resource, water and bituminous coal respectively, as each opposing side claimed that the other was bound to run dry eventually, while they would remain prosperous for the foreseeable future ("Water Power Reaches Out", 1926; "River Gauging Discontinued", 1927; "Edison Says Power Not a Vital Issue", 1928). The competition in this framing centered around not just the relative share of the current energy market, but the presumption that the continued growth of electricity use in the country must be supported by either the rapid expansion of hydropower development or the continued growth of coal mining.

> "'It is apparent that a point will be reached when the supply (of coal) will be exhausted that can be mined at a reasonable cost, and ultimately reaching a point of exhaustion of

> fuel that can be economically mined, especially when it is considered as the power demand of this State has increased at as great a rate as 10 percent during recent years." ("Would Replace Coal", 1923)
>
> "So limited are the possibilities of hydroelectric development that if all the available water power of the country were harnessed by 1933, fuel-burning plants with capacity equal to the total water power should still be required, according to (Electric World) publication... The East North Central States, with only a relatively small amount of water power available for development would account for over 15,000,000 horsepower of fuel-burning electric generating plants after all the available water power had been developed." ("Steam Remains Prime Factor", 1924)

This competition between coal and hydropower went beyond the issue of market shares, representing an ideological divide between public and private ownership of resources and of energy production. While coal has always been a privatized industry, hydropower represents an interesting intersection between public and private ownership. This is primarily because the ownership of water and waterways is contentious and poses questions of privatizing public goods and interstate rights. In the 1920s and 1930s, it was the government that was developing large-scale hydropower, thus, at the systems level, there was competition to provide energy for the country, and to be provided for, in terms of federal investment ("Steam Remains Prime Factor", 1924; "Pessimist Pens Power Report", 1929). This is amplified during the New Deal in 1934 as federal investments in hydropower reach an all-time high ("Moves to Extend", 1934; "Roosevelt Policy on Power", 1934; "New Deal's Power Plans Attacked", 1934; "Hoover Charges New Deal Waste", 1939). The National Coal Association goes so far as to launch a formal protest against federal investment in public hydropower projects:

> "'It is our contention,' says a letter sent to members of the industry by J.D. Battle, executive secretary (of the National Coal Association), 'that many of these water-power development schemes are without any economic justification and should be halted... the new power is not needed, as existing power plants have a capacity substantially in excess of the present demands.'" ("Coal Men Protest", 1934)

At a smaller scale, if we zoom into the material realities of developing energy projects,

hydropower and coal often co-existed as complementary pieces of the larger energy goals of a project ("Provides Operation of Muscle Shoals", 1926). Specifically, hydropower projects were often proposed as including a steam power component to address concerns of reliability. The TVA, for example, acquired steam plants to avert power shortages during a 1939 drought:

> "In the future, (a utility official) asserted, TVA and any other Federal power projects east of the Rockies, with one or two exceptions, will have to build stand-by steam plants as auxiliary sources of supply in dry years." (Porter, 1939).

At the same time, this complementarity still features the language of competition because it is based on the presumed inadequacy of hydropower to provide energy, while coal is positioned as ready and able to provide power, and in turn, hydropower projects would inherently lower the use of coal. This can be seen in the so-called "superpower" propositions were made to combine steam and hydropower into an interconnected system that could grow alongside energy demand:

> "Recommendations for the construction and development of great interconnected steam and hydroelectric power projects throughout the Northeastern section of the United States estimated to make possible a saving of 50,000,000 tons of coal annually, lower the cost of producing electric power and extend the use of electricity generally to farm areas... Generation of electric power from coal, the report says, must be the principal dependence of the Northeastern area, because the maximum development of the water power will supply only 25 percent of the needs of that section." ("Superpower Report Made for Northeast", 1924)

As coal was more common in the Eastern part of the country, due to larger coal deposits and ease of access, this also highlights the geographic specificities present in the narratives around supplying energy demand, which will be further elaborated on in the next section. The material realities of approving and building out projects required a confrontation of this tension between complement and competition in ways that were unique from the systems-level scope. Especially when we consider that the principal justifications for development at this time were predicated on energy Availability and Affordability, it becomes clearer why this complicated tension exists- coal and hydropower represent tradeoffs in either energy justice principle. Coal is reliable and

therefore Available, but its long-term Affordability is called into question and depends on human labor and the supply of a natural non-renewable resource. Meanwhile hydropower has a high startup cost but promises long-term Affordability since water is presumably a free natural resource, but its Availability is called into question by natural fluctuations in weather patterns and geographic restrictions:

> "'The truth of the matter is that many water powers offer investments at a rather uncertain value... 'Because of the uncertainties and dangers of water power construction, due to floods and other accidents that cannot be anticipated: because of the uncertainties and dangers of operation due to floods and droughts and accidents and machinery'" ("State Ownership of Power Assailed", 1924)

Therefore, this tension in framing between competition and complementarity may be born out of the inherent tensions within the energy system.

Hydropower and coal reporting is also greatly impacted by a temporal dimension. As hydropower waned in popularity post-World War II, as explored in previous sections, there were several shifts in its relation to coal. Competition remained a primary dynamic as in some cases the increased government regulations around hydropower benefited coal in making hydropower less desirable to develop:

> "The aluminum industry has eliminated its dependence on hydroelectric power, according to John D. Harper, president of the Aluminum Company of America... Mr. Harper says he now favored steam power for new plants... Behind the trend to steam power, Mr. Harper said, was the rising costs and red tape involved in Government dam projects" (Wright, 1964).

But while this increased government regulation due to environmental concerns was used to halt hydropower developments during the 1960s, articles reporting on environmental issues also highlighted the complicated tradeoffs of stopping hydropower development. This increased recognition of the harms of hydropower, was often accompanied by the acknowledgement that hydropower was still preferable to fossil fuels. So, throughout the 1960s into the early 21st century, hydropower was positioned as both environmentally harmful and the lesser of two evils when pitted against coal, natural gas, and oil (Verhovek, 1992; Salpukas, 1998; Jehl, 2000):

On the proposed development of a Hudson hydropower plant:

> "Conservationists attack the mountain-and-shore-front plant… The project has countered conservationists' complaints by stressing plans for parks on both shores of the Hudson… Aside from seeing greater reliability from hydroelectric generating than steam, Mr. Forbes argues for the Cornwall plant as a means of combatting air pollution" (Kihss, 1964)

> "Hydroelectricity (is) more reliable than imported oil and far cleaner than coal and other potential energy sources" (Wald, 1992)

> On shutting down the aging Ocoee River flume to a hydropower plant: "But there was another result as well: More coal and natural gas was burned to replace the lost hydropower, which translates into dirtier air and greater dependence on more costly fuel." (Cooper, 2001)

Thus, this narrative of co-existing competition and complementarity takes on a new form post-environmental movement. Because wide-scale electrification was no longer the primary driver of hydropower development as it was in the first half of the 20th century, the focus shifted instead to retrofitting efforts aimed at maximizing the efficiency of existing plants:

> On the Rocky Reach Dam implementing fish ladders to continue hydropower generation "The result is that the dam has been able to produce an additional 1.75 million more megawatt-hours of electricity over a three-year period, the equivalent of 702,204 metric tons of carbon if the electricity were generated at a natural gas-fired power plant." (Murphy, 2009)

In this evolution of prioritization, coal and hydropower are still in opposition to each other, but they slowly start to be lumped together as environmentally precarious legacy energy sources that exist along a spectrum from 'dirty' coal to 'clean' hydropower which is better but still harmful to rivers. This becomes increasingly prominent when other renewable energies start to gain widespread traction in the energy sector and the narrative of competition shifts to being between renewables:

> "Wind turbines have sprung up all over the blustery hilltops in eastern Washington and Oregon, an area soon to become home to the largest wind farm in the world… For the

> last three weeks however, many of the wind farms have been ordered to shut down their generation for several hours a day—victims of an unusual surplus of hydroelectric power that has confounded regional electricity operators and infuriated renewable energy advocates who have worked so hard to develop the region's wind bonanza." (Murphy, 2011)

With this shift there is also a return of competition and complementarity co-existing between hydropower and other renewables:

> "Energy experts have said that adding more hydropower could provide a useful tool in the fight against climate change. While wind turbines and solar panels are becoming more widespread, they don't run all the time, and hydroelectricity can offer a backstop as utilities clean up their electrical grid." (Plumer, 2020)

The narratives that have played out between hydropower and coal over this 100-year timespan are not unique to them as energy sources. Instead, they represent the inherent difficulties in reporting on an energy system that operates with complicated tradeoffs. The narratives that played out between hydropower and coal in the 1920s-1950s have evolved with the talking points of the times, but the underlying claims of these same narratives will continue to be perpetuated between energy types today. Hydropower and coal have both undergone important transformations in their coverage, from starting as diametrically opposed but complementary energy types to now, where they have a more complicated relationship in a more crowded energy market.

Narrative Construction as a Tool to Tie Hydropower to Western Progress

One of the primary objectives of using two national newspapers located on opposite sides of the country for this analysis was to determine if there were significant regional differences in hydropower reporting. I found that in the Los Angeles Times, significant coverage was dedicated to centering hydropower in narratives of progress of the West, especially in the 1920s during the hydropower boom. The West is federally defined as Alaska, Arizona, California, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming (Britannica, n.d.). However, in this analysis, I do not include Alaska and Hawaii as part of what I refer to as "the West", specifically because I am interested in the geographic region of two

major river basins- the Colorado and Columbia. As well, by virtue of examining a California-based newspaper, there is special attention paid to California. Construction of this narrative sought to explicitly tie hydropower to the foundational identity of the region by giving hydropower credit for its' prosperity. This is not the case in coverage of hydropower in the East and by the New York Times. The reason for this difference seems to be linked to the history of electrification of each region. Even though the first hydropower sites developed for major generation in the country were in the East (USBR, 2016), hydropower had an outsized impact on the West. As previously explored in the last finding, hydropower projects were often sold as complementary to and in competition with coal. This was especially true on the East Coast, as stores of bituminous coal were more abundant in the eastern and middle parts of the country. The original foundation, both metaphorically and materially, of electrification and industry on the East Coast was built off steam power. Hydropower was therefore an added tool in this existing system of industry and electrification infrastructure. However, on the West Coast, limited coal reserves made steam power a less attractive option for electrification (Teisch, 2001). Instead, natural advantages offered by the rivers of the West made hydropower a better choice, which set these two histories apart. By 1930, California alone accounted for 1/3 of the hydropower projects licensed by the FPC, with only a few projects east of the Mississippi ("Times" Staff Correspondent, 1930). The West Coast of the early 20th century was much less established than the East Coast at that time, so while hydropower was being developed in the West, so too were the industries that would come to define it (Teisch, 2001). This simultaneous development offered fodder for the construction of this narrative that foregrounded hydropower as a driver of Western prosperity.

An important aspect of this narrative construction was the regions' unique geographic advantages. These were often mentioned in coverage, alluding to the natural fit of hydropower to the region's landscape and needs:

> "Secretary Hoover has characterized the Colorado River Basin as our greatest undeveloped natural resource" (Rolfe, 1924)
>
> "The factor of cheap hydroelectric power means a great deal in the development of this empire, for it may solve a great problem that has hindered the development of inland

> mountainous areas—that of securing cheap transportation to the coast and central marketing points." (Rolfe, 1924)

These natural resources were not just tied to current prosperity, but explicitly tied to long-term prosperity, as water itself was framed as an unfailing source of progress. This further entrenched hydropower as a foundation onto which more would inevitably be built:

> "'All of this ties in with the big step in our development which was taken yesterday, and which assures all of Central and Southern California an abundant power supply for many years to come'" (Hydroelectric Titan is Begun, 1923)

Water is seen as a given constant, such that its unfailing future availability is not questioned in this coverage, tying it to the Energy Justice principle of Availability. The abundance of water is instead the premise upon which hydropower development is sold as an obvious answer to the question of how to elevate regional industry to national and international prominence:

> "The initial expense is heavy... But this investment is permanent. Huge dams constructed of concrete tunnels bored through the heart of the granite mountains, and powerhouses built to withstand the ravages of time are practically everlasting. The falling waters from the mountain tops are an unfailing source of power" (Babcock, "Power is Basis of Development", 1923)

> "The permanency, therefore, of water power in California, the imperishable nature of it, the always increasing making for electricity... and the large scale on which electricity is being generated from water power in California should make of this State the center of the greatest and richest industrial and agricultural development in the world." (Martin, 1924)

This coverage presents the West as a sort of perfect scenario of men with the ambition to harness the landscape striking at the exact time that the technology for doing so is at its peak. The narrative here singles out the exceptionalism of both the landscape and of the Western people. This narrative represents an intentional coupling of identity to development, and to status that reverberates beyond the region:

> "Commercial, financial, and industrial California owes its present great stride to the far-seeing plans of the men who have built up these companies and who have made water-

power development of the State possible. Their plans were not of a today merely, but of a tomorrow when a still greater Pacific Coast will be in the building." (Martin, 1924)

"Anglo-Saxon creative energy has outstripped lagging Europe. Even the Germans, once noted for their efficiency, can no longer stand the pace. California leads the world in the development of water-power resources under high heads... Two causes contribute to this effect: In few spots on earth are there mountain ranges with such magnificent heights and chasms as in the California Sierras, and in not one of these spots elsewhere is there market for the maximum hydropower that can be developed." (Hogue, 1928)

This narrative of permanency of water and of harnessing water for hydropower in the 1920s and 30s promised a foundation for the region and encouraged the adoption of hydropower into self-identity. In this long time-horizon, hydropower was not just tied to electrification efforts that furthered industry, but more generally to the efforts of harnessing water for human use. The irrigation of Western land physically changed the environment so that it could become more conquerable and profitable:

"By the transformation of large areas of arid lands into sections rich in agricultural products, the hydroelectric corporations of California have enriched this State by millions of dollars annually and provided employment for thousands of citizens. The growth of the State has been identified closely with the development of hydroelectric projects." (Babcock, 1923)

"The most important achievement in the growth of California, industrially and agriculturally, is the development on an unprecedented scale of the State's vast water-power resources." (Martin, 1924)

By tying hydropower so closely to irrigation, and thus agricultural prosperity in the region, the role of hydropower development came to represent more than just electrification. Development of water for various purposes in the West helped to bridge the gap between the identity of 'Wild West' and that of an American West that could compete with the industrialized East. This is important because it both establishes the role of dominance over nature as a necessary component for progress and ties the geographic exceptionalism of Western rivers to technological development and progress. That is to say that electricity via hydropower is

positioned as a foundational component in making the region habitable, profitable, and progressive. Those components go on to become emblematic of the imaginary ideal represented by the West:

> "The power companies are not claiming credit for bringing the people to California, but perhaps they can legitimately claim that it is cheap and ample power that is measurably responsible for keeping them here. Land booms serve to bring the people, but other agencies besides arable land and men are required for the production of goods. Water is needed to make the land productive, and power is demanded to apply the water to the land." (Crowe, 1925)

By the 1940s, many large hydropower projects had been well-established in the West, including the Bonneville Power Authority in the Pacific Northwest, and the value of cheap electrification to the aluminum, lumber, and agriculture industries that defined the regional economy was seemingly unassailable. However, in the 1940s the natural limitations of hydropower began to creep into coverage as concerns. In 1948, as energy demand was rapidly increasing, due largely to industrial and population growth, so too was drought limiting energy production. Ironically, drought was then used as a reason to push for further hydropower development throughout the state of California:

> "'This year's drought with its accompanying critical power shortage in many sections of the State emphasizes the need for early development of all possible hydroelectric sources' (Samuel B. Morris, general manager of the municipal utility) said." (Hydroelectric Power Project, 1948)

Offering hydropower as a solution for rising energy demands even in the face of increasing drought should logically highlight the flaws in the narrative of geographic exceptionalism upon which hydropower development was predicated in the 1920s and 30s. Instead, what we see is applications for licenses for increasing river diversions to fuel existing projects and the continued development of largescale hydropower (San Joaquin to Get Water Next Year, 1950; Fourth Tunnel Drilled, 1951; Hydroelectric Project Gets Federal OK, 1953) and the region is still touted as a "logical place for hydroelectric development" (Morin, 1953). This insistence on the compatibility of hydropower to the West supports the idea that it was woven into the narrative

foundation of Western identity.

It's only in 1955 where there starts to be some governmental pushback against further hydropower development as W.C. Mullendore, a Los Angeles utility executive, comes out touting the "vulnerability of hydro to drought conditions" and encouraging steam development as an alternative (Mullendore Hits Hydroelectric, 1955). Coupled with a 1957 denial by the government to divert more water from the Colorado River to a powered dam in the Imperial Valley (Imperial Valley Power, 1957), the coupling of hydropower with ever-continuing progress began to be undermined by the realities of the varied weather conditions in the region. Drought conditions continued to fuel difficult decisions about water allocation into the 1960s and 70s (Herbert, 1964; Stall, 1976; Drought Raises Possibility, 1977). Concurrently, dam sites were becoming more contentious, with environmentalists opposing developments (Jones, 1977). Even so, in 1979 going into the early 1980s, California Governor Jerry Brown encouraged small scale hydropower development (Brown Leans to State, 1979; Brown Calls for Building, 1980). Notably, these calls for small-scale development served not only the function of keeping energy prices down by fostering energy independence, but also as a form of international diplomacy by encouraging developers to buy parts from Chinese companies. Here we see a reversal of earlier shows of Western technological dominance in hydropower "(Brown said) 'It is rather ironic that California may benefit from a technology from China instead of the other way around'" (Brown Leans to State, 1979), alongside efforts to preserve the ideal of exceptionalism by leaning on natural resources in the region to maintain energy independence: "'We've got all the potential. It's here. It's clean.'" (Brown Calls for Building, 1980).

The push for small-scale hydropower in the early 1980s includes none of the flowery language of the early 21st century that characterized the landscape as a dominion to be concurred. Instead, it is steeped in practicality (Birkinshaw, 1981; Gladstone, 1981; Hydroelectric Plant on Line, 1981), claiming that the humble megawatts of small-scale projects play a small part in helping to shield against oil price hikes, and that they present "no pollution or waste disposal problem" (Dedmon, 1980). Overall, there is a shift away from tying hydropower to the development of regional prosperity towards it being a small but important piece of a national strategy. Therefore, the narrative function here had transformed from abstract notions of

regional identity into more concrete realities of national energy independence.

With this shift away from regional identity, the calls to geographic exceptionalism that were once used to promote development start to come up as reasons for blocking development and decommission in the 1990s. In this new iteration those same rivers that were deemed necessarily conquerable for progress should instead be protected from human intervention. Coverage turned towards efforts to protect water quality and quantity, as well as salmon populations (Healy, 1994; Connor, 1995). Now, in the face of growing calls for large-scale decommissions in the West, we can see the full extent of this transition wherein hydropower went from being a beacon of progress to a symbol of blockade to equity and progress.

Recent Case of Decommission

I believe it's important to address a major case of hydropower dam decommission currently taking place in the United States, specifically in the West- that of the Lower Klamath Hydroelectric Project in Oregon and California. This issue of the Klamath dams did not come up in the articles I sampled for this research but nevertheless it represents an important part of hydropower history in this country. This case reflects many of the complicated themes of the energy system in the United States and the thorny tradeoffs presented by energy justice principles in their practical application at the examination of this system which came up in my research.

The Lower Klamath Hydroelectric Project is a series of dams along the Klamath River in Oregon and Northern California that was originally approved in 1954 (ferc.gov, 2022). In November of 2020, a Definite Decommissioning Plan (DDP) was submitted to FERC for four of those dams along the Klamath River (KRRC, 2020; ferc.gov, 2022). In November of 2022, FERC approved the decommissioning of those four dams, set to begin in the summer of 2024, which will constitute the largest dam-removal project in American history (The Economist, 2021; CPUC, 2021). This came after over 15 years of negotiations between the dams' owner PacifiCorps, local and state government, local indigenous tribes- the Yurok and Karuk, fishing groups, farmers, property owners, and other stakeholders (CPUC, 2021; Ingram, 2022). At the center of this decommissioning are the complicated tradeoffs between river health and therefore, salmon population levels, Indigenous rights, loss of non-fossil fuel electricity

production, water rights, and impact on local economies.

Proponents of dam removal have highlighted that the health of the Klamath River has been severely impacted by the dams along its tributary by allowing sediment buildup, and elevating temperatures- which coupled with agricultural runoff prompt toxic algal blooms (Graber, 2022; NOAA, 2022; Profita, 2022a). In addition, the fish ladders along the dams were found to be inadequate to support the safe migration of the salmon and trout populations in the river (NOAA, 2022; Reiss, 2023). PacifiCorps reported that retrofitting the dams with appropriate fish ladders and other mitigation technologies would come at a greater cost to consumers than decommission (Ingram, 2022; Profita, 2022a). Additionally, indigenous fishing of coho and Chinook salmon in the Klamath river basin are an important part of spiritual and cultural practices for the tribes within the river basin (Graber, 2022; Profita, 2022a, 2022b). Dam removal would support the preservation of these indigenous practices as well as the commercial viability of fishing in the region (NOAA, 2022). Further, these 4 dams only produce 2% of PacifiCorps power generation when running at full capacity, which the company has confirmed will be easily replaceable at low cost to consumers (Ingram, 2022). PacifiCorps will provide energy to those consumers who previously relied on that generated by Klamath hydropower from the rest of their energy portfolio, which consists of coal, natural gas, hydropower, and wind (KRRC, 2020).

Opponents of dam removal claim that dam removal will be ineffective at restoring fish populations because of changing ocean conditions and unknown impacts of releasing sediment previously held back by the dams (Associated Press, 2022). Property owners and community members of the surrounding area worry about the impacts that dam and reservoir removal will have on tax revenue, property values, and local jobs (Associated Press, 2022; Profita 2022a). Lakefront property values have already dropped in anticipation of dam removal (Aschbrenner, 2012; Profita, 2022a). As well, these rural counties depend on the tax revenue paid by PacifiCorps to operate crucial local services like libraries and fire departments (Profita, 2022a). They have requested funds to mitigate the impacts of this revenue loss. Though PacifiCorps and recreation jobs would be lost, many temporary jobs will be created in the decommissioning process, a fact which both supporters and opponents of dam removal have emphasized

(Aschbrenner, 2012; Profita, 2022a).

The Klamath Hydroelectric Project was built at a time when the economic and technological promise of hydropower was sold to communities by developers as a vehicle to ensure cheap electricity and consistent progress for their future. The regulatory mechanisms and scientific tools in place were unequipped to assess the full environmental impact of development and ongoing operation. They also failed to account for the cultural harms to indigenous communities by largely excluding them from decision-making processes. In their conception, hydropower projects from the early 20th century did not have to include decommissioning plans. It is therefore unsurprising now in the 21st century that the reverberations of these decisions at the projects' inception are still playing out in tangled ways. A decommissioning of this size is more than just an experiment in the science of dam decommission and river restoration, it is also contending with the complicated history of hydropower development and long-standing narratives of American values as represented in the evolving prioritization of energy justice principles.

The Evolution of Energy Justice Representations in Reporting and Justifications for Development

There is an important transformation in the way media present news about hydropower over time, and the emergence of Energy Justice principles over time helps illustrate that change. We can see this especially through an evolution of the justifications for large-scale hydropower development. The ways in which different principles are foregrounded in reporting reflect the societal priorities as they shift over time. As an entry point to explore this transition, in this section I will discuss the evolution of the principle of Availability (AVAIL) as a justification for hydropower development. Availability refers to the availability of reliable, consistent energy.

In the early days of hydropower development in the US, the Energy Justice principle of Availability was very often used as a justification for pushing forward hydropower projects. However, over time other energy justice principles gained prominence in the popular discourse and hindered it as a justification for large-scale development. This progression mirrors the rise and fall of hydropower acceptance in the United States, as the boom of development was due to rapid need for electrification and the downfall was brought on by the rise of the environmental movement. This offers insights into the ways in which Energy Justice principles

interact with each other in practice within a complex systems framework.

Energy Availability was foregrounded in coverage in the early days of development from the 1920s through 1930s, especially as big regional electrification projects like the Tennessee Valley Authority (TVA) in the South and the Bonneville Power Administration (BPA) in the West were being proposed and developed. During this time, Availability was often paired with the principle of Affordability (AFFORD), framing large-scale hydropower development as an inexpensive vehicle for economic and social progress:

> "Without this cheap power the South would never have been enabled to set up a rivalry to industrial New England" (Bohn, 1926)
>
> "While in practically all states electricity is a daily necessity in the lives of the people, (in California) it is not only a household necessity, but is essential to the agricultural, manufacturing, and mining industries. It is this necessity for cheap electric power which has supplied the incentive for huge development in California." (Babcock, 1923)
>
> "The factor of cheap hydroelectric power means a great deal in the development of this empire, for it may solve a great problem that has hindered the development of this inland mountainous area—that of securing cheap transportation to the coast and central marketing points". (Rolfe, 1924)
>
> "The plant is expected to play an important part in the use of electric power in industry in and around this section (of Pennsylvania) and also in the electrification of railroad lines between New York and Washington." (Special to the New York Times, 1925)

Even while Affordability was prominently featured alongside it, during this time Availability could stand above other concerns as a justification for development. This is significant because while other energy justice principles that were in opposition to dam development arose in coverage throughout this time, they were markedly less dominant in coverage, and arguments using those principles were largely unsuccessful at interrupting large-scale development projects. For example, in the process of developing the Bonneville Dam in the Pacific Northwest from **1934-1943**, the principles of Responsibility (RESP), Resistance (RESIST), Due Process (DUE), and Intersectionality (INTERSECT) were notably present, especially around the dam's impact on the Chinook salmon population of the region. An article covering the topic poses these

questions:

> "What will the giant Bonneville Dam do to the salmon in the Columbia River? This question threatens to rank with the problem of providing power policy for the vast supply of hydroelectricity to be produced at the great barrier. Already Indians, fishermen and naturalists...have added their voices to an ever-increasing clamor that the dam will mean the extinction of the world's principal supply of Chinook salmon." (Neuberger, 1937)

The statement above is clear evidence of these energy justice principles as concerns expressed by the impacted populations, but these considerations did not have the political and economic strength to constitute real blockades to development.

Another principle that was found at that time, was Responsibility which was showcased through efforts to include fish ladders in the project, "To try to avoid this (loss of Chinook salmon) the government is spending more than $7,000,000 for the most elaborate system of fish-ladders and elevators ever planned." (Neuberger, 1937) This example clearly denotes that the principle of Responsibility was a concern, but not a reason to halt development. Responsibility sits at an interesting intersection between being used as an argument for and against dam construction. On one hand, concerns of Responsibility might be a reason to halt development, but on the other hand Responsibility is framed as a technical problem with a technical solution which pales in comparison to the enormity of Availability of energy. So much so that the concern lay less with the efficacy of fish ladders and other technical solutions and more with having a remedy at all. This is further reinforced by the political popularity of Bonneville despite these energy justice concerns:

> "Few undertakings of the Roosevelt administration are as popular in the Pacific Northwest as the Bonneville enterprise. In the 1936 campaign even the Republicans were enthusiastic in praise of it." (Neuberger, 1937).

The long-term abundance of water for power is mentioned, referring abstractly to the principle of Intergenerational Equity and Sustainability, but crucially is never foregrounded as a reason for development, only as a reason that hydropower will successfully fulfill the mandate of Availability:

> "This water power of California will not waste with use—it cannot be exhausted. It will keep in undiminished flow as long as there is a Pacific Ocean to evaporate the water, as long as the earth revolves in swing the vapor against the high Sierras and as long as these mountains exist to condense it and maintain slopes down which it may fall and flow again to the sea. In other words, there is no wastage to this greatest of Nature's resources when electricity is being generated by water power." (Martin, 1924)

Foregrounding Availability as a social good over an individual benefit also intersected with historically important events such as World War 2 (WWII) which served as an impetus for largescale development to support wartime manufacturing. As mentioned in section 2, in the late 1930's early 1940s, as the United States geared up to engage in WWII, there was an urgency in the need to develop hydropower. Power expansion was deemed "vital for defense" (Crider, 1941), and "a defense necessity" (Lawrence, 1941). As with before, Availability of energy was foregrounded as a priority; however, this represented a critical evolution of why Availability was crucial to the country. While previously, hydropower development and energy availability were positioned as vehicles for economic prosperity and ways to industrialize rural regions of the country, during WWII the popular discourse shifted to covering it as a defense priority, which both heightened the need for intense development, and reinforced the collective need for energy over the personal household-level need.

> "The vast stores of hydroelectricity in the Columbia River, tapped anew today when the first generators at the Grand Coulee Dam were switched into operation, will aid in making this region one of the world's principal areas of aluminum production. A year ago none of this key metal in America's national defense effort was manufactured west of the Mississippi. Now plants in the Pacific Northwest are beginning to produce a fourth of the country's entire output." (Neuberger, 1941)

Thus, Availability as an energy justice principle in hydropower coverage at this time refers not to individual rights and benefits of accessing energy, but instead to these more collective benefits of Availability. This goes so far as to sacrifice individual access to energy in favor of industrial access to support wartime efforts:

> "This means, in non-technical language, that 11,000,000 of the 20,000,000 required

> kilowatts would be supplied by diversion from normal uses... This indicates serious dislocations in normal power consumption habits" (Crider, 1941)

Post-war in the 1950s-1970s, as options for development sites dwindled and environmental concerns started to gain mainstream traction, so too did other justice concerns gain prominence in coverage:

> "Use of electricity in the (Northwest) continues to grow rapidly, but the supply of potential sites for new hydroelectric plants is virtually used up. Dams now line the Columbia and Snake Rivers and a host of smaller tributaries. Environmental objections have probably ruled out use of the few stretches of free-flowing river that remain." (Rattner, 1977)

The call for environmental concerns was due in part to the increased legislative efforts to formalize environmental protections, as previously discussed in section 2. So, while Availability coupled with Affordability still came up as justifications for development, the competing energy justice principles of Responsibility, Sustainability, and Intersectionality that were once ignorable or deemed mere technical challenges were now true roadblocks to stop hydropower. At this time, we see a marked slowdown in the pace of large-scale development, which is due in large part to more projects not making it past the proposal stage. This is largely credited to the increased bureaucratic burden of licensing and going through the regulatory processes for proposed projects. With the passage of important environmental legislation and regulation, there is a rise in the use of Due Process to legitimize and foreground other energy justice principles to stop these projects, which is why we see Due Process co-occur with other energy justice codes such as Resistance and Responsibility (see Figure 10):

> "A Federal Power Commission examiner recommended today denial of an application by Tacoma, Wash., for a license to build a hydro-electric project on the Cowlitz River in Washington. Examiner William J. Costello said the city's plans to protect the river's fishery resources have not been developed sufficiently and suggested the application be dismissed without prejudice." (Tacoma Project Barred, 1951)

On a federal level, development projects began to prioritize Due Process:

> "(President Eisenhower) observed, according to Senator Hennings, that he felt the

> Government should have a role in the development inasmuch as it had contributed heavily to it but that the people in the area should also participate." (Kennedy, 1953)

Objectors were more successful in utilizing official avenues for resistance through appeals to politicians, the Federal Power Commission (FPC), and environmental licensing processes:

> Through an appeal to the Governor "Nature lovers, including members of conservation groups, garden clubs and hikers' organizations are rallying to block installation of 'very unsightly' hydroelectric power plants in this heartland of the storied Hudson Highlands, 50 miles north of New York." (Devlin, 1963)
>
> "Now another battle is shaping up in this normally tranquil farming and vacation region in the Berkshire Mountains. It is a fight that may have implications for power companies and conservationists elsewhere as public sites become a major issue across the nation... Foes of the project contend in a protest filed with the Federal Power Commission that nature would be seriously and irreversible disturbed by a pumped storage plant." (Power Projects Fought, 1970)
>
> "Also awaited are the results of an extensive study being made by the Federal Fish and Wildlife Service on the effects of the consequent flooding on ducks and migratory salmon." (Davies, 1963)

As competing energy justice principles gained prominence during this time, there was a breakdown of the hierarchy of priorities, leading to less public support and certainty around developments:

> "Not all residents of the region oppose the plant. Some favor it and some have not made up their minds. For the latter, the conflict between the need for power and the need to protect the environment has not been resolved." (Power Projects Fought, 1970)

While these shifts in regulation and prioritization were taking place, in the late 1970s into the 1980s the American energy system was faced with major challenges to energy Availability spurred by conflict in the Middle East. With these threats to access of foreign oil, Availability and Affordability re-emerged as important justifications for legislation meant to spur development, specifically, the Public Utility Regulatory Policies Act (PURPA). An important distinction here is that PURPA was a push specifically for small-scale hydropower development.

Though the aim was now of a different scale, there was an attempt to recycle some of the Availability rhetoric from the early 20th century that was once enough to justify large-scale projects and to re-center energy independence as a defense priority:

> "The necessity for furthering hydroelectric development so that adequate source of power might be available to supplement and gradually replace the power obtained by coal is pointed out by the New York State Water Power Commission in its annual report for 1922." (Would Replace Coal, 1923)
>
> "Full development of all the sites, scattered throughout New York State and New England, would triple the region's supply of electricity produced from water power and would save up to 40 million barrels of oil a year." (Knight, 1980)

But, unlike its historical counterpart, the 1980 article immediately brings forward the competing justice concerns such as Resistance and Intragenerational Equity:

> "Opposition to the construction of new dams, however, is strong in communities that would be flooded and among environmentalists and sportsmen. Such opposition has held up the largest of the region's projects, the proposed 840-megawatt Dickey-Lincoln School Dam on the St. John River in the northernmost part of Maine." (Knight, 1980)

Even so, this legislative push to spur hydropower construction led to a boom in applications for hydropower projects in 1981 as investors chased after the once-promised economic prosperity of waterpower:

> "Prospectors once sought their fortunes by panning for the bits of gold that tumbled down the nation's waterways. Now, say a number of modern-day forty-niners, forget the gold: The waterways themselves offer prospects of a fortune. The Great Hydropower Boom of 1981 is what more than a few investors are calling the scramble by thousands of entrepreneurs across the country to obtain the right to harness electricity produced by the movement of water along rivers and streams." (Shenon, 1981)

However, despite the governmental reprioritization of Availability, and Affordability in the form of PURPA as justifications for development and efforts to deregulate the energy industry, they could not undo the legislative protections and institutions that had been put into place that required consideration of other energy justice principles:

> "The only thing that has been generated so far in Augusta is controversy, as has been the case at scores of similar endeavors across the country that were spawned by the Public Utilities Regulatory Act of 1978... As the number (of endeavors) has grown, so have the disputes. Those who want to build the projects complain of long and costly delays from Federal regulators' failure to clear a backlog of applications. And environmentalists who once liked the general idea are aghast at the damage they say the projects, especially the newer ones, will do to many small rivers." (Schmidt, 1984)

From the 1990s till now, the calls to reinvigorate the American hydropower industry bring up Availability as a reason for developing new dams or maintaining existing ones, with attempts to square hydropower as an environmentally friendly energy source:

> "America today gets 7% of its electricity from hydroelectric power, and it could rise to perhaps 11% simply by adding more and better generators to existing dams, Hall said. That would mean more clean energy without blocking additional rivers of flooding more valleys—major environmental drawback that halted most construction of dams in the US by the 1950s." (Pelton, 2008)

As well as a necessary component to the green energy transition:

> "Part of the argument for hydroelectric power is that water can be sent through turbines relatively quickly when the sun stops shining or the wind stops blowing, helping to balance out solar and wind power." (Roth, 2021)

Though those attempts to position hydropower as in line with Sustainability and Responsibility have been met with skepticism from opposing parties:

> "But the possibility of more hydroelectric construction around the world has set off alarm bells among some groups of environmentalists. 'Rivers in the US have been seriously impacted by dam construction,' the conservation group International Rivers said in urging California authorities to disqualify hydropower projects producing more than 10 megawatts of power from receiving carbon credits." (Murphy, 2009)

However, even though Availability is brought up as an argument to keep existing dams or to build new ones, especially pumped storage hydropower, those arguments are often not enough to stop the growing push to decommission large- scale hydropower dams:

> “Two top Democrats in Washington State have come out in favor of eventually breaching four hydroelectric dams in the lower Snake River to try to save endangered salmon runs, a contentious option that environmentalists, tribes and business groups in the region have argued over for decades.” (Walker, 2022)

This showcases the full extent of the transformation of energy justice principles as they emerge in news, and the reprioritization that occurred over the last 100 years of coverage. This reprioritization was largely driven by a greater understanding of environmental impacts which lead to societal shifts in acceptance and greater institutional empowerment for opposition.

CONCLUSION

This research explored domestic hydropower representations in American news media from 1923-2022 in the NYT and LAT, national-circulation newspapers. I found that the rate of publication closely mirrored the historical rise and fall of hydropower, and that the topics of reporting reflected both policy and ideological pushes for development as well as public opinion of hydropower. In my discussion I explored how that evolution of hydropower played out in comparative reporting between coal and hydropower, and how the Western US coupled narratives of harnessing water with idealized progress, I also show the evolution of reporting using the energy justice principles as a lens. I believe these discussions exemplify the transitions hydropower has undergone throughout its history and can offer important insights into renewable energy reporting. Because of the long timespan of analysis, this research has the unique benefit of examining the full lifecycle of hydropower as a technology. This is especially timely as American hydropower is on the precipice of another great transition period- that of large-scale decommissioning, but also at that time that the current administration is making an effort to bring it back. Though hydropower is unique from other energy sources because water sites can serve multiple functions ranging from irrigation to recreation, renewable energy reporting can still gain a lot of insight from this work.

Because of the relatively straightforward nature of my research questions, I continue to be shocked by the lack of research around hydropower in news media on a global scale. That's probably due to a variety of factors- the research analyzing energy news reporting is relatively new and focused on other energy forms, hydropower is not often the subject of splashy headlines in the Global North, and the long timeframe of articles is a double- edged sword that can limit the type of analysis. Nevertheless, I think that by neglecting older energy sources in this work, we are missing out on important lessons on the cycles that technologies in the energy system might be prone to, and we are dismissing lessons for other energy sources, especially renewables, for navigating an ever-changing energy system. Namely, this analysis reveals how changing priorities impact development priorities and community acceptance. The modern media landscape is vastly different from that of 100 years ago when news media was one of the sole sources of information dissemination. As energy sources are represented across

decentralized media, these priorities will be both quicker to evolve and harder to distill as more voices are heard.

Applying an energy justice lens to this analysis offers invaluable insights into examining energy at a systems level. By examining the rise and fall of hydropower, other renewables might avoid pitfalls in energy injustice and be better equipped to handle transitions within the system. I believe that while the findings of my analysis are unique to hydropower, in many ways they are applicable for all energy reporting. The narratives of complement and competition surrounding coal and hydropower are being replayed between natural gas and renewables. And questions of identity are constantly being constructed and deconstructed in the slow process of a clean energy transition.

There are many limitations to this study. Methodologically, I had to make several decisions that limited the scope, and therefore broad applicability, of this work. Firstly, by limiting the sources to the New York Times and the Los Angeles Times, the reporting naturally centered on coastal concerns. Though both papers report on national issues, this study only serves to begin to paint a nationally representative picture. Further research could examine national circulation newspapers from other regions, especially those with important hydropower presences such as the Tennessee Valley. As well, I believe that a different narrative entirely might emerge in smaller local newspapers that was not captured here. A second big methodological decision that I made was to exclude “dam” as a search term for my data. I have already explained the rationale for this exclusion in my methods and I believe it to be a justifiable decision, but it greatly limited my study nonetheless. By excluding “dam” I got virtually no coverage of important sites like the Hoover Dam, because despite its status as a hydroelectric plant, articles referred to it by name directly, excluding it from my search. I also believe this is the reason recent Klamath Dam removal articles were absent from my sample. In addition, this may also have limited my capturing coverage of the World Commission on Dams report in 2000. For that reason, this study does lack important historical touchpoints that may be captured with the inclusion of “dam” as a search term, and which could be a fruitful line of study. Another limitation is that since this research is focused on hydropower, in my discussion of other energy sources, especially coal, I lack a nuanced understanding of the policies and history of those

energies. Thus, my comparative analysis is limited to understanding those energy sources only in relation to hydropower and not in and of themselves. Next, this is not so much a methodological limitation as it was a decision to make this a qualitative versus quantitative content analysis. My research questions and project were always geared towards a qualitative methodology because it's what I felt best equipped to take on as well as I think the exploratory nature of this study lends itself to a qualitative methodology. The Energy Justice framework through which I chose to conduct this analysis is also limited in its systems view, and therefore is a limitation. Related to this, analytically, I made the decision to pursue three 'stories' for this thesis that emerged from the data, but I recognize that this work could have gone down many other paths of inquiry based on interpretation of the data and of the framework that would have brought to light interesting insights. Though careful consultation with colleagues and advisors was an important part of this work, ultimately as a sole researcher, I am a limitation to this study. I hope that this research serves as a starting point for further work on hydropower in news media in the Global North.

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APPENDIX

Categories Codebook

Code	Description	Inclusion criteria	Exclusion criteria	Example
TECH	Technology aspect of hydropower	talks about technology directly related to the functioning of a hydropower dam such as a turbine	other technologies not directly related to hydropower (ex. other energy types, a technology that is using hydropower to power their operations, energy grid technology)	"The plant is automated, using two cross-flow turbines, which were built in Germany, to turn two generators that produce as much as 1.4 megawatts of power" (Hydroelectric Station Comes To Life Again Upstate, NYT, 1980)
GRID	The energy grid	talks about how hydropower is connected to the grid, logistical issues with the grid, grid technology		"Inasmuch as Los Angeles will be the most considerable market for energy produced at the proposed Boulder Canyon Dam plants, immense transmission lines must be built across the 300 miles of mountains and the desert between this city and the dam" (River Gauging Discontinued, LAT, 1927)
ECO	Ecosystem +environmental impact	mentions negative impacts of hydropower on ecosystems (ex. fishways) or the environment		"As many as 11 million salmon may have once made the annual trek from the Pacific up the Columbia to spawning grounds as far inland as Idaho. Now only about 2 million return to those stream beds." (Hydropower Changes Offered to Save

				Salmon, LAT, 1995)
GREEN	Positive environmental aspect of hydropower	mentions positive impact of hydropower on the environment (ex. fewer emissions, "green/clean")		"Mr. Drouin noted that the Cree and Inuit would participate in the environmental review, adding that hydroelectricity was more reliable than imported oil and far cleaner than coal and other potential energy sources." (Environmental Study is Likely to Delay Quebec Hydroelectric Plan, NYT, 1992)
HEALTH	Health concerns	talks about impacts of hydropower on human health and/or of community		"But Washington state officials said the study, if it flags the presence of harmful chemicals in the Columbia, could mean as much for humans as for fish." (Salmon Sex Changes Worry Researchers, LAT, 2000)
SAFETY	Safety concerns	talks about physical safety concerns around a hydropower project (ex. dam bursting) includes displacement due to crisis (ex. Breach)	does not include community safety in terms of crime etc.	"Dams are categorized as high, significant, or low hazard in the National Inventory of Dams database. High hazard means loss of human life is likely if a dam were to fail. A significant rating means no deaths are likely, although economic and environmental damage are possible." (Many of America's Aging Dams are Neglected, and Catastrophic Failures Lurk, NYT, 2019)
GOV	Governmental aspects	talks about laws around a project, regulation agencies, or a political issues around a project (ex. politician pushing a		"In the Legislature, one leading Democrat, Fred Keeley, has introduced a bill that would postpone the process, by authorizing the state to purchase the utility's land and

		project)		other assets and retain them for up to six years while deciding whether to transfer individual parcels to public agencies or to sell them to private bidders." (Freeing a Hydroelectric Giant, California Frets about Control, NYT, 2000)
COST	Cost of project	mentions costs (ex. of a new project, of a shut down)		"The district has spent $8.5 million on plans involving the Clavey and estimated that the dam would cost $345 million." (Power Co. Gives up Plans for a Dam Near Yosemite, LAT, 1995)
BEAUT	Aesthetic	talks about the aesthetic of the hydropower project or impact on aesthetic of rivers/landscape		"The application was opposed by some regional organizations because of what they call 'visual pollution' by new high towers near Cooperstown, Glimmerglass State Park and the Catskill Park." (Hydropower Line Backed in Report, NYT, 1984)
COMP	Comparing Technology	compares hydropower to other energy type		"Power from the Niagara plant costs less than half a cent per kilowatt-hour to produce. By comparison, electricity produced at New York City's oil-fired plants can cost 6 cents or more per kilowatt-hour to produce." (Downstate Pressing for Hydropower, NYT, 1985)
SHUT	Shut down of plant	describes a plant being shut down or decommissioned		"The National Park Service has shut down a small hydroelectric plant at this popular park, concluding the operation was incompatible with park values." (Yosemite Will Close

				Hydroelectric Plant, Calls it Incompatible, LAT, 1985)
ECHANGE	Environmental change	describes an environmental phenomenon that has impacted hydropower (ex. drought, natural disaster etc.)		"Curtailment of hydroelectric power production caused by a severe drought in 1952 resulted in a decline in its net power revenues for the fiscal year ended June 30, the Tennessee Valley Authority said today." (T.V.A. Net Cut by Drought, NYT, 1953)
DISPLACE	displacement	describes people being displaced because of hydropower siting		"The construction of the new plants will require the relocation of about twenty miles of track of the Southern Railway. So huge is the project that the damming of the streams will wipe out several of the small towns. Damages, of course, are included as expenses in the project." (Mellon Group Far-Seeing, LAT, 1929)
MAINTAIN	maintenance	maintenance and upgrade of dams, including fish ladders		"Refurbishing is making the United States' 140 large dams more efficient. When the job is completed, the nation will have up to 40% more hydro-generated capacity." (US-Soviet Deal Gives New Spark to Hydropower, LAT, 1991)
ECONPOS	positive economic impact	mentions increase in jobs, and/or positive economic effect of hydropower	does not include increased social access	"Pump-storage hydropower plants like this one are becoming the hottest commodity in the power business."(Revenue Streams from an Old Source, NYT, 1998)
PROGRESS	hydropower	mentions		"'The advent of hydro-

	energy as progress	electrification/energy as modernization and/or progress		electricity, so developed that it can revolutionize heavy industry, and accompanied by equally developed supporting facilities, serves mainly to introduce a new generation to a historic occurence.'"(Ickes Asks Sway over Hydro-Power, NYT, 1945)
SOCIALNEG	negative social impact	increase in worse social outcomes for the community, such as increased crime, as well as interference with recreational uses of water	does not include blackouts	"Such operations are good in terms of energy production and economics. They may not be so good for the river environment, or for people who want to use the river for recreational or other purposes." (Future of Hydropower Must Navigate Crosscurrents of Competing Interests, LAT, 2001)
SOCIALPOS	positive social impact	increase in positive social outcomes for the community such as safety and education, as well as increase in recreational uses of water	does not include increased jobs	"Dams create many auxiliary attractions." (Northwest's Dams, NYT, 1953)

Energy Justice Codebook

Code	Energy Justice Principle	Inclusion criteria	Exclusion criteria	Example
AVAIL	Availability of energy	talks about energy available due to hydropower, how it will impact electrification (ex. providing energy to rural community), issues with consistent energy (ex. Taking down a dam)	blackouts due to grid issues	“The present needs of the area where the power will be available are insufficient to require the full production of the new project, plus the generating facilities already in operation." (Niagara Power Starts Flowing at Plant, NYT, 1961)
AFFORD	Affordability of energy	changes in energy prices (lower and higher), inconsistencies in pricing	cost of project development	“The corps has said removing the dams, a clean energy source, would increase energy costs for nearby residents and increase greenhouse gas emissions from other power sources." (Clearing a Path to Save the Chinook Salmon, NYT, 2022)
DUE	Due process	community input and institutional procedure on projects (did people know this project was happening? is opposition included in considerations? are there official ways for communities to air	protests	"Yesterday's hearing, sponsored by Assemblyman William B. Hoyt, a Buffalo Democrat, and State Senator Franz S Leichter, a Manhattan Democrat, was one of the first in what is expected to be a lengthy series of public forums to examine the contracts in coming months." (Cree Chief Asks New York to Drop Hydroelectric Plan, NYT, 1991)

		grievances? Are people being displaced? is there a process that people can get involved in?) includes regulatory procedures		
ACCOUNT	Transparency and accountability	is there open access to information available to the community such that they can hold the project and or government accountable (who is profiting from the project, where is the project going to be)		"The fundamental questions of just where power is located, what the construction costs will be, and how each regional system can be be laid hold of according to a unified plan--these essential elements of knowledge must be furnished to the public." (Airplanes Chart Sites for Power, NYT, 1926)
SUSTAIN	Sustainability	talks about the long-term viability of/impact on natural resources (are they considering drought? Are they talking about this like a never-ending solution?)	fishways	"The falling waters from the mountain tops are an unfailing source of power" (Power is Basis of Development, LAT, 1923)

INTRA	Intragenerational equity	talks about if this project unduly burdens some people (ex. rural area siting for urban energy, farmers)		"T.M. Hancock, publisher of the Westmoreland Mail, launched an editorial attach in which he asserted that valley town residents are the only ones who would benefit from the power plants. The ranchers, he declared, will assume a large part of the cost without reaping any direct benefit." (Cheap Light for Valley, LAT, 1927)
INTER	Intergenerational equity	will this project impact future (ex. long term project will allow future gens to have more access; project siting will destroy community for future gens)		"'This is a decision for the next 100 years,' Stirling said. 'It's really an attitude or a process that says, 'we have a right as San Diegans to address our energy future'". (Hydropower highlighted in SDG&E Buyout Plan, LAT, 1989)
RESP	Responsibility	steps being taken to minimize negative impacts on the environment, taking responsibility for the impacts of the project, mitigation efforts (ex. fishways, changing site)	long term viability of a site ex. drought	"'We're not talking about the Hoover Dams of old,' said Jose Zayas, a former Energy Department official who oversaw the study. 'There have been some big technological advances that now let us produce more energy in a much more sustainable way.' Some companies are designing new turbines that allow fish to pass safely through while others are looking at ways to reduce oxygen depletion of the water caused by dams." (Environmentalists and dam operators start making peace, NYT, 2020)

RESIST	Resistance	opposition to project (ex. protest for siting/relocation; lobbying group that is against hydropower)	Labor strikes	"In Transylvania County in western North Carolina, a coalition is battling a developer's plans to put a dam on the scenic Horse pasture River." (Hydroelectric Dams Generate Debate, NYT, 1984)
INTERSECT	Intersectionality	mentions another social cause (ex. labor strikes for workers' rights in coal, indigenous rights)		"Striking Department of Water and Power workers intensified their efforts to win an 18% wage hike by walking out Saturday night at all Los Angeles hydroelectric plants, a move that could cut off one fifth of the city's water supply." (DWP Strike Expanded to Water System, LAT, 1980)