

# Changing Perceptions of Repair and Maintenance:

Reflections from the Oral History of the  
Electricity Supply Industry in the UK

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In 2014 I filmed an oral history interview in a coal-fired power station in central England. Built in the 1960s, the station was still operational and its original turbo generators still provided close to their design output nearly half a century from their installation (though aptly, one of them was offline for repairs that day). Standing in the control room I was struck by the juxtaposition of old and new required to keep this cathedral of power running. Along one side of the room were modern computerised control desks, desktop PCs and large flat display screens monitoring every aspect of the plant's operation. On the other side was a wall of switches, dials and glowing light bulb indicators, housed in grey metal cabinets proudly carrying the logo of an electronics company that had been defunct since 1968.<sup>1</sup>

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- 1 I am deeply grateful to all those who were interviewed for An Oral History of the Electricity Supply Industry (henceforth OHESI); for the generous philanthropy of the project funders, Hodson and Ludmila Thornber, for enabling the project to happen; for the advice of the project advisory committee, Sir John Baker, David Jefferies, Stephen Littlechild and Leslie Hannah; for comments on drafts by Sally Horrocks, Heike Weber and Stefan Krebs; and for the support of all the archive staff at National Life Stories who care for the OHESI archive, including Rob Perks, Mary Stewart, Elspeth Millar, Emily Hewitt, Haley Moyse, Eleanor Lowe, Camile Johnson, Charlie Morgan and Cai Parry-Jones. An earlier version of this paper was presented at the Histories of Technology's Persistence: Repair, Reuse and Disposal workshop in 2018 and I am grateful for the suggestions of other delegates.

As this anecdote suggests, electricity supply industries (ESI) are rich systems in which to observe the persistence of technology. The longevity of ESI engineering is a testament not only to the robust quality of original design but also to the care it receives over decades of operation. Yet infrastructure is largely invisible except when it fails, and the activities of the many people who are responsible for its ongoing care over decades often go unnoticed. Graham and Thrift argue that “the processes of maintenance and repair that keep modern societies going ... have been neglected by nearly all commentators as somehow beneath their notice”.<sup>2</sup> Accordingly, whilst there has been some attention to how the electrical system was operated during times of trouble, particularly in Frank Ledger and Howard Sallis’ *Crisis Management in the Power Industry*,<sup>3</sup> the repair and maintenance of the ESI has not been given a great deal of attention in its history in Britain. For example, the subject is mentioned only briefly in Leslie Hannah’s classic history of the post-war industry until the early 1980s, and even less in Dieter Helm’s account of the more recent development of the sector.<sup>4</sup> The focus in these and other works has tended to be on business history, technical development, economics, organisation, politics and the growth of the industry.

Historians of technology have long stressed the importance of adopting a systematic approach to understanding the development of electricity industries.<sup>5</sup> A similar perspective is required to understand their maintenance and repair. The integrated nature of electricity networks means that unchecked local faults can lead to widespread cascading failures. Maintenance work has to be carefully programmed to allow items of equipment to be switched out and isolated, both for the safety of workers but also to protect the integrity of the system as a whole. The British electricity network is a 24/7 operation and, as electricity cannot be stored, supply and demand on electricity networks need to be kept con-

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- 2 Graham, Stephen/Thrift, Nigel: “Out of Order: Understanding Repair and Maintenance”, in: *Theory, Culture & Society* 24, 3 (2007), p. 1–25, here p. 1.
  - 3 Ledger, Frank/Sallis, Howard: *Crisis Management in the Power Industry*, London: Routledge 1995. The major focus here is on political crisis, notably the miners’ strikes of the 1970s and 1980s. Both authors served in the ESI and Frank Ledger was amongst those interviewed for OHESI.
  - 4 Hannah, Leslie: *Engineers, Managers and Politicians*, London and Basingstoke: Macmillan 1982; Helm, Dieter: *Energy, the State, and the Market*, Oxford: Oxford University Press 2003.
  - 5 Hughes, Thomas P.: “The evolution of large technological systems”, in: Bijker, Wiebe E./Hughes, Thomas P./Pinch, Trevor (eds.): *The Social Construction of Technological Systems. New Directions in the Sociology and History of Technology*, Cambridge, MA/London: MIT Press 1987, p. 51–82.

stantly in balance by the coordinated actions of individuals across the industry. Overall, this system presents an excellent example of the sort of “broken world” discussed by Steven Jackson, a piece of infrastructure only kept going by the constant attention of maintenance and repair workers whose efforts are generally hidden except when parts of the system fail.<sup>6</sup>

In this paper I use oral history interviews to explore the history of repair and maintenance from the perspective of electricity supply industry workers. The interviews were collected between 2013 and 2017 as part of *An Oral History of the Electricity Supply Industry in the UK* (OHESI), led by National Life Stories (NLS) at the British Library.<sup>7</sup> Established in 1987, National Life Stories’ mission is “to record first-hand experiences of as wide a cross-section of society as possible, to preserve the recordings, to make them publicly available and encourage their use”.<sup>8</sup> This has been principally achieved through a series of oral history projects that have focused on recording and archiving the life stories of people who worked in particular industries or sectors of society.

NLS interviews are typically semi-structured, relying on a biographical outline, open-ended questions and a conversational interview style, and recorded over several sessions. Eight- to fifteen-hour interviews are quite normal, giving interviewees the chance to reflect at length on their lives within a wider social history framework and to recall daily life and developments in the areas they worked in. OHESI collected over 500 hours of recordings with more than 60 people connected to the electricity industry. Most of them were professional en-

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- 6 Jackson, Steven J.: “Rethinking Repair”, in: Gillespie, Tarleton/Boczkowski, Pablo J./Foot, Kirsten A. (eds.): *Media Technologies: Essays on Communication, Materiality, and Society*, Cambridge, MA: MIT Press 2014, p. 221–239.
- 7 Further details on project background are available in the project scoping study: Horrocks, Sally/Lean, Thomas: *An Oral History of the Electricity Supply Industry. Scoping Study for Proposed National Life Stories Project*. National Life Stories, 2011, [https://www.bl.uk/britishlibrary/~media/subjects%20images/oral%20history/oral%20history%20and%20nls%20documents/nls\\_electricityindustryscopingstudy.pdf](https://www.bl.uk/britishlibrary/~/media/subjects%20images/oral%20history/oral%20history%20and%20nls%20documents/nls_electricityindustryscopingstudy.pdf) (accessed 29.10.2018). Further details on project implementation, including interviewee selection, are available in the end of project report: Lean, Thomas: *An Oral History of the Electricity Supply Industry. Final Report*. National Life Stories, 2017, <https://www.bl.uk/britishlibrary/~media/Oral%20History-Electrical%20Supply%2023102017.pdf> (accessed 29.10.2018).
- 8 “British Library Projects: National Life Stories”, <https://www.bl.uk/projects/national-life-stories> (accessed 17.06.2019).

gineers with long careers in the sector, but the collection also included accounts from some industrial staff, managers and others connected to the industry.<sup>9</sup>

Repair and maintenance were not the specific focus of the interviews, but the issues came up in conversation with several interviewees as they described the work that they had once done and commented on how the industry had changed over their careers. As such, the corpus cannot be read as a continuous dataset but more as a collection of snapshots from across the industry's past; a series of vignettes and reflections on repair and maintenance from a wide range of people. This includes people who worked both in power stations and on the transmission and distribution system. Naturally, the viewpoints in the interviews are subjective, but as oral historians have long argued, this very subjective quality can allow oral history interviews to reveal salient truths. Oral sources, as Alessandro Portelli points out, have a "different credibility". They can show us not just what people did but how they understood the meaning of these activities both then and as they retell them now.<sup>10</sup> OHESI interviews contain three principal sorts of information about repair and maintenance: stories and anecdotes about experiences of repair and maintenance jobs, descriptions of the work activities involved, and reflections on the meanings of these activities and how these meanings could change over time. I illustrate this essay largely with the third category, interviewees' subjective views, but present them in analysis and context based on other information that emerged in interviews.

My particular focus in this essay is on how maintenance and repair were changed by the privatisation of the British electricity industry, i. e. how practices of repair as well as the perception and meaning of repair changed. Through most of the careers of those interviewed, the ESI was owned and operated by the state, after nationalisation by Clement Attlee's left-wing Labour Government in 1948. For most of the era of nationalisation, the Central Electricity Generating Board (CEGB) ran the power stations and nationwide high-voltage transmission system through which electricity was dispatched to a dozen Area Electricity Boards in different regions of the country, which in turn distributed it through low-voltage networks to customers.<sup>11</sup> After the 1979 election of Margaret Thatcher's right-

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9 All interviews cited in this essay were conducted by Thomas Lean for OHESI, and are generally available online at <http://sounds.bl.uk/Oral-history/Industry-water-steel-and-energy> (accessed 12.03.2019).

10 Portelli, Alessandro: "What Makes Oral History Different?", in: Perks, Robert/Thompson, Alistair (eds.): *The Oral History Reader* (2nd edition), London: Routledge 2003, p. 67.

11 The industry was organised differently in Scotland and Northern Ireland, where the functions of the CEGB and Area Boards in England and Wales were more vertically

wing Conservative Government, bent on free-market reforms, the ESI was privatised over the 1980s and 1990s. The CEGB was split up into competing generating companies and an independent National Grid company was established, and the Area Boards became regional electricity companies. The whole industry became increasingly fragmented as more companies became involved in the years that followed. Interviewees often present privatisation as something of a millenarian event, heralding a period of great cultural change in the industry. As the head of one privatised power company recalled of the change, “I used to say to the people at Powergen [one of the new post-privatisation generating companies]: ‘If you don’t know what to do ... think of what you would do in the CEGB and then do the opposite.’ ... I intended them to say: ‘Well if we did it in the CEGB like that, but now we’re a totally different culture ... then how do we do it now?’”<sup>12</sup> As I discuss, there are many aspects to this cultural shift, but it can be very briefly summarised as a move away from a centrally planned and engineering-focused service industry to a competitive energy market of agile businesses that were more driven by financial profit and loss.

The privatisation and liberalisation of infrastructure systems and public services is a subject that has elicited considerable comment, much of it critical. Graham and Thrift, for example, suggest that the application of neoliberal ideologies to electrical systems has been a, “complete rebuttal of the subtle cultures of repair which actually allow complex technosocial systems like electricity to work”,<sup>13</sup> contributing to their degradation and increasing unreliability. I do not make any value judgment here as to whether maintenance and repair arrangements were better or worse either side of privatisation. As I note later, figures from the industry regulator seem to suggest modest improvements in system reliability after privatisation. However, excusing the occasional exceptional event, the lights stayed on fairly reliably before privatisation too. Yet to listen to the impressions of those who worked in the industry through this period, it is evident that, to them, something changed in how this was achieved as the culture of the industry shifted. Various studies have highlighted how repair and maintenance activities are seen differently by the particular cultures they are part of, such as those espousing ideas of self-sufficiency, creativity or environmentalism. My aim in this essay is to explore how the different cultures of the nationalised and

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integrated into single organisations. While OHESI interviews suggest some variations in culture between regions, there seems to be a common commitment to public service and engineering.

12 Interview with Edmund Wallis, OHESI, C1495/26, 2014–15.

13 Graham/Thrift, “Out of Order”, p. 14.

privatised industries contributed to a change in how repair and maintenance were approached and conceptualised, though the end result, the lights staying on, has remained constant.

## **THE NATIONALISED ESI: ENGINEERS AND PUBLIC SERVICE**

It is generally accepted that the nationalised ESI was a largely engineering-led organisation. Dieter Helm, for example, notes the “cult of the engineer” as being a major theme of the nationalised ESI, which concentrated on “ever bigger and more technical investments ... free from the constraints of competitive markets”.<sup>14</sup> As I discuss in detail elsewhere, respect for the “heroism of practical knowledge” was deeply engrained in the culture of the nationalised ESI.<sup>15</sup> Most of its senior managers were originally trained as engineers, generally after following an apprenticeship with periods of hands-on work that encouraged an appreciation of engineering and craft skill. As one senior manager recalled of his apprenticeship alongside craftsmen in the 1950s: “I remember being amazed at the sheer skill of people ... who could make their tools sing and that was not with any book learning”.<sup>16</sup> Industrial workers, including the skilled craftsmen who actually did most of the maintenance work under the direction of engineers, were often trained by the industry itself through its training schools and thorough apprenticeships. “You felt as though you were getting quality training and you were working for a quality outfit”, recalled one foreman of his apprenticeship. This contributed to an organisational culture where engineering, high standards and practical ability were much respected.<sup>17</sup>

The ESI also imbued its staff with a sense of public service and the importance to society of maintaining electricity supplies.<sup>18</sup> As one interviewee put it: “You’ve got to do the best you can to keep the lights on and serve the public”.<sup>19</sup> In an ethnographic study of workplace maintenance staff, Christopher Henke argues that repair of faults is essential for maintaining the normal order of

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14 Helm, *Energy, State and Market*, p. 16.

15 Lean, Thomas: “The Life Electric: Oral History and Composure in the Electricity Supply Industry”, in: *Oral History* 46 (2018), p. 56–58.

16 Interview with Granville Camsey, OHESI, C1495/09, 2013–14.

17 Interview with David Williamson, OHESI, C1495/43, 2015–16.

18 Lean, “The Life Electric”, p. 61–62.

19 Interview with Frank Ledger, OHESI, C1495/01, 2012–2013.

the workplace.<sup>20</sup> Similarly, “keeping the lights on” helped to preserve the normal order of society, but if supplies were threatened by faults then repair staff had a duty to restore normality as swiftly as possible. “There was an ethos there that you looked after people ...”, recalled one distribution engineer, “[y]our job was, if they’re off supply, to get them back as quickly as possible”.<sup>21</sup>

These two aspects of ESI culture are both evident in stories of repairing faults or keeping the system going under pressure. These sometimes take on the character of “war stories”, struggles to keep the engineering of the system going and serve the public despite challenges such as failing technology or horrendous weather. Julian Orr notes in an ethnography of photocopy technicians that such stories are useful in transferring knowledge and building a sense of professional identity.<sup>22</sup> This latter function seems particularly important in the oral history interviews, contributing to building an identity of self-sacrificing public servant and able engineer.<sup>23</sup> Electricity was a 24-hour industry and repair staff could be called on at any hour. Distribution engineers, for instance, served shifts at home on standby, awaiting the night-time telephone call that would summon them to attend to a fault. As one senior manager recalled of his time as a distribution engineer early in his career:

“I think the most exciting part of some of it really is, and I think partly it’s still the same today although it’s much more controlled, is you get rung up about 2 o’clock in the morning on the telephone, you get told that customers [are] off supply, people ringing up all over the place. And *you* have to go out, and *you* have to find the problem, and *you* have to solve it, and *you* have to repair it. Nobody else. That I guess was the challenge.”<sup>24</sup>

There could also be an element of public appreciation too, expressed by interviewees in anecdotes about customers being grateful for their electricity supply being returned. Another retired distribution engineer, recalling various ways that faults and their repair had inconvenienced the public, reflected that people were generally, though not totally, understanding of the efforts made to get their supply back on: “Some people were less pleasant and there were one or two who

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20 Henke, Christopher: “The Mechanics of Workplace Order: Toward a Sociology of Repair”, in: *Berkeley Journal of Sociology* 44 (1999/2000), p. 55–81, here p. 44.

21 Interview with Michael Butterfield, OHESI, C1495/39, 2015.

22 Orr, Julian: *Talking about Machines: An Ethnography of a Modern Job*, Ithaca/London: Cornell University Press 1997, ch. 8.

23 See Lean, “The Life Electric”, p. 56–62.

24 Interview with Bryan Townsend, OHESI, C1495/05, 2013.

were aggressive, but on the whole people were remarkably supportive for what you were trying to do”.<sup>25</sup> On the other hand, if the system failed for too long, public displeasure could be quite unpleasant. In the early 1970s, for instance, when power cuts became a daily feature of life as striking miners cut off coal supplies to power stations, interviewees recall arguments with their neighbours over why their electricity was off and hiding electricity board insignia on their uniforms whilst out in public. It has been argued that the work of maintainers only becomes visible when systems fail. While a handful of interviewees express a certain sadness that the public were generally ignorant of the daily efforts that went into keeping the system going, this lack of awareness is perhaps a tribute to how well it was maintained and operated on the whole: an invisible system was a working system.

## **THE PRIVATISATION OF THE ESI: CREATING A BUSINESS-LED INDUSTRY**

Before nationalisation in 1948, the British ESI was a patchwork of over 300 different municipal and private undertakings. In the years of post-war austerity, power cuts and voltage reductions were a regular feature of daily life. Nationalisation facilitated a dramatic development of the ESI’s capacity and technology and by the 1980s it had evolved into a generally reliable and robust system. The capability of the system as a whole to meet exceptional strain was demonstrated during the 1984–1985 miners’ strike, the most bitter industrial dispute in recent British history. Striking miners brought the industry to its knees in the early 1970s, but a decade later the lights stayed on as the ESI withstood “the greatest challenge ... of the industry’s history”.<sup>26</sup> However, while the ESI was unquestionably meeting its mission to keep the lights on, nationalised industries as a whole were under criticism for their perceived inefficiencies. Privatisation was a major policy plank of the Conservative Government over the 1980s, partly for ideological reasons, but it was also presented as a way of reforming nationalised industries. The memoirs of political figures driving privatisation, for example, go into some detail about the problems of the nationalised ESI, which they identify as muddled central planning, inefficiency and high costs.<sup>27</sup> This reminds us

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25 Interview with Alison Simpson, OHESI, C1495/55, 2016.

26 Ledger and Sallis, *Crisis Management*, p. 293.

27 See, for example, the perspectives of two energy ministers in the 1980s: Lawson, Nigel: *The View from No. 11*, London: Transworld 1992, chs. 12, 15 and 16; Parkinson,

that determining whether a technical system is broken depends not only on whether its technology fulfils its function, but also whether it is perceived as working by the standards of its political-economic context.

Many senior industry figures describe privatisation not as a political issue but as a radical way of reforming problems they perceived in the state-run ESI, such as over-staffing, inefficiency, government interference and muddled or “gold-plated” technical development.<sup>28</sup> As one Area Electricity Board chairman put it: “I think the industry had stagnated, it had ossified ... monolithic, too big, too ungainly ... it was just ready for a massive change”.<sup>29</sup> In the memories of industry figures in favour of it, privatisation appears almost as a way of repairing the industry’s problems and improving efficiency. On the other hand, there were those who saw little wrong with the existing arrangements. As a senior manager from the CEGB recalled: “I couldn’t really believe anybody could do the job better than we were doing”.<sup>30</sup>

Perhaps the biggest difference in post-privatisation companies has been the decline in influence of engineers. Dieter Helm comments that “whereas engineers led the nationalised industries, their role was greatly reduced in the 1980s and 1990s”.<sup>31</sup> Privatisation saw a decline in the status of engineering in the ESI, as management positions, formerly dominated by trained electrical engineers, became more open to figures with expertise in accountancy, human resources and other general management experience. Clearly engineering was still vital, but as financial targets assumed far greater significance than before, the industry embarked on a wave of cost-cutting measures that would have a number of effects on maintenance and repair. Examples noted by interviewees include the reduction of extensive power station stockpiles of spare parts, the closure of maintenance depots, with staff expected to travel further to fix problems, and new information and communication technology being used to increase maintenance staff utilisation rates.

Whilst most interviewees regard the public service mission of the industry as continuing after privatisation, a few also note a change in emphasis as financial issues and targets became more explicitly significant. As one recently retired dis-

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Cecil: Right at the Centre, London: George Weidenfeld & Nicholson Limited 1992, ch. 13.

28 Lean, “The Life Electric”, p. 62–65.

29 Interview with Bryan Townsend.

30 Interview with Frank Ledger.

31 Helm, *Energy, State and Market*, p. 16.

tribution engineer who worked on the system before and after privatisation remarked:

“I think that was the attitude for a long time: that we were a public service ... I suspect that people now have as much satisfaction, but certainly I think that concept of ‘we’re doing what we’re doing for the public’ as a nationalised industry had, I’m not sure. The emphasis of management changed from ‘we’re doing what we’re doing for the public’ to ‘we’re making profits for the company’. And while people still do and get satisfaction from restoring customers on and dealing with customers there’s always that thing: and yes we have to make money. And sort of: we want to get customers on fast, because it’s good to get customers on fast, but because if we don’t get them on fast we won’t meet our targets or ... we’ll end up having to pay them whatever the money, the financial cost, is.”<sup>32</sup>

The shift in philosophy evident in the quote above is a clear example of how regulation and the need of the regulator to measure progress came to change how staff carried out their jobs, and how this approach could clash with the values the industry had previously instilled. The industry regulator monitored and imposed targets for reliability, repair and customer service, and required financial compensation to customers if their supplies were off for too long. Public service was now something with targets and financial implications for failure, and there was perhaps a subtle shift in industry emphasis from “public service” to “customer service”.

The need to save money also led to changes in the people who were actually doing maintenance and repair work. The nationalised industry, while making some use of contractors, relied heavily on its own large force of directly employed maintenance staff, who it had often raised from its own apprenticeship schemes. In 1983, for example, the ESI as a whole employed some 83,026 industrial workers directly, not to mention some 25,675 engineers, out of a total workforce of some 158,025.<sup>33</sup> This technical staff of over 108,000 included operations and design staff, but it seems a safe assumption that the majority were probably working in repair and maintenance. Post-privatisation staff numbers steeply declined as part of an effort to cut costs. Whilst it is hard to find exact numbers, as of 2011 the whole sector was reckoned to employ just 87,000 peop-

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32 Interview with Alison Simpson.

33 The Electricity Council, Industrial Relations Department (ed.): *Digest of the Electricity Supply Industry’s Manpower Statistics 1983*, London 1983.

le.<sup>34</sup> Clearly there are fewer maintainers than before. Post privatisation, electricity supply companies also increasingly contracted out maintenance and repair work they would once have largely done using in-house staff to external companies to reduce direct staff costs.<sup>35</sup> The result was a more flexible maintenance workforce, but also a smaller and cheaper one.

In the interests of flexibility and efficiency in the time after privatisation, maintenance staff were also called upon to broaden their skills and knowledge. One post-privatisation electricity company chairman recalled the introduction of “multi-disciplinary, well-trained staff, they would get paid more money as a result of being able to go in and do the one job, and they would be fitters and jointers all wrapped up into one.”<sup>36</sup> Specialist maintenance departments for electrical, instrument and mechanical aspects were merged together, with fewer staff overall. Industrial workers were up-skilled to take responsibilities previously held by more highly trained – and highly paid – engineers. Large reductions in staffing and the amalgamation of different sorts of work were partly facilitated by a decline in the power of trade unions. In the nationalised ESI, unions were strong; many managers recall being frustrated by unions’ opposition to new ways of working and saw privatisation as a means of changing this. As the electricity company chairman quoted above recalled of the 1990s, it was “quite obvious that we could actually improve the efficiency of our overall labour forces ... because of the unionisation that had not been something that we’d really tackled with as much energy or as vigorously as we would do if we were independent companies”.<sup>37</sup>

## **DECLINE OR DIFFERENCE: POST-PRIVATISATION CHANGE**

The nationalised ESI had not been uninventive in developing new maintenance and repair technologies, but given its large workforce it did not have the same motivations to introduce labour-saving innovations as private companies did. With a greater imperative to cut costs and a smaller and more flexible workforce,

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34 Anon.: “UK energy sector: facts and figures”, in: Daily Telegraph, 13 Jul. 2011, <https://www.telegraph.co.uk/finance/newsbysector/energy/8633356/UK-energy-sector-facts-and-figures.html> (accessed 05.04.2019).

35 This is a commonly mentioned point in several interviews from OHESI.

36 Interview with David Jefferies, OHESI, C1495/23, 2014–15.

37 Ibid.

private companies had more need and freedom to introduce new technology and methods to speed up maintenance work, and sometimes to allow them to be done by workers without extensive skills training. One interviewee who had worked as a cable jointer in the 1980s before privatisation spoke early in his interview about the complex work of connecting cables together “in a hole in the ground on a rubber mat wearing a pair of Wellingtons [rubber boots]”:

“You’d got two ladles ... you’d configure the cable in such a way so you could pour molten metal over the bound conductors and catch the residue in the larger of the two ladles. Often this would be done in a confined space ... always uncomfortable, unpleasant. There’d be molten metal involved. There’d be the fumes from the flux and all the dirt, it might also be raining ... the hole might be filling up with water ... and then you would wrap a rag around the plasticised metal and just wipe it ... until you’d got a nice smooth surface and that would eventually set hard and become a joint ... then you would get rolls of ... impregnated paper oil tape and wrap them continuously ... tie that off with a piece of oil-impregnated string ... whilst you were pouring this molten metal over the exposed conductor all the metal and the ladles were live at 240 volts.”<sup>38</sup>

As this description suggests, there was often a considerable level of craft skill required to do repair and maintenance work in the ESI, not to mention some hardship too. Later the same interviewee explained how new methods of joining high voltage cables together, using snap-together parts and heat-shrunk materials, meant that such work could be done far more quickly and with a lower level of craft expertise:

“Many years previously it was a very, very highly skilled job and only a very small number of staff were capable of that level of craftsmanship, but as technology moved on, and as I got into the section I was looking after, it quickly became apparent that ... the technological side of it, the physical side of jointing, it had been dumbed down quite a bit, you know there wasn’t the same level of physical skills involved.”<sup>39</sup>

The contrast between these two quotes and the evident appreciation of practical skill and sadness at its demise that they convey provide a glimpse into how staff perceived the changing culture of the industry. Much of the drive to cut costs after privatisation came from the industry regulator, established after privatisation, whose remit included imposing targets for expenditure and customer service on

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38 Interview with David Williamson.

39 Ibid.

the privatised companies. The imposition of regulatory targets and constraints on spending was intended to promote business efficiency and value for money. Levels of capital investment, including maintenance and equipment renewals, were thus influenced by the regulator. “Mainly it’s the engineering that drives it”, reflected one regional electricity company technical director, but decisions to renew equipment in the private sector were based on a mix of financial and engineering issues, more explicitly than in the past:

“If you’ve told the regulator you’re going to spend a certain amount of money, the regulator is not an engineering organisation, it’s an economic organisation so they tend to go by the money... and if you stick to the original plan you’d underspend, because of the difficulty of doing things, then spending money on some of the easier things that you might have done next year, but doing it this year, to hit your spend target, that’s a financial-driven investment plan ... you’re moving something from next year to this year, if you’ve got a 50 year life what difference does it make? But you can’t do that every year, you’ve absolutely got to unwind that, otherwise you build up a legacy of problems. So year on year, you’re always happy to move things around, but you’ve got to be very careful you don’t keep putting some of the hard stuff off forever. Otherwise it never gets done.”<sup>40</sup>

Perhaps the clearest example of how the private sector has invested less in the industry than the state may have done can be seen in power stations. Other than a short rush to build new, highly efficient, gas-fired power stations in the 1990s, the privatised industry has preferred to “sweat the assets”, to get as much use as possible out of its existing technology rather than investing in new technology. Although many coal-fired stations were closed in rationalisation measures in the 1990s, some have been kept in operation far beyond their expected service lives. Indeed, the oldest stations in Britain in 2019 were commissioned in 1968, and are now a decade beyond the 40-year service lives expected when designed.

From the perspective of those actually doing the maintenance work there seems to have been a decline in standards of care compared to the engineering-led nationalised industry. They remark, for instance, on how private companies seem to have cut back on how much maintenance was done, as one power station control room operator recalled:

“The periods between maintenance became longer ... they lengthened the period of time on routine plant maintenance so they would run longer ‘cos it didn’t cost as much, took the chance on it breaking down. And in some instances some of the plant was, because it

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40 Interview with Mike Kay, OHESI, C1495/44, 2015–16.

was longer between maintenance, it became more leaky, but they still felt it was cost effective to put up with that ... so the place did deteriorate somewhat.”<sup>41</sup>

A distribution foreman recalled further stories of cost-cutting from out on the networks:

“Look at the condition of the substations, most of them look semi-derelict, they’re overgrown, the paint’s peeling off ... you can imagine the state of some of the switch gear ... We always used to maintain substations on a six-year period, and then we came across new terminology ... ‘We’re going to sweat the assets’: We were going to make them last a lot longer before we did anything to them ... One particular company ... they had to develop all kinds of weird, elaborate techniques of operating the switchgear by lanyards with pulleys ... tugging on a rope to operate a switch because that substation hadn’t been maintained ...”<sup>42</sup>

As I have noted, the engineering and workmanship standards of the nationalised industry were high. The apparent decline in this standard after privatisation was something that some maintenance staff, brought up in a culture of high standards, found distasteful, as the above examples suggest. However, other interviewees, particularly engineers turned managers, suggest that the engineering standards of the nationalised industry were perhaps higher than they really needed to be. As one distribution company technical director noted: “Although we were always cost conscious [in the state-run industry], I think we were very capable of doing lots of activities that didn’t add much value ... It’s certainly true that in the past we used to over-maintain things”.<sup>43</sup>

Judging from the interviewees’ accounts, the privatised industry seems to have performed less maintenance than the nationalised industry. However, we cannot simply characterise this as neglect. Rather there seems to be a different approach to this sort of work; it was not about applying uniformly high standards and maintaining by rote, but rather taking an approach influenced by risk management, cost-benefit analysis and greater use of information:

“We had certain standards to keep up and from the electrical point of view we were discarding work, you know, instead of doing something once a year we’d make it once every two years type of thing. A lot hard decision-making was involved there, where you’d look

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41 Interview with Kevan Gee, OHESI, C1495/36, 2015.

42 Interview with David Williamson.

43 Interview with Mike Kay.

at past history ... If it failed, it depends on where it was, if it [was an] ancillary plant you can say if it fails it's not going to have too much detriment ... if you had like a main breaker and that failed then the unit was off and it'd be costing megabucks per hour then you don't even risk it. And that's what they call risk management, a lot of it goes on now ... When it was CEGB, CEGB had one standard and that was top notch, it was Rolls-Royce standard all the time, without a doubt. The time element didn't really matter. It was a case of once you took a piece of plant out and it was maintained then it wouldn't break down, that's the sort of level it was at. Whereas perhaps nowadays instead of something taking five hours, it might take two, because you've cut your work content down a bit to not do certain items, you've cut corners but there's a risk element of it, where you know what you're doing."<sup>44</sup>

Information technology also brought about changes. Maintenance and renewal in the nationalised industry seems to have been a largely planned and routine activity; things were maintained when they were due to be maintained. However, with new ways of understanding data about how assets had been used, diagnostic tools and remote monitoring, privatised companies have developed a greater understanding of the condition of their engineering assets and when they need maintenance or replacement than in the past. As one National Grid technical manager explained:

"We gradually moved away from nameplate lives to start to look at the environment the assets had worked in, the duty [they] had done ... and started to do diagnostics associated with examining the piece of kit and deciding actually, you know, it may have been there 40 years but it looks pretty new, why replace it? ... Starting to be forensic, more scientific about when stuff needed to be replaced has been a feature right through from 1990 ... You are just more able to understand the condition the asset's in and to replace it at exactly the right moment, rather than thinking: 'Well, 40 years is up. It's time for a new one.'"<sup>45</sup>

Some have argued that worldwide the liberalisation of energy industries has led to a neglect of electricity networks, which has contributed to a decline in their standard of service.<sup>46</sup> However, it is quite difficult to judge how the changes privatisation clearly brought to maintenance and repair have affected the reliability

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44 Interview with Brian Moore, OHESI, C1495/35, 2015.

45 Interview with Nick Winser, OHESI, C1495/32, 2015–16.

46 See, for example, Timothy, Luke: "Power Loss or Blackout: The Electricity Network Collapse of August 2003 in North America", in: Graham, Stephen (ed.): *Disrupted Cities. When Infrastructure Fails*, Abingdon: Routledge 2009.

of electricity supply in Britain – not least because they do not seem to have made a great deal of discernible difference on the outside. To some extent, this may reflect a legacy of generous margins in equipment installed by the state industry, with its robust approach to engineering. Whether new equipment installed by the privatised industry proves as long-lasting and resilient remains to be seen. Presently there are concerns for the future of electricity generation, as older power stations are decommissioned and less consistent renewable energy sources replace them. However, other than occasional severe weather events and local issues, the reliability of the privatised electricity system as a whole does not yet seem to have been a major issue affecting electricity supply in Britain.

According to figures from the electricity regulator, from the point of view of the consumer, not much changed regarding reliability of supply in the first decade after privatisation. In 1998 the regulator found that “there have not been major changes in the security of supply for any company since Vesting”.<sup>47</sup> Indeed, overall the story has been one of gradual slight improvement in overall security of supply, albeit with problems in a few companies from time to time. Nationally, in 1990/1991, the first year of privatisation, there were 111 interruptions per 100 customers.<sup>48</sup> By 1997/1998 this had fallen to 88 and the trend of gradual improvement largely continued afterwards.<sup>49</sup> Yet as we have seen, this outward picture of stability conceals an enormous amount of change within the ESI itself and, in the memories of those who experienced this change, a different philosophy of maintenance. There is a lesson here perhaps not just for electricity supply industries but for infrastructure more generally: as a changing context of politics, technology and business affects the culture of the organisations responsible for caring for our infrastructure, many things have to change for them to remain outwardly the same.

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47 Office of Electricity Regulation (ed.): Report on Distribution and Transmission System Performance 1997/98, Nov. 1998, p. 6. [https://www.ofgem.gov.uk/sites/default/files/docs/1998/11/2556-dats97-98\\_1.pdf](https://www.ofgem.gov.uk/sites/default/files/docs/1998/11/2556-dats97-98_1.pdf) (accessed 18.09.2019).

48 Office of Electricity Regulation (ed.): Review of Public Electricity Suppliers 1998-2000, Distribution Price Control Review: Consultation Paper, May 1999, p. 63. <https://www.ofgem.gov.uk/ofgem-publications/78992/review-oes-1998-2000-dpcr.pdf> (accessed 18.09.2019).

49 Office of Gas and Electricity Markets (ed.): Ensuring a Secure and Reliable Gas and Electricity Supply 2013, p. 2. <https://www.ofgem.gov.uk/ofgem-publications/59150/ensuring-secure-and-reliable-gas-and-electricity-supply-pdf> (accessed 18.09.2019).

## CONCLUSIONS

Oral history offers a valuable route for revealing the hidden world of the repairers and maintainers of infrastructure. Yet whilst these stories of late-night call-outs and descriptions of fixing things provide a glimpse of the activities that kept the lights on, the subjective assessments that accompany them are perhaps even more revealing. They suggest that maintenance and repair in the state-run industry, with its emphasis on high standards and craftsmanship, were influenced as much by the industry's "cult of the engineer" ethos as by other aspects of its activities. They hint too at the value of public service in the identity of the repairers and maintainers who kept the lights on for society. As I have shown through analysis of these testimonies, interviewees seem to have viewed privatisation as bringing about a different philosophy of repair and maintenance. While engineering and public service have remained features, interviewees seem to regard the privatised industry as having become much more led by business concerns, finance and targets than in the past. Uniformly high engineering standards have given way to more flexibility and efficiency and perhaps lower engineering standards. The lights have stayed on, but in these subjective assessments the issue is perhaps not whether technical problems have happened or not. Rather, interviewees' perceptions of these changed, lower or more flexible maintenance standards sometimes seem in conflict with the values the state-run ESI instilled in its workforce, its emphasis on "Rolls-Royce" engineering and public service. On a personal level, for some repairers and maintainers the values of the privatised industry seem to have conflicted with the personal identities that they had built up in the state-run ESI.<sup>50</sup>

Whilst the conclusions of this essay must be limited by the subjective nature of its source base, the changes it attributes to privatisation and the motivations behind this shift warrant further examination. In a technological sense, the nationalised ESI worked well; it kept the lights on. However, as Britain's national politics changed in the 1980s, it was not seen to be working well in a political-economic sense. In this context, while much of the technology remained in place, the "repair" of the industry as a whole was affected by privatisation changing the organisational culture and the practices around that technology. This process suggests that histories of maintenance and repair need to think in broader terms of business organisation, politics and different perceptions, of

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50 For a detailed discussion of how industry managers negotiated this change in industry identity, see Lean, "The Life Electric", p. 62–65.

whether or not systems are broken, rather than just whether the technology itself functions as it should.