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Discursive destabilisation of socio-technical regimes:

Negative storylines and the discursive vulnerability of historical American railroads

Abstract

Incumbent socio-technical regimes based on fossil fuels probably cannot be destabilised to the extent necessary to achieve major reductions in carbon emissions without significant policy action. Policy actors, however, remain loyal to fossil fuels. Effective transitions to sustainability will therefore require the identification of political vulnerabilities in fossil fuel regimes. This article identifies one such vulnerability in the form of negative storylines. It describes the development of these storylines using the multi-level perspective on socio-technical transitions, as well as four dimensions of frame resonance developed in social movement theory. It then illustrates this phenomenon using an historical case study describing the development of negative storylines portraying the American railways as abusive monopolists during the late nineteenth and early twentieth century. These storylines played an important role in destabilising the railways, particularly when they also faced pressures from road transport, as policymakers were unwilling to relax regulations on a regime whose key actors they believed could not be trusted. This article argues that this pattern is unlikely to be unique to this case, but is rather a common development in incumbent socio-technical regimes. This article concludes by considering some implications of these findings for the destabilisation of existing fossil fuel regimes.

Keywords

- Socio-technical transitions
- Storylines
- Transport
- Railways
- History of technology

Highlights

- Theories of regime discourses do not account for negative regime discourses.
- The success of regime storylines is described using 4 elements of frame resonance.
- Regimes are vulnerable to negative policy feedbacks due to negative storylines.
- American railways were undermined by a storyline portraying them as monopolistic.

1 Introduction

An adequate response to the challenge of climate change in the energy sector requires not only a rapid expansion of renewable energy resources, but also a major *reduction* in the amount of electricity generated by fossil fuels [1]. This will require significant policy action. Despite offering some support for renewables in the form of feed-in tariffs or research funding [2], however, policymakers are often reluctant to support either of these goals: Renewable energy projects often

face political opposition, which often emerges in the form of negative discourses challenging new energy infrastructures. Fossil fuel energy, meanwhile, retains enough political and discursive clout to attract significant government subsidies [3]. Thus, the political situation of both renewable energy and fossil fuels will have to change dramatically for a transition to low-carbon energy to get the necessary political support.

One important finding of research about discursive conflict in energy systems is that local, “mundane” concerns, such as the noise and visual obstruction caused by wind turbines, or health concerns related to the development of unconventional gas resources, are more important barriers to the development of renewable energy than big environmental controversies [4–9]. One side of this that is under-explored, however, is the effect that similar concerns might have on the dominance of the fossil fuel industry. Fossil fuels, as Grubert and Hewitt’s research (this issue) shows, are subject to their own set of complex, deeply-rooted narratives [10]. Appalachian coal mining, for example, is often seen in melancholic terms focused on its history and ties to local communities, while oil drilling is seen as exciting and novel but also capricious. These narratives, crucially, cannot be reduced to mere factual claims: they are deeply emotional, symbolic, and rooted in people’s experiences. This poses a problem for efforts to understand, and possibly shape, public perceptions of energy issues to support the development of renewable energy. It is not enough merely to popularise facts about technological and environmental issues; the evolution of big public narratives must also be taken into account. This has implications both for the narratives that emerge around renewable energies, and the narratives that might help to destabilise energy systems based on fossil fuels.

It is relatively easy to document the influence of negative public perceptions on renewable energy projects, as these occur in the present day and can be observed directly. It is more difficult, however, to document the effect that negative perceptions might have on the stability of incumbent fossil fuel systems, as there are few opportunities for direct real-time observation of the destabilisation of a technological system. While we can easily observe the impact of public discourse on the stability of fossil fuel energy systems, it is harder to imagine its potential impact on their future destabilisation. This, however, is an important piece of the puzzle for discussions about energy politics. Theoretical studies of big technological transitions typically identify the *destabilisation* of incumbent systems to be at least as important as the development of new systems to replace them [11–13]. This is also important in empirical analyses of incumbent energy systems, which show that their supporters have been able to use discursive and political power to disrupt renewable energy [14,15].

Given this background, then, an interesting question is whether the kinds of mundane public objections that block the development of new energy resources might, when acting on a longer time-scale, also disrupt incumbent energy systems. This question is the focus of this article, which investigates the sources of sustained negative storylines about an incumbent socio-technical regime, and the effects that these can have on the regime’s stability. It uses an historical example of the collapse of the American railway regime to argue that incumbent energy systems might be vulnerable to the effects of destabilising storylines, not just in spite of their power and stability, but *because* of it.

2 Literature review

2.1 Discourse and policy in socio-technical regimes

To understand the discursive forces that might destabilise incumbent energy systems, it is important first to understand how these systems are stabilised in the first place. This is well accounted for by the multi-level perspective, which accounts for socio-technical transitions by reference to three conceptual levels [11,16]:

The socio-technical regime is comprised of stable, mutually-supporting linkages between technologies, policies, user practices, scientific knowledge, cultural categories, and financial arrangements.

Socio-technical niches are sheltered spaces, such as experiments or niche markets, which give new technologies an opportunity to develop without having to compete directly with the regime.

The socio-technical landscape includes exogenous developments, such as major economic or political shifts, wars, or cultural movements, which can sometimes destabilise the dominant regime.

Socio-technical regimes are likely to be stabilised by stable discourses, which turn new and unfamiliar things into “concrete and ‘objective’ common-sense realities” [17]. Stable narratives can provide meaning, and thus legitimation, to stable entities in the world, including socio-technical regimes [18]. Scholars have described discursive structures that contribute to the defence of a dominant socio-technical regime, through “symbolic lock-out” of competing technologies, through political strategies that “parry” the framings of niche advocates, or through widely-shared, stable representations depicting the socio-technical regime’s dominance as a simple matter of common sense [15,18,22,23]. This is echoed by some more general perspectives on discourse in transitions, including Sheller’s [24] cultural multi-level perspective, and Pesch’s [25] account of transitions, both of which describe stable discourses supporting the incumbent regime. As Jensen [26] points out, however, regimes can be represented in multiple different ways, some of which might be negative. There has also been considerable research on how discursive change influences socio-technical transitions. Niches, for example, have been identified as being sustained by discursive efforts, including promissory visions and expectations of the future, and discourses legitimizing new technologies [19–21]. The landscape level is considered by Hermwille [18], who demonstrates that landscape events have to be interpreted discursively before they become meaningful.

Some other perspectives on discourse in transitions emphasize its role in processes of change. Kern’s [27] institutional analysis indicates that radical change occurs when new discourses challenge and transform existing institutions. Elzen and Geels’ [28] account of normatively-driven transitions argues that they are more likely when discursive pressures line up with other pressures on the incumbent regime. Lawrence and Phillips’ [29] account of whale watching shows how discourse develops to support emerging technologies and industries.

A common theme here is a focus on how *new* discourses support *new* technologies and systems. This is an important phenomenon, but it is not the whole story. Historical studies reveal that changing discourses attached to *old* technologies, such as the New York Streetcar system or the

British coal regime, can play an important role in undermining them [30,31]. In both of these cases, these discourses had a clear policy effect, acting as a negative policy feedback [32,33] by which policies that were initially supportive of the regime contributed political developments that ultimately undermined it. On a more theoretical level, Bigelow et al.'s [34] concept of a *dormant issue* suggests that it might be possible for big problems that are not solved satisfactorily to create simmering resentments that might become important at a later date. There is, however, little in the way of a detailed theoretical model describing how these resentments might emerge in connection with incumbent regimes, and the effect this might have on a socio-technical regime's ultimate stability.

2.2 Conceptual framework

Hajer's [35] account of discursive storylines offers a useful unit of analysis for the study of regime-level discourses. Hajer defines storylines as "narratives on social reality through which elements from many different domains are combined and that provide actors with a set of symbolic references that suggest a common understanding" [35]. This account emphasizes storylines' importance in allowing actors to make sense of complex environmental problems such as acid rain, but the concept is also useful for understanding how actors make sense of complex socio-technical systems. All actions influencing a socio-technical niche or regime, as discussed above, are influenced by actors' *understandings* of that regime, which will of necessity be incomplete, inexact, and subjective. Storylines are therefore a crucial variable in understanding the choices made by actors in relation to the incumbent regime. A storyline, in the context of a socio-technical transition, can be defined as a single explanatory scheme integrating different observations, facts, experiences, and understandings of a socio-technical regime or a niche-innovation into a single narrative that is comprehensible to a wide audience. Storylines play a key role in the formation of discourse coalitions, or political coalitions of actors holding to similar discourses. These coalitions can in turn influence a regime's development. While storylines are not actively managed on a macro-scale, they evolve through the deliberate strategic efforts of actors opposing or supporting niche or regime technologies. The result is a set of competing storylines which, while not actively designed, nevertheless are the product of strategic competition.

The outcome of this competition is determined by which storyline scores the highest in a list of four elements of frame resonance, based on Verhees' [36] account of cultural legitimacy, and on Snow and Benford's [37] account of social movement framing efforts:¹

Empirical fit. This refers to the fit between the storyline and widely acknowledged empirical facts about the world. A storyline portraying wind turbines as unreliable, for example, will have greater empirical fit if there are widespread reports of brownouts in energy systems that use wind turbines.

Experiential commensurability. This refers to the extent to which a storyline is consistent with the lived experiences of its intended audience. A storyline portraying an energy system to be too expensive, for example, will have greater experiential commensurability if this expense is reflected in consumers' bills.

¹ The category of centrality, which is used by Verhees as well as Snow and Benford, and which refers to the perceived importance of the topic to its audience, has been left out because this analysis does not consider the competition for attention between debates about the regime, and other public debates.

Macro-cultural resonance. This refers to the extent to which a storyline fits with deep cultural values, identities, ideologies, or myths. A storyline portraying wind turbines as an affront to the landscape will, for example, have greater macro-cultural resonance in locations where an unaltered landscape has more cultural importance.

Actor credibility. This refers to the extent to which the actors in a storyline, or the actors promoting the storyline, are perceived as credible and trustworthy. Storylines promoted by trusted public intellectuals or beloved celebrities, for example, will have more actor credibility than those promoted by scandal-plagued politicians.

These elements of frame resonance suggest four ways in which an incumbent regime can become vulnerable to negative storylines:

- Well-established socio-technical regimes are likely to create persistent problems, such as the smog created by coal power stations, or by the threat of nuclear accidents [20,38]. These can add empirical fit to negative storylines.
- The public's frequent day-to-day interactions with incumbent socio-technical regimes can lead to persistent frustrations, such as the common frustration that motorists have with parking [39]. This can create experiential commensurability for complaints about the regime.
- Macro-cultural resonance can be affected by cultural changes occurring at the landscape level, which can make a long-established socio-technical regime seem outdated, as was the case when coal power in the United Kingdom began to be seen as at odds with popular ideas of modern convenience and cleanliness [31].
- Finally, actor credibility can be undermined by scandals involving regime actors, which are particularly likely to occur in an incumbent regime that has been amalgamated into a small number of very dominant firms, as was the case with streetcar companies in New York City [30].

This suggests that negative storylines about an incumbent regime have the potential to become more compelling as the regime becomes more established. This could potentially create a powerful negative policy feedback, as public attitudes towards the regime sour, and a discourse coalition of anti-regime advocacy groups begins to emerge. Given the right conditions, this could pose a serious threat to pro-regime policy arrangements.

3 Methodology

3.1 Case study methodology and case selection

Public storylines about socio-technical regimes are a complex, context-dependent phenomenon, making them an ideal candidate for qualitative case study research [40]. Because history provides an ideal setting in which to investigate the complexities of transitions [41], this article demonstrates the conceptual framework set out in section 2.2 using an analysis of the public storylines that contributed to the collapse of the American railroad regime. The goal is to develop an “eventful sociology” of discourse in the development of socio-technical regimes, which does not seek to establish general social laws, but which uses history to describe the potential contingent pathways that can lead to certain outcomes [42].

American transport history might seem a peculiar choice for a case study primarily intended to make a point about *energy* transitions, but the American railroads at the start of the twentieth century are a useful analogue for present-day fossil fuel regimes: they were a powerful, entrenched socio-technical regime dominated by a relatively small number of powerful companies who wielded considerable commercial, political, and technological power. The fact that this powerful regime had collapsed so completely by the end of the Second World War makes it a useful case study to investigate the details of regime collapse. There are, of course, some important differences between transport and energy that should be taken into account. People are far more aware of a car they are driving or a train they are boarding than they are of a distant power plant that keeps their lights on, and consumers have more direct choice between transport modes than they do between energy technologies. These differences, however, do not mean that discussion of discourse and narratives influencing energy systems cannot benefit from *theory* that is informed by discussion of different kinds of systems.

This is also a useful case study for methodological reasons. Transport regimes are important and highly visible, while also being dependent on political developments. This subjects them to intense public debate, making transport transitions information-rich cases in which to study storylines about a regime. Intercity surface transport is particularly attractive for this, due to the fact that it involves few competing technologies when compared with urban transport [11]. The setting of the case in the United States adds further information-richness, due to the wide availability of archival material documenting American print media, as well as political debates.

3.2 Source selection and analysis

Popular storylines about the American railroads were sought out using historical primary sources, which were chosen based on the following criteria:

- **Popularity:** Sources were chosen that were read primarily by the general public, rather than experts.
- **Diversity:** Sources were chosen to reflect a large political, economic, social, and geographic cross-section of American society.
- **Ease of access and use:** The sources chosen had to be readily accessible from the United Kingdom, and had to be written in English.

These criteria led to the selection of the following historical primary sources:

- **Newspaper opinion journalism.** This includes letters to the editor, editorials, opinion columns and op-eds. Five newspapers were surveyed: the *Chicago Tribune*, the *Baltimore Sun*, the *Boston Globe*, the *New York Times*, and the *Washington Post*.
- **Rail magazines.** Editorials, opinion columns, and letters to the editor in railway magazines, including *Railway Gazette*, *Railway Age*, *Electric Railway Journal*, and *Railroad Stories*, were searched for discussions about policy or public opinion relating to the railroads.
- **Presidential speeches.** Speeches from every president from Grover Cleveland to Franklin Delano Roosevelt, sourced from The Miller Center's [44] Presidential Speeches Archive were searched for keywords relating to railroads, or transport more generally.
- **Congressional Debates.** Debates about railroad legislation in the *Annals of Congress* were searched for commentary about the railroads.

Primary sources in digital archives were sampled at three-year intervals using keyword searches for articles mentioning railroads, railways, trains, or transportation. Magazine archives were searched

by hand at five-year intervals for editorials or letters to the editor discussing railroad politics. In the congressional archive, debates about important pieces of transport legislation were manually searched for arguments about the railroads. These were complemented by secondary historical sources, which provided broader historical context.

Storylines are macro-level explanatory schema covering a wide range of phenomena, issues, and arguments, meaning that they can only very rarely be inferred directly from any one historical document. Instead, analysis of the sources discussed above first looked for *topics* appearing in each document. Topics simply refer to issues, arguments, facts, or experiences appearing in discussions about the railroads. Two approaches were used to determine the most prominent topics related to rail transport. Firstly, a qualitative approach weighed the importance of the topics appearing in each document by considering factors such as the prominence and biases of the document's author, its placement in the larger publication (such as whether it was included in an editorial versus as a short column), and the strength of its language. A second, quantitative approach was used to avoid selection bias. For this analysis, the titles of opinion articles were subjected to the same keyword search for four periods during the time period considered for this study: 1887-1909; 1910-1920, 1920-1929 and 1930-1945. A maximum of the top 20 articles from each newspaper, as ordered by relevance by the ProQuest newspaper archive's search algorithm, were read in detail, and each one was tagged according to the topics appearing in it. A similar quantitative analysis was carried out for the Congressional debate over one crucial transport bill. A list was made of all the Congresspeople voting yea or nay on the bill, and then, using the *Annals of Congress* and *Congressional Record* indices, the statements of each congressperson about the bill were looked up, and tagged according to the topics that appeared.

Two or more topics were considered to be part of the same storyline if they implied the same basic factual and moral understanding of transport issues. So, for example, the commonly observed topic of complaints about negligence of the railroad companies on safety could be amalgamated with articles complaining about railroad companies profiteering through extortionate fares into a single storyline portraying railroad companies as more interested in profit than public service. This amalgamation of topics into storylines allowed a longitudinal account of the most prevalent storylines during the period being studied.

These storylines were sorted into two categories: Storylines that portray the railroads in a positive light, and storylines that portray them in a negative light. This simplifying assumption, that all storylines either favour or oppose the system, is necessary for simplifying the analysis of these storylines, but it is also a plausible assumption, as positions on an issue in modern societies tend to evolve into an antagonistic dichotomy [45]. Actors are likely to connect their storylines together with those of their allies. Taken to its conclusion, this process leads to a situation in which most storylines either support or oppose the incumbent regime.

4 Case study: American railroad transport (1887-1945)

This account of popular storylines about the American railroad regime is divided into two sections. Section 3.1 considers storylines appearing during the railroads' commercial zenith, which fell roughly between the first passage of federal railroad regulations in 1887, and the end of the First World War. Section 3.2 covers the period from the end of the First World War to the end of the Second World

War, during which time the railroad regime collapsed and was replaced with one based on motorised road transport (Figure 1).

Figure 1: American railroad passenger mileage per capita, 1890-1980. Data from Cain [46] and Comin and Hobijn [47].

4.1 Period 1: 1887-1920

American railroads at the turn of the twentieth century are a good example of a stable incumbent socio-technical regime. They had reached the peak of their technological power by this point, having sunk considerable capital into major projects, including several transcontinental railroads, making them the sole practical means of long-distance transport in many places [48]. This translated into commercial power, as railroads began to form regional monopolies [49], and political power, as railroads shaped government regulations so that they did more to shore up railroad profits by averting rate wars than they did to control fare increases [50].

The railroads' technological, commercial, and political power did not readily translate into discursive power, however, as the railroads were a common target of public criticism. This began with the Granger and Populist movements of the nineteenth century, which challenged what they saw as exploitative and monopolistic commercial institutions, especially including the railroads [51]. Populism, as a landscape-level discourse, set the stage very well for the development of storylines hostile to the railroads, but by the turn of the twentieth century, populist concerns about monopolism were far from the only complaint against the railroads. Table 1 contains a quantitative analysis of opinion journalism about the railroads between 1887 and 1909. Each decimal number in the body of the table indicates the proportion of articles in each newspaper that contains a particular topic, while the "other" category indicates the proportion of articles containing topics that were not prominent enough to appear in the table. This analysis shows that the most popular concern about the railroads was accidents, appearing in nearly a fifth of all the articles surveyed, and in a quarter of the articles surveyed in the *Los Angeles Times*. Many of these articles alleged, often using very strong language, that the railroads were negligent on safety.² After an 1887 accident in

² *Los Angeles Times*, 1907, 'Responsibility for Railroad Horrors', 22 April, p. 6; *New York Times*, 1892, 'The Railway Wrecks'. *New York Times*. 22 September, 1892. p. 4.; *Boston Globe*, 1890, 'Regulation of Railways', 31 May, p. 5.

which several passengers burned to death, the editor of the *Boston Globe* suggested that “It would almost seem that the railroad managers meant to guard every avenue of escape for passengers in case of accident, and to make sure that, if the wrecked cars were not set afire by unsafe stoves, petroleum from the lamps might be depended upon to inaugurate the lurid feast of flames”.³ These complaints declined somewhat after 1910, but remained fairly popular up to the First World War (Table 2).

	<i>Boston Globe</i> (20)	<i>Chicago Tribune</i> (20)	<i>Los Angeles Times</i> (20)	<i>New York Times</i> (20)	<i>Washington Post</i> (20)	All Newspapers (100)
Accidents or safety concerns	0.15	0.1	0.25	0.25	0.2	0.19
Support for railroad regulations	0.2	0.15	0.2	0.1	0.05	0.14
Railroad companies are negligent on safety.	0.1	0.1	0.05	0.15	0.05	0.09
Defence of railroad companies	0.1	0.1	0.05	0	0.15	0.08
Complaints about fares or freight rates	0	0.05	0.25	0.05	0	0.07
Economic contributions of railroads	0.1	0.1	0.05	0	0.05	0.06
Labour issues	0.1	0.1	0.05	0.05	0	0.06
Train robberies	0.05	0.1	0.05	0.1	0	0.06
Service complaints	0.05	0.05	0.1	0.05	0	0.05
Opposition to railroad amalgamation	0.05	0.15	0.05	0	0	0.05
Portrayal of railroad structures as engineering marvels	0.1	0	0	0.05	0.05	0.04
Praise of railroad development	0.1	0	0	0	0.1	0.04
Reference to widespread opposition to railroad rates	0.05	0.1	0	0	0.05	0.04
Defence of railroad amalgamations	0.05	0	0	0	0.15	0.04
The railroads are dangerous.	0.1	0.05	0	0	0	0.03
Technical discussions	0.1	0	0.05	0	0	0.03
Other	0.2	0.25	0.25	0.45	0.45	0.32

Table 1: Quantitative analysis of opinion journalism about railroads (1887-1909).⁴

³ *Boston Globe*, 1887, ‘The Railroad Horror’, 7 February, p. 4.

⁴ The number in parentheses under each newspaper title refers to the number of articles that were surveyed in that publication. The decimal numbers in each row refer to the proportion of the articles surveyed which include the theme listed in the first cell of the row. Only themes accounting for at least 10 percent of the articles surveyed in at least one newspaper have been included here.

	<i>Boston Globe (20)</i>	<i>Chicago Tribune (20)</i>	<i>Los Angeles Times (20)</i>	<i>New York Times (20)</i>	<i>Washington Post (19)</i>	<i>All Newspapers (99)</i>
Labour issues	0.15	0.20	0.50	0.20	0.30	0.27
The railroads are over-regulated.	0.10	0.05	0.20	0.26	0.05	0.13
The railroads are essential.	0.20	0.10	0.30	0.05	0.00	0.13
Accidents or safety concerns	0.15	0.05	0.05	0.26	0.10	0.12
The railroads are in crisis.	0.05	0.15	0.15	0.05	0.00	0.08
Praise for railroad improvements, innovations, or developments	0.05	0.05	0.15	0.00	0.05	0.06
Railroads in war	0.10	0.00	0.05	0.05	0.10	0.06
Railroad history	0.10	0.10	0.00	0.00	0.00	0.04
Complaints about fares or freight rates	0.00	0.10	0.05	0.00	0.05	0.04
Opposition to railroad nationalisation	0.00	0.10	0.05	0.05	0.00	0.04
The railroads need state help.	0.10	0.00	0.00	0.05	0.00	0.03
Service complaints	0.00	0.10	0.00	0.00	0.00	0.02
Railroad companies are incompetent.	0.00	0.10	0.00	0.00	0.00	0.02
Analysis of railroad policy or regulation	0.00	0.00	0.00	0.00	0.10	0.02
Other	0.4	0.3	0.1	0.45	0.4	0.33

Table 2: Quantitative analysis of opinion journalism about railroads (1910-1920).

A less common complaint prior to 1910 concerned the railroads' passenger fares and freight rates (Table 1). This complaint appeared frequently in the *Los Angeles Times*, whose editors noted in 1905 that "Cynics will of course say that the railroads are in public disrepute, that the country has made up its mind to no longer permit their extortions, and that a reform of their ways is the only way to avert legislative interference of a far-reaching kind".⁵ Poor quality of service was another complaint sometimes listed in these articles, although it does not show up prominently in the quantitative analysis. The *Los Angeles Times* argued that suggestions for improved service, "coming from an outsider, will doubtless be received from the railway fraternity with the same contemptuous sneer that sometimes awaits the 'layman' who is so presumptuous as to suggest to a hidebound physician that the best way to treat disease is to remove the cause".⁶

It was rare for any single article to accuse the railroads of poor safety records, exorbitant charges, and bad service, but all three complaints nevertheless contributed to a common storyline portraying railroad managements as aloof, monopolistic, and abusive. All of the problems listed above were consistently blamed on complacent, monopolistic, profiteering railroad managers: an accusation which did not always remain implicit. Even the editor of the pro-business *New York Times* remarked

5 *The Los Angeles Times*, 1905, 'Railway Freight on Oranges', 21 September, p. 4.

6 *The Los Angeles Times*, 1908, 'Railroad Conundrums', 17 July, p. 4.

in 1888 that “Practices which in a bank or ordinary mercantile business, still more in relations of special trust, would be regarded as dishonourable and even criminal, are excused in railroad management as if they were matters of necessity.”⁷ This anti-railroad storyline was voiced most aggressively in the staunchly anti-trust *Chicago Tribune*, whose editor argued in 1895 that the railroads were one of the worst examples of a pattern in which “Great corporations monopolize the production of all the comforts and many of the necessities of life”.⁸

The first political consequences of this storyline appeared in 1887, with the founding of the Interstate Commerce Commission to administer regulations designed to control prices on the railroads [49]. The congressional debates around the establishment of the Commission show the power of the storyline portraying railroads as abusive monopolists. Representatives and senators frequently invoked rhetoric from the American Revolution to complain about the railroads’ abuses, often describing the railroads as an unelected taxman.⁹ Populist Democratic senator Wilkinson Call complained that the railroads had “a greater right of taxation without representation of the people, [than the government] without responsibility to them”.¹⁰ Prominent democratic representative William McAdoo noted that pooling arrangements had brought about a state of affairs in which “five or six men who control these great trunk lines which traverse the continent can, by meeting and confederating together, fix the price of the necessities of life, which you in the West raise to be consumed by our people in the East”.¹¹ Democratic narratives were also invoked to accuse the railroads of subverting government institutions. Illinois Representative Johnathan Rowell, for example, described Washington during the debates over the legislation as a city “swarming with keen, zealous, able agents of railroad power trying to defeat the passage of this bill”.¹²

In this early period, however, negative storylines about the railroads had only a limited impact on the railroads themselves. The railroads had so much commercial, technological, and political power at this time that public objections could not be translated into any meaningful challenge to them [50]. While some regulations were passed in response to these concerns, they were heavily influenced by railroad lobbyists who ensured that they were aligned with the interests of the railroad industry. The Interstate Commerce Commission in its earliest form was a fairly toothless organization, which the railroads may have in fact welcomed as a way of avoiding price wars [50]. Nevertheless, these storylines indicate a broad public and political mistrust of the railroad industry, which would lead to the passage of further railroad regulations. In the Congressional debates around the Hepburn Act, which in 1906 gave the Interstate Commerce Commission the right to impose maximum rates on the railroads, Senator Asbury Latimer argued that the railroads threatened “the elimination of competition and the placing of despotic power in the hands of a few men.”¹³ Other congresspeople agreed.¹⁴ Perhaps the most dramatic examples of anti-railroad political rhetoric

⁷ *New York Times*, 1888, ‘The Morals of Railway Management’, 23 December, p. 4.

⁸ *Chicago Daily Tribune*, 1895. “Dangers of the twentieth century”. 28 July, 1895. p. 12.; *Chicago Daily Tribune*, 1897. “The Interstate Commission”. 28 November, 1897. P. 34.

⁹ *Annals of Congress*, 49th Cong., 2nd sess., 526; *Annals of Congress*, 49th Cong., 2nd sess., 852.

¹⁰ *Annals of Congress*, 49th Cong., 2nd sess., 565.

¹¹ *Annals of Congress*, 49th Cong., 2nd sess., 861.

¹² *Annals of Congress*, 49th Cong., 2nd sess., 857.

¹³ *Congressional Record*. 59th Congress, 1st session, 5247.

¹⁴ *Congressional Record*. 59th Congress, 1st session, 3920.; *Congressional Record*. 59th Congress, 1st session, 4059.

around this time came from President Theodore Roosevelt, who became known in the media as an anti-railroad crusader (Figure 2). Roosevelt's 1907 annual message accused the railroads of

Swindling in stocks, corrupting legislatures, making fortunes by the inflation of securities, by wrecking railroads, by destroying competitors through rebates—these forms of wrongdoing in the capitalist, are far more infamous than any ordinary form of embezzlement or forgery; yet it is a matter of extreme difficulty to secure the punishment of the man most guilty of them, most responsible for them.¹⁵

This speech references two important scandals in which railroad managements had been implicated. The first was the practice of “watering” railroad stocks, to artificially inflate their value through fraudulent transactions. The second was the practice of granting rebates to favoured shippers, or, in some cases, politicians [52]. Both of these contributed to a growing distrust of railroad managers, which Roosevelt's speech played on. In the same speech, Roosevelt proposed a new national transport system, which would be created by linking the Great Lakes with the Mississippi, thereby creating a national network of waterways. This was ostensibly intended to reduce railroad congestion, but its mention in a speech which so aggressively condemned the railroads' business practices suggests that limiting the commercial power of the railroads was another motivation.

¹⁵ Roosevelt, T., 1907. *Seventh Annual Message*. [online]. 3 December, Washington. The Miller Center, University of Virginia. Available at: ><http://millercenter.org/president/roosevelt/speeches/speech-3779>>. [Accessed 16 September 2014]; Roosevelt, T., 1908. *Eighth Annual Message*. [online]. 9 December, Washington. The Miller Center, University of Virginia. Available at: ><http://millercenter.org/president/roosevelt/speeches/speech-3780>>. [Accessed 16 September 2014].

WILL HE BUST THE BRONCO?

Railroad interests are snorting at the President's plan of rate regulation.

Figure 2: A cartoon depicting President Roosevelt taming the railroads. From the *Los Angeles Times*, 1905. 'Editorial Cartoon 1—No Title'. 4 November, 1905. p. II-4

Topics expressing praise for the railroads, or defending them, appeared very rarely in either Congress or the newspapers prior to 1910, although after the Hepburn Act gave more teeth to the Interstate Commerce Commission, they became somewhat more common in the media (Table 2). In general, they relied on a storyline portraying the railroads as important, sophisticated technological marvels whose operation should be left to the experts rather than ill-informed public critics or government regulators. One topic contributing to this storyline was the argument that the country should be grateful to the railroads for the material benefits that they provided. A 1908 editorial in the *Railway Gazette*, for example, argued that "A new country in which most of the people are

landholders will favour whatever policy gives most railroads and gives them most quickly.”¹⁶ In a 1910 *Washington Post* opinion piece, soon-to-be Republican house minority leader James Robert Mann argued that “The modern industrial, commercial, social, and intellectual life depends to a large degree for its success, its usefulness, progress, and its beneficence, on the railways.”¹⁷

A second topic championed the railroads’ engineering accomplishments.¹⁸ This most commonly appeared shortly after a major new piece of railroad infrastructure was completed. When the Florida Keys Railroad, which island-hopped over the Gulf of Mexico, was completed, The *Boston Globe’s* reaction emphasized its technological novelty and its economic contribution: “When this novel project was attempted it was deemed a rash and impossible undertaking, but all the difficult engineering problems have been solved. When this road opens for business it is destined to have a marked influence on the commerce of the Atlantic coast.”¹⁹

The editors of railroad journals were largely dismissive of the railroads’ critics, portraying them as an uninformed mob. An 1887 *Railway Gazette* editorial arguing against the Interstate Commerce Act complained that

The national representatives hasten at the beck of a general clamor against the railroads, like the granger agitation some years ago, to turn this hastily digested scheme loose upon the business interests of the country...it may be presumed that the president will sign the Interstate Commerce Bill, in spite of its deficiencies, as being the expression of a loudly expressed popular opinion.²⁰

This topic of the railroads being besieged by an ignorant mob can also be found in newspaper coverage of railroad issues after 1910, which often focused on the negative impacts of unfair regulations on the railroads (Table 2).²¹ The *New York Times* argued in 1931 that “public opinion has undergone a change in regard to the railroads...the grant of living rates to the railroads will no longer be a subject of complaint or resistance.”²² Even if the *Times’s* assessment is correct, however, this softening of public attitudes was of limited effect, as railroad regulations were not relaxed during this period, and even as motor transport became increasingly competitive, the Interstate Commerce Commission repeatedly refused to allow the railroads to change their rates to meet the new competitive threat [52].

4.2 Period 2: 1920-1942

After the First World War the railroads began to falter, as road competition began to threaten their dominance [52]. While this competition would have been a severe problem for the railroads

¹⁶ *Railway Gazette*, 1908, ‘Editorial’, 34 (14), p. 250.

¹⁷ Mann, J.R., 1910, ‘Give Railroads Fair Show’. *Washington Post*, 15 May, p. E4.

¹⁸ *Washington Post*, 1907, ‘Railroad Building in 1907: Every 5 years the United States Creates a New Railway System’. 27 December, p. E4; *Boston Globe*, 1909, ‘Railroad Enterprise’, 12 August, p. 6.

¹⁹ *Boston Globe*, 1908, ‘A Railroad over Water’, 10 February, p. 6.

²⁰ *Railway Gazette*, 1887, ‘Editorial’, 19 (2), pp. 24-25.

²¹ *Los Angeles Times*, 1913, ‘The Owners of the Railroads’, 21 May, p. 6; *Washington Post*, 1913, ‘Railroads Under Scrutiny’, 29 October, p. 6; Smith, M., 1913, ‘Strangling the railroads’, *New York Times*, 6 January, p. 8; W.T.T., 1913, ‘Favours Rate Increase, But Wonders If Other Railroads Besides The New Haven Have Misused Increased Control’, *Baltimore Sun*, 28 December, p. 8; W.W., 1913, ‘A Travelling Man Wants Rates Increased So Railroads Can Buy Steel And Provide For The Safety Of Their Passengers And Handled Traffic’, *Baltimore Sun*, 14 December, p. 6.

²² *New York Times*, 1913, ‘The Railroads and the Commission’, 15 November, p. 10.

regardless of the dominant narratives about them, it was exacerbated by the political struggles created by negative storylines. Responding in part to these storylines, Congress added a slate of stricter regulations to the railroads when they returned them to private hands after the First World War [49]. The Interstate Commerce Commission was empowered to set minimum rates (previously they had only been able to set maximum rates), while the railroads' profit was capped at 6 percent, with the remainder being recovered by the Federal Government [52]. These regulations handed a considerable advantage to road transport: Strictly set prices made it very easy for buses or trucks to undercut the railroads, while the cap on railroad profits meant that in 1929 the railroad industry would enter the Great Depression without sufficient savings.

The ultimate effect of this was that the railroads were no longer the sole dominant transport regime. This was noticed in opinion journalism about the railroads during the 1920s and 1930s, which began to talk about ways to "help the railroads", to portray their regulations as unfair, and to argue that the appearance of motor competition meant that the railroads could no longer realistically establish a monopoly on transport (Tables 3 and 4).²³ A source of particular sympathy for the railroads was the perceived ill-treatment they had received at the hands of the Federal Government during the war. Several cartoons from this period depicted an incompetent Uncle Sam trying to hand a badly damaged railroad system back to its dismayed owners (Figure 3). Another cartoon showed a penniless and downtrodden railway boss facing up to a shadowy board of Interstate Commerce Commissioners, who demanded that he state his reason for why he should be allowed to earn a living (Figure 4). Railroad journals, unsurprisingly, also promoted topics of overzealous regulation. The editor of *Railway Age* argued in 1921 that widespread animus against the railroads had become "a serious menace to all fair and reasonable regulation."²⁴ The *Electric Railway Journal* made similar complaints in 1925.²⁵

Other topics evident in the newspapers, however, show that the old storyline portraying the railroads as abusive monopolies was remarkably tenacious. Many	<i>Boston Globe</i> (19)	<i>Chicago Tribune</i> (20)	<i>Los Angeles Times</i> (20)	<i>New York Times</i> (20)	<i>Washington Post</i> (20)	All Newspapers (99)
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²³ *Los Angeles Times*, 1913, 'The Owners of the Railroads', 21 May, p. 6; *Washington Post*, 1913, 'Railroads Under Scrutiny', 29 October, p. 6; Smith, M., 1913, 'Strangling the railroads', *New York Times*, 6 January, p. 8; W.T.T., 1913, 'Favours Rate Increase, But Wonders If Other Railroads Besides The New Haven Have Misused Increased Control', *Baltimore Sun*, 28 December, p. 8; W.W., 1913, 'A Travelling Man Wants Rates Increased So Railroads Can Buy Steel And Provide For The Safety Of Their Passengers And Handled Traffic', *Baltimore Sun*, 14 December, p. 6.

²⁴ *Railway Age*, 1921, "'The Railroads must defend themselves better', 71(23), p. 1075.

²⁵ *Electric Railway Journal*, 1925, 'Wasted Government a National Menace', 65 (23), p. 875; *Electric Railway Journal*, 1925, 'One reason that sometimes underlies the unfairness of the public', 66 (10), p. 346.

<p>journalists argued that the railroad crisis was the fault of the railroads themselves. This added to the existing negative storyline portraying railroad managers as monopolistic and abusive, claiming that in addition to that, they were also obstinate, as proved by their failure to innovate. During the 1930s, as the depression cut deeper into railroad finances, letters to the editor and some editorials increasingly condemned the railroads for failing to apply the latest technological innovations, and for failing to reform their business practices sufficiently to solve the crisis by themselves.²⁶ These arguments</p>						
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²⁶ *Chicago Daily Tribune*, 1932, 'The Rail-bus-truck', 12 March, p. 12; Schlesinger, E.J., 1935, 'Railroad speed and rates', *New York Times*, 6 May, p. 18.; Rogers, W., 1932, 'Mr. Rogers offers a 1-point Suggestion to the Railroads', *New York Times*, 19 September, p. 19; Surcher, R. G., 1935, 'Fare cuts weighed as boon to travel', 11 August, p. E11.

became increasingly marginal in the press during this period as sympathy for the railroads became more common, but they remained popular among a very vocal minority of commentators (Tables 3 and 4).						
Labour issues	0.00	0.40	0.20	0.40	0.15	0.23
The railroads are over-regulated.	0.00	0.10	0.30	0.05	0.05	0.10
There is hope for a railroad resurgence.	0.00	0.10	0.05	0.05	0.15	0.07
Accidents and safety concerns	0.00	0.00	0.00	0.05	0.25	0.06
Motorists are responsible for safety at level crossings.	0.00	0.15	0.00	0.00	0.05	0.04
Praise of railroad innovation or development	0.00	0.10	0.05	0.00	0.05	0.04
Opposition to nationalised railroads	0.00	0.00	0.20	0.00	0.00	0.04
Defence of the railroads	0.00	0.10	0.05	0.00	0.00	0.03
Critical discussion of railroad amalgamations	0.00	0.00	0.00	0.15	0.00	0.03
The railroads are negligent on safety.	0.00	0.00	0.00	0.00	0.15	0.03
Technical discussions	0.00	0.00	0.00	0.00	0.15	0.03
Critics of the railroads are socialists.	0.00	0.00	0.10	0.00	0.00	0.02
Railroad speed records	0.00	0.00	0.00	0.10	0.00	0.02
Other	1	0.3	0.4	0.25	0.15	0.42

Table 3: Quantitative content analysis of opinion journalism about railroads (1920-1929).²⁷

In the congressional debates over returning the railroads to public hands, attitudes remained hostile to the railroads, to the point that an unsuccessful but popular “Plumb Plan” proposed to keep the railroads in public hands to protect workers, shippers, and passengers from abuse by railroad managements [49]. Even those members of Congress who did not support the Plumb Plan expressed significant concern about the railroads, particularly that they might use predatory pricing tactics to suppress competition from other transport sectors such as the waterways.²⁸ This fear is well-illustrated in an applause-inducing speech by Texan Congressman Rufus Hardy, who complained that “we spend hundreds of millions of dollars to improve the Mississippi and yet let the railroads tax the interior points in order to reduce their rates at water competitive rates, and so prevent any traffic on the river.”²⁹

²⁷ Note that the Boston Globe’s opinion journalism during this period focused mainly on incidental or local issues related to the railroads, and so none of their themes merited inclusion in this table.

²⁸ *Annals of Congress*, 66th Cong., 1st sess., 8584; 8592; 8603.

²⁹ *Annals of Congress*, 66th Cong., 1st sess., 8592.

Coming Back for Them.

Uncle Sam is the Hat-Check Boy for the Railroads.

Figure 3: A cartoon observing the state of the railroads as they were returned to the private sector in 1920. Los Angeles Times, 1920. 'Coming Back for Them'. 13 January, 1920. p. II-4.

Interstate Commerce Commissioner (to Railroad President)—State your reason for thinking you should be allowed to make a living.

Figure 4: A New York Tribune cartoon supporting the railroads against the regulations imposed by the Interstate Commerce Commission. New York Tribune, 1914. 'The Inquisition', 21 October, p. 6.

	<i>Boston Globe</i> (20)	<i>Chicago Tribune</i> (20)	<i>Los Angeles Times</i> (20)	<i>New York Times</i> (20)	<i>Washington Post</i> (19)	All Newspapers (99)
Labour issues	0.15	0.5	0.25	0.25	0.3	0.29
Railroads in war	0	0.05	0.15	0.1	0.1	0.08
The railroads are over-regulated.	0	0.15	0.2	0	0.05	0.08
Praise for railroad innovations or improvements	0.15	0.05	0	0	0.05	0.05
Business developments in the railroad industry	0.15	0	0	0.05	0.05	0.05
Road competition with the railroads	0	0	0	0.1	0.1	0.04
Service complaints	0.1	0	0	0	0.05	0.03
Pleas to save the railroads	0.05	0	0	0	0.1	0.03
Railroads are good for the economy.	0	0.1	0.05	0	0	0.03
Accidents and safety concerns	0	0	0.05	0	0.1	0.03
Railroad managements are obstinate and unimaginative.	0	0.1	0	0	0	0.02
Opposition to railroad nationalisation	0	0.1	0	0	0	0.02
The railroads are in crisis.	0	0	0	0.1	0	0.02
Railroad rates are too high.	0	0	0	0	0.1	0.02
Critical discussion of railroad consolidation	0	0	0	0	0.1	0.02
Other	0.45	0.1	0.45	0.5	0.20	0.34

Table 4: Quantitative analysis of opinion journalism about railroads (1929-1942).

This debate reached the Presidential level once again during the 1932 election race between Franklin Delano Roosevelt and Herbert Hoover. Roosevelt, who would later win a landslide victory, argued that the railroads should solve their own problems through innovation and better management.³⁰ This, like the opinion articles cited above, supports the idea that the railroads had an obvious way out of their predicament which was not being pursued due to their obstinate managements, and that the railroads therefore should not expect any help from the government.

³⁰ *Washington Post*, 1932, 'Roosevelt on Railroads', 18 September, p. 1.

The topic of the railroads as technologically backwards, however, did not take into account all of their efforts during the 1930s. One highly visible example of new technology on the railroads came in the form of streamliner trains: fast and luxurious diesel-powered long-distance trains with grandiose names such as the *Pioneer Zephyr*, the *Super Chief*, the *City of Portland*, and the *Forty-Niner*. The great lengths to which railroad companies went to promote the new trains suggests that they were as much a public relations innovation as a commercial one. The *Pioneer Zephyr's* debut journey in 1934, for example, was a record-breaking run from Denver to Chicago, where the train was then displayed at the latter city's "Century of Progress" exhibition.³¹ As a public relations strategy, the streamliners enjoyed some success. Unsurprisingly, they were positively reviewed in railroad journals, such as *Railroad Stories*,³² which argued in 1937 that the new trains "have given the traveller more in the way of speed, comfort and price than he has ever got before, and he has forsaken the competition—including the motor bus and his own car—to ride on them."³³ This positive coverage was not restricted to the railroad press, however: several newspaper articles can also be found portraying the streamliners as evidence of a coming railroad renaissance.³⁴ A 1936 *Chicago Tribune* article argued that "The circle is now complete and the railroads can point with pride to much-expedited schedules in every direction from Chicago,"³⁵ while the *New York Times* praised the trains' designers for realizing the "advantages of injecting a little glamour into rail travel."³⁶ These positive reviews of streamliner trains, however, were not very frequent: Coverage of streamliners does not meet the minimum threshold for inclusion in the quantitative analysis tables (Tables 3 and 4).

Streamliners were also too expensive to be used by any but the wealthiest members of society, and so they were rarely profitable [52]. The technological innovation most appealing to the average American traveller during this period was the bus, which, as previously mentioned, enjoyed a major commercial advantage due to restrictive railroad regulations. The railroads' only way out of this bind was a political effort to level the regulatory playing field. This effort began in 1926, when the railroads began petitioning the government to extend Interstate Commerce Commission control to buses. In 1929, the Commission's inquiry into the subject led to the consideration of the Parker Bill, which would have extended Interstate Commerce Commission regulations to road transport.

Congressional debates over the Parker Bill were highly contentious, with opponents of the bill arguing that it had been proposed by the railroads to allow them to regain monopolistic control of transport. Representative Hare of South Carolina condemned the legislation, calling it a "railroad bill", and alluding to the railroads' "well-known reputation" for stacking the political deck in their favour.³⁷ Representative John McSwain of South Carolina predicted that the railroads, if allowed to do so, would seize control of road transport by running "busses of such elegance, of such luxurious equipment, of such conveniences, and make riding in their busses so attractive" as to drive all

³¹ Stover 1961, p. 234.

³² *Railroad Stories*, 1937, 'Trains that are Making Good, No. 11: The Daylight', 23 (3), pp. 27-32; *Railroad Stories*, 1937, 'Trains that are Making Good, No. 12: The Super Chief', 22 (4), pp. 52-57; *Railroad Stories*, 1937, 'Trains that are Making Good, No. 14: The Green Diamond', 22 (6), pp. 35-39.

³³ *Railroad Stories*, 1937, 'Trains that are Making Good, No. 9: The Royal Blue', 19 (7), pp. 85-89.

³⁴ L.H.R., 1938, 'The 'Iron Horse' Carries On.' 13 February, p. 167; Howe, W.A. 'Rail Notes: New Flyers', *New York Times*, 11 February, p. 145.

³⁵ Laird, H.A., 1936, 'Chicago's Twenty Luxury Liners of the Rails', 12 July, p. 1.

³⁶ J.M., 1941, 'Glamour Rides Rails', *New York Times*, 30 November, p. 1.

³⁷ *Annals of Congress*, 71st Cong., 2nd sess., 5865.

competing bus traffic off the roads, thereby re-establishing their monopoly.³⁸ One of the most vocal opponents of the bill was Senator James J. Couzens, who argued that the railroads' goal was to "control all methods of passenger transportation...We may just as well not have any bus lines at all if they are going to be owned and controlled and operated by the railroads".³⁹ The bill was eventually defeated in the Senate.

A quantitative analysis of speeches in the House of Representatives during the debates over the Parker Bill indicates how important negative storylines about the railroads were in its defeat.⁴⁰ 86 percent of the representatives voting against the bill who spoke at length on it expressed some kind of hostility towards the railroads (Table 5), with over 70 percent worrying specifically about the re-establishment of a railroad monopoly. This was not offset by any comparable support for the railroads among those voting for the bill, where positive perceptions of the railroads were voiced by just 20 percent of the representatives speaking on the subject (Table 6). In fact, even 20 percent representatives *supporting* the bill were nevertheless hostile towards the railroads. Rather than justifying the legislation on the grounds of helping the railroads, its supporters tended to justify it on the grounds of regulatory streamlining, state precedent, or the need to better control the bus industry.

Topics among representatives voting for the Parker Bill	Incidence	Proportion
There is state precedent for bus regulation.	7	0.30
Irresponsible bus operators	5	0.22
Praise for or trust of the Interstate Commerce Commission	5	0.22
Suspicion of the railroads	5	0.22
Private buses use publicly funded highways.	4	0.17
Streamlined regulation	4	0.17
Trust or sympathy for railroads	4	0.17
Reassurances that the bill is not burdensome	3	0.13
The railroads provide a precedent for bus regulation.	3	0.13
There is urgent demand for the bill.	3	0.13
The bill successfully avoids railroad abuse.	3	0.13
Safety concerns	3	0.13
Bus transport is a positive development, which might replace the railroads.	3	0.13
Buses should be regulated as a public interest monopoly.	3	0.13
Negative perceptions of the railroads	6	0.3
Positive perceptions of, or sympathy for, the railroads	4	0.2

Table 5: Quantitative analysis of topics present in speeches among members of the House of Representatives who voted for the Parker Bill.

³⁸ *Annals of Congress*, 71st Cong., 2nd sess., 5868.

³⁹ *Annals of Congress*, 71st Cong., 2nd sess., 12298.

⁴⁰ Unfortunately, a similar analysis of Senate speeches could not be carried out, due to the unavailability of any information on how individual Senators voted in the final vote on the Bill.

Topics among representatives voting against the Parker Bill	Incidence	Proportion
The bill will create a railroad monopoly.	10	0.71
Opposition to the Interstate Commerce Commission	7	0.50
Distrust for the Interstate Commerce commission	7	0.50
The bill will create a bus monopoly.	6	0.43
Private buses use publicly funded highways.	5	0.36
The railroads have a history of price gouging.	5	0.36
The legislation serves the interests of big bus companies.	5	0.36
Constitutional concerns	4	0.29
Suspicion of the railroads	4	0.29
States' rights concerns	4	0.29
The legislation suits the interests of the railroads.	4	0.29
There is no public or traveller demand for the bill.	4	0.29
The railroads will use the bill to fix prices.	4	0.29
The bill will impose an oppressive bureaucracy.	4	0.29
Negative perceptions of the railroads	12	0.86
Positive perceptions of, or sympathy for, the railways	1	0.07

Table 6: Quantitative analysis of topics present in speeches among members of the House of Representatives who voted against the Parker Bill.

Distrust of large bus companies rivals distrust of the railroads as a reason given for the bill's opponents to vote against it, but even in this case, speeches typically used railroad monopolism as a cautionary tale against road monopolism. Nebraska Senator and progressive leader Robert B. Howell recounted that "in 1920 the railroads came to Congress, just as the busses are coming to Congress now and said, 'We are not getting enough money. We are entitled to more for our services'".⁴¹ This indicates that despite some softening of attitudes among journalists, storylines portraying the railroads as dangerous, abusive monopolists remained popular among politicians. While it is debatable whether or not the Parker Bill would have allowed the railroads to compete more effectively against road transport, given the various commercial and technological advantages that road transport had gained by that time, it is nevertheless telling that the political efforts of the once-powerful railroads had been stymied by the influence of negative storylines.

It took until 1935 for road transport to be brought under Interstate Commerce Commission control [52]. Even this legislation, however, had some very important loopholes. It excluded intrastate road transport, as well as any non-commercial road transport, and several categories of freight, from regulation.⁴² This meant that the railroads continued to be at a regulatory disadvantage against road transport, with predictable commercial and financial consequences. By the end of the 1930s, the railroads had given up, and begun scaling back their track infrastructure. This was interrupted by a brief resurgence during the Second World War due to rationing, but by the time the war was over, the railroads had been replaced as the dominant regime by road transport. This was due to a wide variety of factors, including technological change, economic instability, and political contingencies.

⁴¹ *Annals of Congress*, 71st Cong., 2nd sess., 2288

⁴² *New York Times*, 1935, 'Competitors for Traffic', 18 April, p. 22.; R.G., 1935, 'ICC Control Reaches Highways', *New York Times*, 18 August, p. 1.

Negative discourses, however, while not a single decisive factor, played an important role in these events.

5 Analysis

Section 4 uncovered two storylines about the railroads that can be found throughout this case. The first is a positive storyline, promoted by actors portraying the railroads as an engineering triumph and an economic necessity which was unfortunately vulnerable to the regulatory whims of an ill-informed public and political class. Actors promoting a negative storyline, meanwhile, portrayed the railroads as an abusive monopoly which threatened American democracy and prosperity, and whose managers were not to be trusted. There were some important variations on these two storylines: politicians who were hostile to the railroads, for example, tended to focus more on their alleged political malfeasance, while anti-railroad journalists focused more on their commercial and safety issues. Both storylines also evolved over the 6 decades that the case study considers: The topic of the railroads being oppressed by a clueless Federal bureaucracy, for example, was a new addition during the 1920s. In general, however, most of the topics uncovered by the historical research contribute to one of these two storylines.

Of these two storylines, the negative one appears to have had a greater influence, as demonstrated by the reluctance of government officials to loosen railroad regulations at the crucial moment when the railroads faced the twin problems of road competition and the Great Depression. This storyline, and the actors it influenced, was not the only, or even the most important, contributing factor to the railroads' demise. Indeed, the American railroads survived just fine during the late nineteenth century, when this storyline was arguably already dominant. Decades later, however, the dominance of this negative storyline, particularly among political actors, would exacerbate the railroads' growing problems with road competition and economic collapse. With that in mind, the longevity of the storyline is interesting: The fact that it emerged during a period where the railroads were a very strong and stable socio-technical regime, and yet was also able to contribute to their eventual collapse, suggests that negative storylines could be a key vulnerability in otherwise stable socio-technical regimes.

Table 7 uses the elements of frame resonance outlined in section 2, to describe the resonance of each storyline as either high or low, based on a qualitative assessment of the historical evidence discussed in section 4. Storylines reflected in a high number of newspaper articles, or voiced by very powerful actors are described as highly resonant, while storylines appearing in a smaller number of articles, or voiced only by relatively insignificant actors, are described as having a low resonance. This approach shows that the positive storyline about the railroads had a weak resonance among most of its audience, scoring highly only on empirical fit. The negative storyline, meanwhile, scored highly on all four elements of frame resonance, due to the sheer diversity of complaints about the railroads.

	Empirical fit	Experiential commensurability	Macro-cultural resonance	Actor credibility
Period 1: 1887-1918				
Positive storyline: Railroads are technologically sophisticated and economically benevolent.	High , due to railroad engineering projects and the country's obvious economic reliance on railroads.	Low , due to shipper and traveller frustrations.	Low , due to anti-trust feeling, combined with increasing railroad amalgamations.	High , due to technological accomplishments and expertise of railroad companies.
Negative storyline: Railroads are abusive monopolists.	High , due to common knowledge of amalgamations, accidents, and high fares.	High , due to frustrations about service and fares.	High , due to American democratic myths clashing with railroad lobbyists, and due to anti-trust populism.	High , due to past scandals involving railroad companies.
Period 2: 1918-1945				
Positive storyline: Railroads are a good, reliable, and innovative system being unfairly suppressed by government regulations.	High , due to public knowledge about regulations and the increasing competition with road transport, and due to reporting on streamliners.	Low , due to limited public experience with the details of government regulations.	Low , due to continued anti-trust attitudes and the railroads' anti-democratic reputation.	Low , due to general distrust of the railroads, and to declining importance of railroad expertise in the wider transport system.
Negative storyline: Railroads are an abusive monopoly that is technologically obstinate.	High , due to evidence that the railroads were losing the battle against road transport.	High , due to public frustrations and limited knowledge of streamliner trains.	High , due to continued anti-trust attitudes.	High , due to past scandals involving railroad companies.

Table 7: Analysis of the measures of frame resonance for each of the storylines about railroads that were observed during this study.

The greater resonance of this negative storyline allowed its supporters to amass a powerful anti-railroad discourse coalition, including many journalists, social movements such as the populists, multiple generations of politicians, and at least one President. This ultimately stopped the railroads from convincing Congress to loosen their regulations when they needed it most. This negative storyline was therefore a crucial negative policy feedback mechanism, by which the railroads' previous strong influence over policy came back to undermine them. The resulting strict regulations, combined with other problems the railroads were experiencing, such as the loss of traffic to road

transport, and the loss of heavy freight traffic during the Great Depression, badly undermined the railroads' commercial position.

It is worth noting that the emergence of this negative storyline was largely due to developments which are quite normal in mature socio-technical regimes: A relatively small number of powerful, amalgamated companies; increased public awareness of the regime's problems; routine user frustrations; and the development of cultural trends, such as Populism, with which the regime was incompatible. Empirical accounts of the discursive destabilisation of other socio-technical regimes confirm the importance of these kinds of developments. The storyline that destabilised the New York City streetcar regime, for example, gained experiential commensurability from travellers' daily frustrations, and from the lack of actor credibility of the scandal-wracked streetcar companies [30]. British coal power, meanwhile, was partly destabilised by the growth of modernist discourses that made it seem dirty and old-fashioned [31]. In each of these cases, negative storylines emerged from within the regime, rather than from competitive niche-innovations or landscape events. This suggests a key discursive vulnerability in incumbent socio-technical regimes.

Another interesting finding of this research is that the negative storyline portraying the railroads as abusive monopolists was very long-lived. Its key element, accusing the railroads of monopolistic abuse, remained constant from the nineteenth century right up to the end of the Second World War, by which point motor transport had eliminated any threat of a railroad monopoly. This suggests that storylines can out-live the facts that support them, which has important implications for the long-term effects of negative storylines about socio-technical regimes, even if they emerge during periods of regime strength. Another interesting finding is that during the second period, media and political elites subscribed to very different storylines. The recruitment of politicians into an anti-railroad discourse coalition was perhaps the most important impact of negative storylines about the railroads: Even as journalists' attitudes towards the railroads began to soften, politicians continued to support very strict regulations. This suggests that the resonance of negative and positive storylines *for different social groups* could be an important determinant of their ultimate impact.

6 Discussion and conclusion

This research presented in this article suggests that far from enjoying stable supportive discourses, socio-technical regimes actually face an important negative feedback in the form of negative storylines. Unless the regime can remain empirically credible as a safe and reliable system; keep its users perpetually satisfied; maintain a positive link with ever-changing cultural trends; and avoid any scandals that discredit its key actors, it risks becoming attached to entrenched negative storylines, which could potentially undermine its position and become severe problems when combined with other challenges to the socio-technical regime, such as landscape shifts or competitive niche-innovations.

The case study presented in this paper is useful as a *critical case* [53], demonstrating that *even* a socio-technical regime as entrenched and powerful as the American railroads can have discursive vulnerabilities, and that these vulnerabilities may even have been a *result* of its stability and power: big, stable railroad regimes appeared highly insensitive to the needs of their users and of the nation they served, leading to deep-seated public frustrations. This narrative emerged due to many of the same kinds of complaints that appear in the energy research discussed in section 1. Mundane

concerns such as safety and ticket prices, comparable with concerns about noise from wind turbines or water contamination from fracking, played a key role in establishing animosity towards the railroads. Once these were amalgamated into larger anti-railroad narratives that touched on bigger societal debates such as anti-trust legislation, however, they became much more powerful.

This suggests that researchers looking to find ways to influence energy transitions should pay attention to the kinds of complaints levelled at incumbent fossil fuel energy regimes, with an eye to how these complaints can be linked up into storylines that score highly on the four elements of frame resonance. These storylines can then support technological, financial, or policy efforts to accelerate transitions to sustainable energy systems by helping to destabilise fossil fuel incumbents. The empirical investigation of such storylines as they pertain to present-day fossil fuel regimes is beyond the scope of this paper, but based on the case study presented here, one can speculate about the circumstances that might destabilise fossil-fuelled energy regimes. Public complaints about electricity rates, for example, combined with concerns about air pollution from coal plants and the environmental consequences of shale gas could produce a compelling and popular storyline depicting incumbent energy regimes as dangerous, ecocidal, and out-of-touch monopolies. The resulting consumer and voter backlash could lead to increased support for policies that punish the regime, to the benefit of renewables or other forms of alternative energy.

A second implication of this research is that renewable energy systems are not exempt from this discursive feedback effect. This finding is particularly important in light of the research discussed in the introduction, which shows that renewable energy technologies are already subject to many of the mundane objections that could potentially coalesce into a hostile public narrative. Renewable energy is projected to become a major part of the world's energy infrastructure in the coming decades [54], a process which will undoubtedly involve the development of large-scale infrastructures and big corporate players. It will be important to manage this process to avoid the entrenchment of storylines depicting these technologies as the playthings of rich, cosmopolitan environmentalists that ruin landscapes and drive up energy bills.

The practical application of this research will require a more detailed understanding of the dynamics of storylines than is presented in this paper. More research should be done on the resonance of storylines among different groups, such as journalists, users, or policymakers. Case studies featuring incumbent socio-technical regimes that *have* maintained positive storylines would also be useful, to show how they differ from socio-technical regimes that have not. Ultimately, more knowledge about the stories associated with incumbent technologies is essential both for destabilising existing unsustainable incumbent regimes, and for ensuring the stability of future energy regimes, particularly those built around renewables. This suggests that more empirical work should be done not just about the public perceptions of new technologies, but also public perceptions of old systems. More detailed analysis of the resonance of present-day storylines concerning renewables or fossil fuels could help to map out the influence that these storylines might have on the political and commercial success of competing energy technologies, and on other developments affecting the long-term stability of different energy systems.

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