Contested Futures: Reimagining Energy Infrastructures in the First Oil Crisis

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Abstract: »*Umkämpfte Zukünfte: Energieinfrastrukturen in der ersten Ölkrise*«. The oil crisis of 1973/74 is commonly seen as the advent of state-led attempts to restructure rich societies' energy infrastructures. Indeed, from a historical perspective, crises have repeatedly facilitated infrastructural transformations toward sustainability. But under what conditions can crises challenge existing orders and promote alternative infrastructures? Drawing on a historical vignette that reconstructs the public discourse emerging around the first oil crisis in the United States, this article proposes to reconsider the transformative potential of crises from a perspective focusing on the contested constitution of the future. We argue that the potential of crises to foster broader processes of infrastructural change is dependent on the capacity of actors to discursively challenge hopes and expectations inscribed in established infrastructures. As the example of the first oil crisis illustrates, crises are instances in which political actors engage in interpretative struggles to settle on whether disruptions present "real" crises that require infrastructural transformation – or are mere accidents, errors, or irregularities that existent infrastructure can either withstand or requires only minor adaption as a result. In these discursive struggles, images of the future are contested on three layers: tangible experiences are linked to or detached from broader future consequences; potential causes are projected into the future or relegated to the past; and feasible future remedies are conceived or discarded. It is on these three layers of crisis discourse that the future is "opened up," and alternative infrastructures become conceivable.

Keywords: Crisis, future, discourse, energy, infrastructures, interpretation, conflict, oil crisis 1973/74.

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1. Introduction

Crises are seen as a major driver for the recent renewal of scholarly interest in infrastructures. In an effort to explain the current infrastructural turn in anthropology, Dominic Boyer (2018, 223) describes it as "striking that the conceptual rise to intuitiveness of infrastructures roughly parallels the crisis and stasis of neoliberal governance since 2008." The planetary multi-crisis characterizing the Anthropocene, Boyer continues, compels social scientists to take up the issue of infrastructure (cf. Boyer 2022, in this volume). In a similar vein, Klinenberg, Araos, and Koslov (2020) maintain that in light of a deepening climate crisis, infrastructure needs to be positioned more prominently on the sociological agenda. What underlies such appraisals for an infrastructural turn in the face of crisis is the assumption that, first, large infrastructural transformations toward sustainability will become inevitable; and, second, the disruptive experience of crisis may trigger such fundamental change. In the words of Star (1999, 382), infrastructures characteristically become "visible upon breakdown" and are hence subject to attempts at collective remodeling in situations of crisis.

Indeed, from a historical perspective, crises have repeatedly served as catalysts for infrastructural transformation: the New Deal that shaped US society and involved large infrastructural reforms after the 1930s cannot be explained without the groundbreaking experience of the Great Depression (Gerstle and Fraser 1989). The European Bovine spongiform enephalophathy crisis (BSE, also known as "mad cow disease") crisis in the late 1990s gave way to new agricultural policies that fostered "alternative," often organic, infrastructures of food production and supply (Oosterveer 2002; Feindt and Kleinschmit 2011; Sutherland and Darnhofer 2012). In numerous countries the politics of nuclear energy were reshaped by the crises of Three Mile Island, Chernobyl, and Fukushima (Bernardi et al. 2018; Useem and Zald 1982). Similarly, the oil crisis of 1973/74, which this article explores, is today understood as the advent of state-led attempts to promote renewable energy and restructure rich societies' energy infrastructures.

The hope articulated in parts of the infrastructure literature (cf. Degens, Hilbrich, and Lenz 2022, in this volume) – that a sense of crisis could promote infrastructural change toward sustainability – resonates with a basic tenet of modern sociology: that transformative potential inheres in crises. Distinctions between fluid crises and structured routine are arguably foundational for neo-institutionalist theory (Powell and DiMaggio 1983), recent French pragmatism (Boltanski and Thévenot 2006), and historical sociology (Capoccia and Kelemen 2007), to name but a few. Social structures, it is commonly argued, only give space to transformative agency in *unsettled times* (Swidler 1986). Notwithstanding the widespread reliance on crises to

explain change, systematic exploration of how such disruptions are constituted is comparatively rare – both within the literature on infrastructure and beyond.[1] The conceptual framework and empirical illustration of this paper present a modest contribution in this direction.

The approach we suggest provides a more nuanced understanding of whether and how crises, natural disasters, and other tangible catastrophes can bring about infrastructural transformations toward sustainability. Drawing on recent scholarship on the role of imagined futures (Beckert and Ergen 2021; Beckert 2016; Beckert and Suckert 2021; Suckert 2022), we focus on how discursively constructing a disruption as a genuine crisis involves engaging with alternative futures and contesting the hopes and expectations inscribed in established infrastructures. We hence complement ongoing scholarly debates on infrastructural transformations by proposing an approach to the transformative potential of crises that highlights their capacity to *open up the future*.

This capacity, we argue, crucially depends on multilayered interpretative struggles in which societies make sense of the meaning of a situation (Diaz-Bone 2017). As activists, experts, journalists, politicians, and other social actors struggle with whether disruptions present real crises that necessitate infrastructural change or are mere accidents, errors, and irregularities that existing infrastructures can withstand, they also challenge established hopes and expectations and render the future more fluid. We suggest distinguishing three conceptual layers on which the future is contested in such discursive controversies: tangible experiences are linked to or detached from broader future *consequences*; potential *causes* are projected into the future or relegated to the past; and feasible future *remedies* are conceived or neglected. It is on these three layers that the future is "opened up" – and alternative infrastructures become conceivable in the first place.

The conceptual framework we propose is informed and illustrated by a historical vignette of American discourse on the first oil crisis of 1973/74. Drawing on extensive archival material, the analysis historically reconstructs the major controversies over the nature and consequences of the oil shock. It shows how a tangible disruption became framed as an *energy crisis* that eventually challenged existing infrastructures. Contesting the future, we find, was crucial to this process. We show how, in their controversies over plausible causes, consequences, and remedies to this crisis, actors constantly referred to the future and called the hopes and expectations inherent in existing energy infrastructures into question. Through this opening up of the future of energy infrastructures, alternative energy supply systems became conceivable, facilitating not least the emergence of renewable energy as an institutionalized policy field.

[1] For foundational thoughts, see Dobry (1986); Knöbl (2022).

Taken together, our conceptual framework and the empirical example provide a novel perspective on crises and their potential to bring about infrastructural change toward sustainability. The paper complements the current interest in "crises" within the infrastructural turn by suggesting a perspective that considers crisis – just like infrastructure – as a phenomenon requiring interpretation. While we acknowledge the salience of material infrastructure and tangible dysfunctions, we show that whether crises can facilitate change (or not) is to a substantial degree reliant on their discursive constitution and the inherent multilayered contestations that allow the future to be opened up. It is particularly in the contemporary moment, beset with environmental and geopolitical crises and urgent – but for now futile – calls for infrastructural change, that understanding such transformative potential is so pertinent.

2. Can Crises Bring about Sustainable Infrastructures?

The literature on infrastructures is increasingly concerned with the phenomenon of crisis (Klinenberg 2015; Freudenburg et al. 2012; Graham 2010; Dalakoglou 2016). Particularly, scholars are interested in crises as instances in which established infrastructures become visibly dysfunctional or break down (Anand, Gupta, and Appel 2018, 3). While infrastructures have famously been defined as "invisible" (Ruhleder and Star 1996) in normal circumstances, it is in times of crises – when they can no longer deliver as they are supposed to – that infrastructures are assumed to become visible and "dys-appear" (Niewöhner 2015).

This visible dysfunctionality, understood as the overt mismatch between an abruptly changing environment and established infrastructures, is assumed to both require and facilitate infrastructural change. With respect to the multiple crises of neoliberal, carbon-fueled capitalism, authors like Dominic Boyer (2018) are therefore optimistic that the tangible experience of breakdown, the "deepening shadow of the Anthropocene," can indeed help to bring about alternative, more sustainable infrastructures. Once such "revolutionary infrastructure" is implemented to a critical scale, argues Boyer (2016, 2018), it will also necessarily foster new, more sustainable practices and give way to alternative modes of thinking.

In line with the neo-material and posthuman turn that dominates many current analyses within the "infrastructural turn," infrastructures in the face of crisis are not only seen as passive material objects. Rather, scholars are interested in what infrastructures do – or cease to do – in crisis situations. Recent contributions have explored how crises, natural disasters, and other catastrophic events are "engineered" through defective, flawed, or lacking infrastructures and the social practices that enact these infrastructures

(Freudenburg et al. 2012; Graham 2010). Similarly, analyses pay attention to how infrastructures mitigate or amplify the social and distributional consequences of crises (Klinenberg 2015; Dalakoglou 2016). Following the overall tenets of the infrastructural turn, such scholarship is careful to highlight the social and political processes necessary to establish, maintain, or dismantle infrastructure and how infrastructure is put into practice, related to and made sense of in discourses. Instead of taking infrastructure for granted, this research shows it to be socially constituted.

While scholarship within the infrastructural turn thus takes great care to deconstruct infrastructure, its approach to crises appears much more affirmative. In the aforementioned literature, crises are first and foremost considered as tangible, often material ruptures and dysfunctions and not as a phenomenon that actors need to interpret and make sense of in the first place. Until now – and in line with its often neo-materialist orientation – this literature pays little attention to how crises are discursively constituted as "real." The potential of crises to trigger change is mostly attributed to their material features.

In some respects, this understanding of crisis resembles, albeit unintentionally, the perspective prominent in most economic models of change toward environmental sustainability. Economists conceptualize crises as "exogenous shocks," necessary for sustainable transformation. The material reality of crises, they argue, can modify actors' cost-benefit calculations and thus increase the attractiveness of environmental protection or sustainable infrastructures. Anthony Downs, for example, speculated that "the cause of the ecologist would […] benefit from an environmental disaster like a 'killer smog' that would choke thousands to death in a few days" (Downs 1972, 46f). Similarly, it is argued that a potential disaster, like climate change, of which the dramatic material dysfunctionalities can (at least in the Global North) not yet be fully experienced, is unlikely to generate substantial change.[2]

While scholarship within the infrastructural turn clearly does not understand crises as "exogenous shocks," it still primarily depicts them as material dysfunction and pays less attention to their interpretation and socially contested constitution as "real." In economic accounts as in much of the anthropological literature on infrastructures, the potential of crises to trigger substantial infrastructural transformation toward sustainability is thus derived from the material features and dysfunctions of the given rupture.

The perspective we adopt in this article differs from such approaches. What we propose is a more ideational perspective that can complement neo-

[2] For an economic calculation of the potential costs of climate change, see Stern (2007). Psychologists like Sunstein (2006), however, have argued that as long as risks cannot be experienced and remain "unavailable," they have difficulty stimulating enduring public concern.

materialist approaches by highlighting the social constitution and contested discursive construction of crises (cf. Roitman 2013). The focus on material dysfunctions may obscure the complex social and political processes that turn tangible disruptions into "real" crises and make deviations from established (infra-) structures imaginable, feasible, and reasonable. From this perspective, material dysfunctions are hardly self-evident drivers of sustainable transformations and infrastructural change, but require collective interpretation. Drawing on a sociological perspective that foregrounds the salience of imagined futures (Beckert 2016; Beckert and Ergen 2021; Suckert 2022; Beckert and Suckert 2021), we argue that the transformative potential of crises is dependent on political actors' capacity to discursively open up the future. It is by challenging the hopes and expectations inscribed in established infrastructures that alternatives become conceivable.

At first sight, such an ideational account of transformation appears opposed to how scholarship within the infrastructural turn, particularly the idea of "revolutionary infrastructure" proposed by Dominic Boyer (2016, 2018), conceptualizes infrastructural change toward sustainability. While Boyer, from a neo-materialist perspective, argues that the implementation of innovative sustainable infrastructures will enforce new practices and alternative modes of thinking and thus lead to a changing "epistemic infrastructure" (Boyer 2018, 235), we instead foreground the salience of such epistemic infrastructure in the first place. As our historical vignette of the crisis discourse surrounding the first oil crisis maintains, discursively challenging sedimented expectations and opening up the future are crucial for bringing about tangible institutional and infrastructural change.

And yet, neo-materialist and ideational approaches to infrastructural transformations toward sustainability are not necessarily at odds with one another (Bowker 2018, 205). Rather, they offer different perspectives on mutually intertwined processes. While Boyer's approach provides valuable insights into how alternative infrastructures, once brought into material existence, can "fuel" a sustainable revolution, our approach highlights how such revolutionary infrastructure can be reimagined in situations of crisis. As we will show, it is the discursive struggle over whether a crisis is "real" that can open up the future and give way to imaginaries of change and alternative ways of thinking about infrastructure.

3. Crisis and Infrastructure as Temporal Concepts

Before we turn to the contested construction of crises in the next section, it is apt to briefly explore the two central concepts of infrastructure and crisis,

particularly insofar as both concepts refer to divergent temporalities and inverse relations to the future.

In line with Larkin's (2013, 329) fundamental observation, we can consider infrastructures as "matter that enable the movement of other matter. Their peculiar ontology lies in the facts that they are things and also the relation between things." Yet, this amalgam of things and their relations is itself related to a particular perception of time, duration, and the future. As most prominently the work of Anand, Gupta, and Appel (2018) has emphasized, infrastructures are *saturated with imaginaries of the future*. They are embodiments of past hopes and expectations, predictions, and planning. Particularly, they incorporate promises of modernity, of progress and growth (Anand, Gupta, and Appel 2018, 19f). Infrastructures give such imagined futures a tangible form, they solidify and stabilize them – but in doing so they also *create inertia*. Boyer observes for established, conventional energy infrastructures a "path dependency while also casting a dark shadow of improbability of any imagined alternative to the long-chained fossil status quo" (Boyer 2018, 236). Once established, infrastructures appear hard to reverse. This is even more the case as infrastructures are also *saturated with expectations of continuity*. Ruhleder and Star's (1996) basic definition already characterizes infrastructure as extending the present situation and reaching well into the distant future. Infrastructures are supposed to endure over time, often longer than a human lifetime, and enable social practices as expected. Authors like Akhil Gupta (2018) have rightly pointed out how this sense of solidity and stability is not self-evident but requires substantial maintenance and adaptation work, which is often overlooked. Yet, as "infrastructure seeps into the background, it sediments out and disappears from view" (Niewöhner 2015), it conveys a temporal perception of stability, routine, and taken-for-granted continuity; of a present that can be prolonged well into a linear future, which will endure and on which expectations can be built.

In this sense, the inherent temporality of infrastructures differs significantly from the temporality associated with the concept of crisis, which emphasizes the precise opposite of taken-for-granted continuity. Indeed, the concept of crisis has long been at the heart of sociological investigations. Since its founding era, the discipline was considered a "science of crises" (Koselleck and Richter 2006, 377), first and foremost concerned with dysfunctional societal dynamics and ruptures. Nevertheless, many sociologists have conceptualized crisis as an ambivalent phenomenon. Most pronounced in Marxist traditions, crisis is considered to hold the potential for "progressive" transformation (Boltanski and Thévenot 2006) and counter-hegemonies to emerge. Crisis holds the potential for better futures to be brought about.

While sociological work has never developed a universal definition of crisis, it has pointed to (at least) three respects in which crises refer to temporality

and the future. First, a crisis is considered to be an *unexpected development*, a sudden deviation from the predicted "regular" course of action, from the assumed "normal condition" (Habermas 1973). It can be understood as a mismatch between the future as we expect it to be and reality as it actually unfolds (Mayntz 2019). In situations of crisis, previous plans, forecasts, projects, and aspirations become redundant. Considered a turning point (Abbott 2001, 240ff), crisis is a decisive moment (Walby 2015) that divides the flow of time into a regular "before" and an unexpected "after." Crises thus counteract any sense of continuity. This of course also applies to the hopes, expectations, and perceptions of continuity inscribed in established infrastructures. As unexpected phenomena, crises may interrupt the orderly operation of infrastructures. Second, however, crises differ from other unexpected events in the *scope of the uncertainty* they imply. For accidents and errors, even if they may have catastrophic effects (Perrow 1984), experts can point at what technically went wrong, fix it, and prevent it from happening again (Engelen et al. 2011, 2-3). We may not be able to explain outliers and irregularities, but we consider them to be restricted to a particular situation. Such unexpected experiences usually do not challenge established infrastructures per se. Referring to a disruption as crisis, by contrast, implies a degree of uncertainty that projects into the future. Crises challenge basic taken-for-granted principles upon which expectations – and thus infrastructures – are built. Gramsci (1971) famously characterized crises as "interregnum," in which the established order is dying, while "the new cannot be born." Not plans and forecasts, but also the established frames, explanations, and narratives on which such imaginaries of the future rely are thus made redundant. In crises, established modes of action and familiar responses cannot provide solutions (Jessop 2013). As the experience of the past can no longer serve to orient the future, the foundations, the basic reasoning underlying enduring infrastructures, become challenged. The flip side of this extended scope of uncertainty is, however, that crises are also instances in which the future opens up and alternative paths become conceivable. Third, and finally, the reference to crisis involves the notion of an *undetermined future* that is open to agency. Like the related notion of risk (Beck 1986; Reith 2004), the concept of crisis refers to a modern conception of the future, i.e., a future that can be managed, handled, and shaped and is therefore seen as "a field of possibles to be explored and mastered" (Bourdieu 1979, 8). A crisis does not involve disastrous automatisms. Instead, referring to something as a crisis highlights contingency and hence human agency (Emirbayer and Mische 1998).

In summary, the concept of crises, as depicted in the sociological literature, is thus associated with a perception of the future that appears to be in conflict with the temporality of established infrastructures. While infrastructures are sediments of imagined futures and convey a sense of linearity and continuity,

crises refer to decisive tipping points that can "open up" the future and trigger alternative projections. Crises may thus be well-suited to disrupting and transforming seemingly path-dependent infrastructures. However, the remainder of this article maintains that this "opening up" of the future cannot merely be derived from material dysfunctions, but needs to be understood as a genuinely social and therefore contested process. When assessing the potential of crises to bring about infrastructural change from a sociological vantage point, it is therefore crucial to explore how they are socially constituted and how the experience of crisis becomes discursively contested.

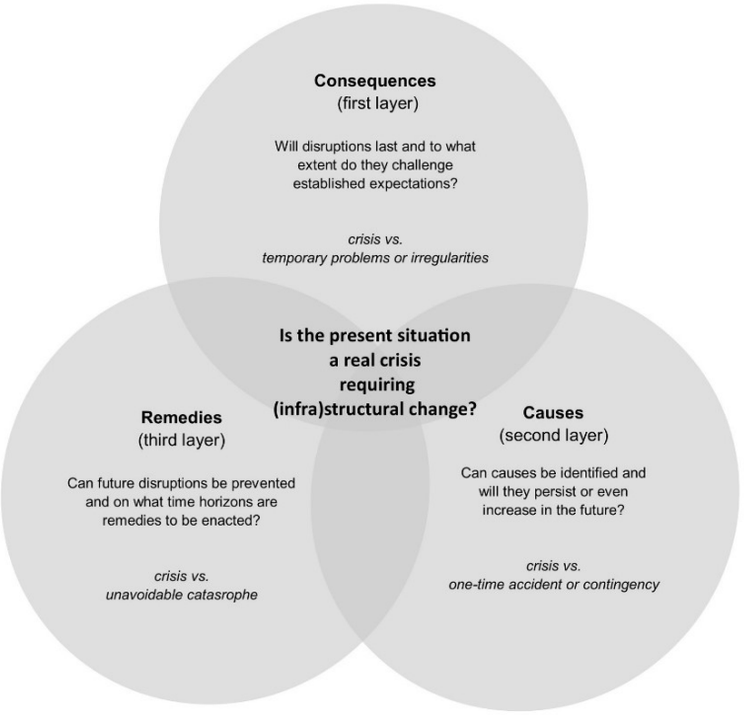
4. Contested Futures and the Three Layers of Crisis Discourse

How does a crisis emerge? In theory, as for example in stylized models of bank runs (Diamond and Dybvig 1983; Merton 1948), there may be crises that cannot be traced back to any material disturbance and are entirely socially constructed. However, most empirical crises, and particularly environmental ones, entail a "material core," i.e., a tangible disruptive sequence of events that often upsets the orderly operation of infrastructures. What is more, how well such a material core and associated dysfunctions are suited to being constructed as a crisis is not entirely independent of its structural characteristics, e.g., to what degree the experienced disruptions actually differ from previous expectations, or the scope of the turmoil caused by the material disturbance. Some "material cores" can more easily be interpreted as a crisis than others. Nevertheless, in order to make sense of any disruptive development or infrastructural dysfunction as a crisis, actors need to interpret the respective sequence of events and relate it to broader understandings. Crisis "is not some objective condition," writes Colin Hay (1996, 255) in summarizing this argument, but "brought into existence through narrative and discourse." Classics in the literature on infrastructures have worked with a similar constructionist notion of the topicality of infrastructures, suggesting that they are "relational" phenomena (Ruhleder and Star 1996, 113; Star 1999, 380).

The perspective we propose in this paper resonates with such constructivist accounts of the emergence of crises and related literatures (Roitman 2013; Walby 2015; Hay 1996). However, we make this perspective more specific by arguing that crisis discourse is shaped by multilayered interpretative conflicts in which perceptions of the future play a critical role. To advance this argument, we propose conceptually distinguishing between three discursive layers on which the future is contested: causes, consequences, and remedies (see Figure 1). The question of whether the disruption at hand

qualifies as a "real crisis" that requires infrastructural change (or whether it should be considered as something else) is at the heart of these interpretative struggles. Only when causes, consequences, and remedies can be related to the future can a convincing crisis narrative emerge out of the discourse.

Figure 1 Contested Futures: Three Layers of Crisis Discourse



Source: Authors' illustration.

A first important layer of conflict concerns the *consequences of a disruption*. To be considered a crisis – and not just a temporary problem or irregularity – the material core needs to be discursively linked to broader frames that stretch the direct context and challenge the established order. Plausible scientific forecasts about possible catastrophic futures and dystopic scenarios of a coming infrastructural breakdown are crucial in this endeavor, because they spell out which practices, life spheres, populations, or industries might be affected in the future – and where this predicted future deviates from the previously expected future (Weingart, Engels, and Pansegrau 2007) that is built into existing infrastructures. Providing credible narratives about the devastating long-term consequences of a disruption gives it significance beyond the situation (Walby 2015, 19). In contrast, those who oppose

interpretation of a disruption as a crisis (see also Boyer 2018, 239) will renounce the scope of the disruption, tying it closer to the present and representing it as a temporary issue that will not have consequences for the future.

A second interpretative struggle concerns the *causes of a disruption*. Causality surely involves explanations oriented toward the past and spelling out what went wrong. However, framing a problem as a crisis requires these assumed causes to be projected into the future. Credible crisis narratives need to spell out why causes will persist or even become more pronounced in the future. This is particularly the case if established infrastructures – which, as we have seen, convey a sense of continuity into the future – can be identified as contributing to the disturbance. Consequently, disruptions are depicted as being bound to happen again or to get worse, unless the underlying mechanism is removed or the affected infrastructures revised. Actors who are intent on preventing a situation being perceived as a crisis will instead emphasize finite causes and portray the situation as a one-time accident; or they will refer to contingency and reject causalities altogether. Such actors will certainly neglect infrastructural problems as a genuine cause to the disruption. As interpretative struggles over the causes of a disruption involve attributing blame and responsibility, they can be assumed to be especially fierce power struggles (Scholz 2016).

Making sense of the causes sets the stage for a final layer of interpretative struggle concerned with possible *remedies to a disruption*. The discursive frame of a crisis is opposed to the notion of determinism, as it involves an element of agency. Crises need not be understood as catastrophes that unavoidably have to be endured, but as developments that can be overcome or prevented through creative action. Indeed, the crisis narrative implies an urge to act, the necessity of a remedying response. However, the proposed remedies may differ substantially in their time horizons: they can be depicted as one-time emergency actions, mitigating immediate consequences with minor infrastructural adaptations and proposing a return to the previous normality; or they can be depicted as long-term solutions that suggest alternative futures and profound (infra)structural change. The alternative remedies that can credibly be depicted are, of course, highly interdependent with acknowledged causes and consequences of the crisis (cf. Gibson 2012).

Finally, we argue that these distinctive spheres of contention constitute layers rather than stages or phases of an interpretative struggle in which a "real crisis," which will require infrastructural change, is constructed (Jessop 2013). Whether a credible crisis narrative promoting an alternative path to the future emerges depends on the salience of dominant interpretations for each of these layers. There has to be an almost hegemonic perception of consequences, causes, and potential solutions to a crisis. Yet this is not a linear process, as all three layers are interdependent and interpretative

struggles can move back and forth between the layers – or address all of them at the same time. What is more, even if a disruption is widely acknowledged as a real crisis, its consequences, causes, or remedies can be challenged and future prospects can become contested again. In line with what classics on infrastructures call their "relational" property, the constitution of a disruption as a genuine crisis requires "relational work."

5. The Social Constitution of the First Oil Crisis: A Historical Vignette

We illustrate our conceptual argument with a historical vignette of the social constitution of the first oil crisis (1973/74) in the United States, which we believe is particularly well-suited to demonstrate the fruitfulness of our argument. The 1973/74 oil crisis remains one of the rare historical episodes in which the sociotechnical infrastructures of capitalist postwar societies were fundamentally questioned. It also represents an episode that is widely remembered as a textbook case of an "exogenous" shock, and hence of a "natural" crisis. Our reconstruction of the intense debate surrounding the criticality of the moment, and hence the topicality of energy infrastructures, exemplifies the value of the perspective we are proposing. It exemplifies how the discursive contestation as to whether the crisis was real or not invoked alternative futures and brought about a collective reimagining of infrastructures.

Today, the first oil crisis is unequivocally understood to have been a watershed moment in the history of the postwar social order. It has been made responsible for grave societal transformations in the fields of economic policy, environmental protection, and geopolitics. Our focus here is on the less often discussed historical juncture of the advent of state-led attempts to restructure Western energy systems. The process we hope to illuminate is how the energy system turned from a taken-for-granted infrastructure into a contested topic. We document how multilayered interpretative struggles between an increasingly large swath of US elites opened up the future and allowed for societal coalitions and policies that deviated from decades of established practice in the energy arena.

The material trigger for the first oil crisis consisted of a four-months-long reduction of oil exports by a number of Arab oil-producing nations. The embargo constituted a political reaction to US support of Israel in the Yom Kippur War. While Arab nations had made public threats to use the "oil weapon" as part of their foreign policy arsenal since the 1950s (Yergin 1990), an earlier attempt to put pressure on Western nations through coordinated

supply restraints failed in 1967.[3] In 1973, however, the price reactions to the cutbacks were severe. Oil prices roughly quadrupled and threw importing nations' economies into economic turmoil. Of high symbolic significance were long lines at gas stations and a series of emergency rationing measures, such as imposing the national speed limit in the US or banning Sunday highway driving in Germany. Especially in the US, the effects of the embargo questioned faith in American global supremacy. Despite the fact that the immediate material trigger (the embargo) was only of limited significance, it led to comprehensive economic disruptions. "The world 'energy crisis' or 'energy shortage' is a fiction," as one contemporary economist characterized the moment, "but belief in the fiction is a fact" (Adelman as cited in Graf 2014). The historical vignette we present reconstructs how the energy crisis was discursively constituted as such a fact.

The empirical example we explore in our vignette is derived from a larger project tracing the emergence of renewable energy policies through multiple countries and decades (Ergen and Umemura 2021). The vignette itself draws on diverse primary and secondary sources. First, it is based on extensive archival material from the US Congress and the Jimmy Carter and Ronald Reagan administrations, obtained through the respective archives. The Federal political arenas, which this material captures, were among the major battlegrounds for rival approaches to make sense of the crisis. As alternative interpretations of the situation implied radically different policies throughout the 1970s, experts and interest groups were drawn into these arenas to make their voices heard. Hence, such political arenas can arguably serve as "windows" into the cross-section of contemporary crisis discourse. This archival analysis was then, second, backed up with an analysis of Federal news coverage (from *The New York Times* and *The Washington Post*) and output from experts and research institutes (drawn from the MIT Libraries, the National Technical Information Service, and the US Department of Energy). Together, the historical analysis of these materials allows us to identify and reconstruct major argumentative lines shaping the contemporary discourse of the years following the 1973 embargo.

Indeed, our selection of materials focuses on "elite" discourse. It is certainly limiting in that we miss fringe and niche approaches to making sense of the situation. However, as our conceptual argument zooms in on conflicts over hegemonic interpretation, we believe our selection biases match our theoretical argument.

As our argument is decidedly one about the "mechanisms" of discursive crisis-making, we chose a single historical case rather than a collection of

[3] Explaining exactly why the 1973 embargo did not fizzle out in a similar fashion, but has in fact affected pricing and supply behavior, is not an easy task. A common structural explanation in the literature is that the US had incrementally lost its power to act as a "supplier of last resort" (Thompson 2017, 95).

more diverse empirical manifestations. While this paper's empirical section hence has a strong resemblance to those usually grouped under the methodology of process tracing (Bennett and Checkel 2015; Mahoney 2012), it deviates from them in both aims and standards. The presentation of our historical vignette alongside theoretical arguments should not be conflated with methodological designs aimed at "theory testing." In terms of methodological standards, our case study was intentionally selected on "the dependent variable," and we did not systematically explore alternative explanations of the patterns of discursive crisis-making we describe. Our historical vignette should rather primarily be understood as illustrative of the potential usefulness of our conceptual argument.

6. The Multilayered Constitution of the 1973/74 Disruptions as "Crisis"

How did the 1973 oil embargo and ensuing shortages become framed as a crisis of energy infrastructure? Important for our purposes, debates about an emerging energy crisis started a few years earlier and provided a fertile narrative ground to frame the embargo. Several communities developed the interpretative building blocks to render energy infrastructure a topic of public concern well before the oil shortage. Warnings about a coming watershed moment in modern societies' resource use circulated in the environmental movement, the scientific community, and the public sphere. Most prominently, the landmark first report of the Club of Rome, *The Limits to Growth*, had been published just one and a half years earlier (Meadows et al. 1972). Its scenarios emphasizing the finite nature of planetary resources were intensely debated in politics and the public (see, for example, US Congress 1973).

On the first layer of crisis discourse – future consequences – the material disruptions of the embargo were discursively related to such frames. Scientific scenarios were publicly interpreted as forecasts depicting dystopic future consequences of current energy consumption. *The New York Times* in January 1974 described the oil crisis in the following words: "[not] since World War II has there been a global problem that has threatened to change relationships and ways of life more than the current energy crisis" (*New York Times* 1974a). Similarly, on what we have described as the second layer of crisis discourse – future causes – the oil crisis was propagated as a new kind of political economic crisis, resulting not from idle capacity but from naturally limited material means: "The current crisis stems not from a deficiency of demand but of supply, the most dramatic manifestations of which have been shortages of food and soaring food prices, and shortages of

oil and soaring energy prices" (*New York Times* 1974b). Projecting both the causes and consequences of the embargo into the future, it was portrayed as a "real" crisis challenging the established order.

Yet, the nature of the embargo as a critical situation requiring action was repeatedly doubted. In numerous congressional hearings, influential politicians charged oil executives with artificially engineering shortages to profit from price hikes. The question of whether the shortages were "real" was among the major points of contention in 1974 (*New York Times* 1974c). Securing public legitimacy for crisis policies in the energy sector required first and foremost the generation of widely accepted knowledge (Graf 2014). Policy-makers were afraid that public denial of the severity of the crisis would block political countermeasures. Assembling executives from the major oil companies, members of Congress begged the oil industry to supply the information necessary to shift public opinion:

> gentlemen, it is your duty to make [...] as convincing a case as needs to be made to convince the American people that this is not a phony shortage induced by you. That is not only your duty as businessmen [...], but it is your duty as Americans [...] There is nothing that we can do by legislation that the people can't undo by simply refusing to go along. (US Congress 1974, 119)

In addition to the reality of the shortages, actors doubted if Arab nations could be expected to maintain cartel discipline, i.e., whether the causes of the crisis would persist in the future. James Akins, an adviser in Richard Nixon's administration, complained publicly in April 1973 that belief in the dangers of an oil crisis was undermined by theories of natural cartel instability: "[T]he common response among Americans has been: 'They need us as much as we need them'; or 'They can't drink the oil'; or 'Boycotts never work'" (Akins 1973, 467). In the public sphere, the economist Milton Friedman was among the most vocal critics of an understanding of the crisis as a critical juncture. In a March 1974 *Newsweek* op-ed he lamented that

> The world crisis is now past its peak. The initial quadrupling of the price of crude oil after the Arabs cut output was a temporary response that has been working its own cure [...] World oil prices are weakening. They will soon tumble. When that occurs, it will reveal how superficial are the hysterical cries that we have come to the end of an era and must revolutionize our energy-wasting way of life. (Friedman 1974)

Such diagnoses refer to both the first and second layer of our framework: they describe the embargo as an isolated incident without inherent long-term consequences – and an incident that does not require infrastructural change. With a similar narrative, one of Nixon's aides tried to calm demands for government action internally:

> I urge that we not allow pressures of the next month or two, based on a real and immediate shortage, seriously compounded by trendiness and news-magazine hysteria, to result in unnecessary and even counter-productive energy policies [...] In a few months, I suspect, we will look back on the

> energy crisis somewhat like we now view beef prices – a continuing and routine governmental problem – but not a Presidential crisis. (cited in Yergin 1990, 618)

Early attempts to downplay the crisis weaved together judgment about the significance of the incident for the future with projections about causes. Collectively "sitting the problem out" would unmask the embargo as a minor nuisance. Such initiatives make visible that the maintenance of infrastructure as taken for granted is subject to interpretative relational work through which actors plead for continued collective ignorance.

Despite its reservations about hysteria, the government was forced by public opinion, expediency, and Congress to initiate a series of emergency measures, among them complex price controls and allocation schemes (Jacobs 2017). Moreover, public and congressional voices demanding more encompassing government measures put increasing pressure on the administration to take a more proactive stance. In May 1974, *The New York Times* – in line with influential congressional forces – decried "Anarchy in Energy," demanding a coordinated energy policy (*New York Times* 1974d).

In light of the escalated Watergate scandal, the Nixon administration repeatedly gave in to demands for a more forceful policy response. Incrementally it established what it called Project Independence, a potentially radical departure from established energy policy and a renewal of underlying infrastructures. When Nixon announced the (in 1973 daring) intention to make the United States independent from any "foreign energy sources," he used language promising a path break:

> Today the challenge is to regain the strength that we had earlier in this century, the strength of self-sufficiency [...] I have ordered funding of this effort to achieve self-sufficiency far in excess of the funds that were expended on the Manhattan Project. (Nixon 1973)

However, this quest for possible remedies (our framework's third layer) was still intertwined with substantial struggles over the causes of the crisis. The exact meaning of Project Independence was subject to ongoing conflict (Graf 2014). Moreover, Nixon repeatedly oscillated between acknowledging the structural severity of the crisis and downplaying its significance for the future of American society. In effect, significant parts of the conservative administration tried to use the bid for a national energy policy as a vehicle to push through deregulatory measures in the energy arena (Jacobs 2017). In line with Milton Friedman's thinking quoted above, the underlying rationale was that the energy crisis was believed to be caused not by deficient energy infrastructures or foreign policy complications but by government measures preventing society from adapting to fluctuating supply conditions. While important factions in American society fought for price controls – both to ease the pain for consumers and to rein in Big Oil on profiting from price hikes – important conservatives fought for deregulation and hence for price

rises. Nixon himself echoed this causal account of the energy crisis when he criticized the American public for its unwillingness to adapt to new supply conditions: "Our deeper energy problems come not from war, but from peace and from abundance [...] in prosperity what were once considered luxuries are now considered necessities" (Nixon 1973). The causal account of the energy crisis as being the result of excessive demands of the American consumer – for many symbolized by Jimmy Carter's later plea for Americans to please lower their thermostats (Carter 1977, 71) – was among the most influential positions in the energy politics of the 1970s. Crucially, it repeatedly brought together groups in favor of sectoral liberalization, environmentalists fighting for conservation, and industry groups pleading for minimal government interference.

In 1975, an oil executive tried to appeal to this coalition when describing the underlying causes of the shortages:

> The fact is that people tend to waste what is cheap and plentiful, and to conserve what is dear [...] Because we thought petroleum and other fossil fuels were, for practical purposes, inexhaustible, we saw no reason to conserve them. We were, we see now, mistaken. The system is beginning to recognize this mistake by pricing these fuels in accordance with their economic scarcity. (Bradshaw 1975, 49)

This interpretative position was highly influential in policy-making throughout the decade. The partial rollback of price controls, the deregulation of natural gas, and the final deregulation of oil under Jimmy Carter and Ronald Reagan were legitimized on the basis of a consumerist-conservationist notion of the causes and associated remedies of the energy crisis (Marchi 1981a, 1981b; Jacobs 2017).

Already in the early 1970s, however, deregulatory and moderately conservationist policies were criticized for being based on false premises and were complemented by a third suggested remedy. Since the turn of the decade, networks of environmental activists, firms, government administrators and researchers had accelerated activities to develop approaches for moving the energy system away from exhaustible fuels and promoting alternative energy infrastructures (Ergen 2017). A key success of these networks was to establish within the broader Project Independence a then gigantic new Federal agency in charge of developing established and "alternative" energy sources, the Energy Research and Development Agency (ERDA, later consolidated into the new Department of Energy). While a majority of its resources were spent on nuclear energy projects, the new agency was a seedbed for initiatives throughout the decade to commercialize renewable energy technologies. All major renewable energy technologies in use today have received major kickstarts in ERDA-led programs. Even more important, it laid the foundation for imagining alternative ways out of the energy crisis and for making energy infrastructure enduringly topical. By way

of example, the American debate on the oil crisis led to Amory Lovins's proposal of a future "soft energy path," the idea of democratizing energy production with the help of renewable energy technologies (Lovins 1976). A so-called Solar Coalition in Congress managed to pass numerous dedicated support laws and established permanent Federal laboratories. Through ERDA and the congressional Solar Coalition, the idea became institutionalized that one of the routine functions of the modern state is to advance the systematic development of new energy sources to cut into the reliance on politically unstable and exhaustible fuels. To this day, mobilization in favor of renewable energy development and infrastructural change routinely relies on a set of promises developed in conflicts over the nature of the first oil crisis (Ergen and Umemura 2021).

From the middle of the decade, an increasing share of the debate moved to what were then called "long-range" solutions – often targeting "the year 2000." A *New York Times* op-ed in 1976 echoed this way of thinking, wondering if it may be in the national interest to make the entire world independent of fossil fuels, as "even if the United States could become 'embargoproof,' this would not make us very secure if some of our chief trading partners were still vulnerable" (*New York Times* 1976). Congress dedicated extensive hearings to the problem of long-range energy planning, discussing scenarios stretching into the 2000s (US Congress 1977). The language in these hearings had changed significantly from the skeptical routine-oriented language found in the early phases of the crisis. "We are concerned with such questions as these," Senator Nelson said as he opened the first hearing,

> Where are our energy assumptions, policies and programs taking us [...]? Might we prefer to go somewhere else? And, if so, how do we change course? The way our society answers these questions will affect employment, lifestyles, wealth, equity, war, and peace. (US Congress 1977, 1)

In this quote it becomes clear that energy infrastructures which were once taken for granted and assumed would endure had become contested – with expected consequences for the various life spheres these infrastructures relate to.

Opening up a debate about the long-range future of the American energy system changed planning approaches and led to an increasing legitimacy of renewable energy support measures. It prompted Jimmy Carter's administration to proclaim a national goal of a 20-percent share of renewables in American energy consumption by the year 2000 and created spaces to experiment with demand-led support schemes (US Department of Energy 1979).

Many of the developments of the 1970s receded in the following years, many promises were not kept, and, from today's vantage point, many projections and diagnoses proved to be flawed. Nonetheless, the 1970s' oil crisis has durably shaken the taken-for-granted nature of energy

infrastructures across the OECD. The gradual redesign of energy infrastructures through economic, regulatory, security, and technology policies has become a routine task of governments and a legitimate issue of political conflict. The case of the first oil crisis emphasizes how the interpretation of consequences, causes, and remedies is subject to discursive struggles in which different perceptions of the future are contested. The social construction of the 1973/74 disruptions as a discrete crisis of American society led to numerous highly significant attempts to experiment with the collective restructuring of modern energy infrastructures. Most of these attempts have had direct technological, institutional, and ideational lineages into contemporary interpretative struggles and the renewed pleas for infrastructural change toward more sustainable energy systems.

7. Conclusion

How can crises promote infrastructural transformations toward sustainability? In this article we have suggested that the potential of crises to foster socioeconomic change and the renewal of infrastructures relies on the interpretative work to open up the future that takes place in the process of constituting a crisis as "real." Adopting a perspective that emphasizes the role of imagined futures, we have shown how discursive struggles over the consequences, causes, and remedies of a crisis involve engagement with alternative futures and contestation of expectations inscribed in established infrastructures.

Our suggested conceptual framework and the historical vignette of the first oil crisis have highlighted, first, that whether a disruption is acknowledged as a crisis is not self-evident nor can it be derived from the material features of the disruption or the infrastructures affected by it. As we have seen, the nature of the oil shortages as a crisis was heavily contested. Discursive struggles are thus important for the process of "crisis-making." Within these discursive struggles we have shown, second, that references to the future are crucial. In our empirical example, those who objected to the depiction of the situation as a crisis took great care to detach observable disruptions from the future and tie them closer to the past and present. By arguing that causes would not last and consequences were singular events, and by proposing only emergency remedies and minor adaptations, if at all, these actors depicted disruptions as not interfering with the continuity of established energy infrastructures. In contrast, those who embraced the interpretation of an energy crisis referred to (infrastructural) causes that would not go away, forecast broad dystopic futures, and demanded remedies directed at the long-term, including a renewal of infrastructure toward more decentralized

renewable energy. It is thus in this process of contesting the future that the expectation of enduring infrastructures can become fluid.

Our theoretical argument has interesting connections to wider debates about infrastructural transformations in the face of crisis in (at least) two important ways. First, it relates to the recent interest in crisis within the infrastructure literature by highlighting that not only infrastructure but also crisis is a socially constituted phenomenon. A more nuanced understanding of the social and often discursive processes in which crises emerge, endure, or end appears to be important for the various interrelations between crises and infrastructures, which scholars have only begun to account for (Klinenberg 2015; Freudenburg et al. 2012; Graham 2010; Dalakoglou 2016). This also holds particularly for attempts to assess whether crises can be expected to facilitate or require infrastructural change.

Second, our argument complements approaches that emphasize the specific temporality of infrastructures and their relation to the future (Gupta 2018; Anand, Gupta, and Appel 2018). Our emphasis on expectations and the work that is required to open up the future may productively connect research on infrastructures with research on sociotechnical imaginaries (Jasanoff and Kim 2015; van Lente 2012; van Lente and Rip 1998). As nicely argued in the foundational texts on the problem of infrastructure, the relational nature of sociotechnical structures implies that the politicization of hitherto taken-for-granted sociotechnical structures is a cultural process (Ruhleder and Star 1996). Infrastructures becoming topical, we suggest, is a process influenced by expectations about future sociotechnical arrangements and their place in society.

The current historical moment appears to be awash with environmental and geopolitical crises and urgent calls for infrastructural change. As our example of the first oil crisis illustrates, the transformation toward sustainable infrastructures can be facilitated by coalitions that share interlocking interpretations of the crisis at hand. The discursive contestation and the "opening up" of the future are pivotal in this process, as they turn infrastructures into topics of public concern. If the crisis discourses of the early 2020s – the climate crisis discourse and the economic and geopolitical discourse on an imminent energy crisis, to name just some – can be aligned with regard to the future causes, consequences and remedies of the respective crises, such a broad coalition, which champions broad infrastructural change, is not beyond reach. Yet, as we have highlighted in this paper, such processes are not inherent to material disruptions or dysfunctional infrastructures alone, but depend on political interests, power resources, and – not least – the discursive skill of the actors involved.

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