"It's not a very certain future": Emotion and infrastructure change in an industrial town

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ABSTRACT

Four decades on from the onset of deindustrialisation in the UK and other late-capitalist societies, industrial places are again emerging as key objects of policy discourse. Under the dual pressures of decarbonisation, and the recognition of 'left behind' regions as potential hotspots for feelings of political marginalisation, new strategies for clean growth are emerging, aiming to boost local economic and environmental performance. Presenting data produced via biographical interviews and deliberative workshops in Port Talbot, South Wales, we explore how experiences of life in one of the UK's most significant manufacturing towns has shaped local feelings towards four place-based scenarios for industrial and energy systems decarbonisation. Drawing on the rich literatures detailing the cultural and emotional impacts of deindustrialisation, we illustrate how situated experiences of industrial dependence and decline shaped how Port Talbot residents made sense of visions for the town's future. In so doing we show how, in the face of industrial decline, alternative aspects of place emerged as locus points of emotional and cultural identification, 'public things' (Honig, 2017) in which alternative hopes for the future are invested. As emergent policies for clean growth become enacted in concrete projects, we argue for a clearer focus on experiences of and relationships embedded in industrial places, to ensure such strategies meet the desires of local communities.

1. Introduction

As the UK and other late-capitalist economies embark on decarbonisation, industrial towns and regions are coming into view due to their reliance on fossil fuels in manufacturing processes and their prominent role within national energy networks (Committee on Climate Change, 2019). Industrial strategies in the UK and European Union have increasingly come to construct industrial decarbonisation, digitalisation and smart energy services as key strategies for economic growth and employment over the coming decades (European Commission, 2019; HM Government, 2017a). Such moves have gained renewed impetus in the face of recent electoral politics, signified by the BREXIT vote in the UK, the Presidential term of Donald Trump, and the success of populist political parties elsewhere in Europe. In many cases, the perceived marginalisation of industrial and post-industrial places has been seen as contributing to scepticism over the capacity of mainstream politics and institutions to deliver positive change (Emery, 2019; Essletzbichler et al., 2018; Goodwin and Heath, 2016; McQuarrie, 2017). Whilst the macro-economic consequences of COVID-19 are yet to become clear, renewed calls for a 'green new deal' centred on low-carbon industry are beginning to feature prominently in public and media discourse, and may also feed into this agenda (cf: Rowlatt, 2020).

Following four decades of economic liberalisation, a significant proportion of the UK's manufacturing base has moved offshore. The legacy of (de)industrialisation has been variously theorised as contributing to the dissolution of identities and social solidarities situated in territory and work (Bauman, 2004), and as heralding more uncertain and reflexive forms of subjectivity (Beck, 1992; Giddens, 1990). Aspects of such theorisations have been challenged by studies emphasising the continued role of cultural identities as a focal points for affective, cognitive and emotional forms of subjectivity in relation to uncertain social, policy and infrastructure risks (Taylor-Gooby and Zinn, 2006; Tulloch and Lupton, 2003). For example, literature on deindustrialisation has paid close attention to how industrial identifications persist in

feelings of dislocation, grief and mistrust, but also in rich and strong communal bonds; all of which continue to shape relations within and between post-industrial regions, the state and economy (Dudley, 1994; Strangleman et al., 2014). While it might appear reasonable to assume new infrastructure will be welcomed in areas where old industries are struggling or gone, such experiences do not always dissolve in the face of new projects and proposals and may give rise to unforeseen forms of resistance (Walkerdine, 2016).

Research in a relational vein has increasingly argued that people's priorities for environmental protections often hinge on lived, embodied, place-based experiences (Tschakert et al., 2017). While often excluded from planning and policy processes prioritising economic development, industrial development and retrenchment are transformative not only economically but also in terms of affective, cultural and emotional relationships to place. Attending to such affective histories (Emery, 2019) may thus provide an alternative orientation to and fuller accounting of the past and potential future impacts of industrial development (Ey et al., 2017). We thus take the experience of life in industrial places as a starting point for exploring how potential scenarios for energy systems and industrial decarbonisation may support or depart from the aspirations of local communities. Contextually situated research in such locations has a long history in wider social geography research around industrial facilities and community responses to environmental risks (Bickerstaff and Simmons, 2009; Bush et al., 2001; Henwood and Pidgeon, 2015; Horlick-Jones et al., 2003; Irwin et al., 1999; Pidgeon et al., 1992).

Presenting data produced via a series of place-based interviews and deliberative workshops, we explore how experiences of life in one of the UK's most significant manufacturing towns shapes local feelings towards the four place-based scenarios depicting low-carbon futures. Derived from social science work undertaken as part of the FLEXIS Project, these scenarios described four potential models for industrial and energy systems decarbonisation within the project's Port Talbot (hereafter PT) demonstration area. The demonstration area houses the adjoined towns of Neath and Port Talbot, encompassing Tata Steel (the UK's largest integrated steelworks, and the largest point source of CO_2 in South Wales) and a variety of existing and potential renewable energy resources.

We illustrate how experiences of industry have left their mark as a source of collective pride and identity, but also an enduring sense of neglect and insecurity brought on by the decline of heavy industry. BP's Baglan Bay works, a site which once employed 2,500 people was demolished in 2006 (Neath Port Talbot Council, n.d.). While PT's steelworks remains open, it now employs under 4000 workers, a fraction the 20,000 of its' 1960s heyday. In the mid 2010s, falling commodity prices and deficits in the company pension fund led to the spectre of closure. This gave rise to significant anxieties among the plant's remaining workers, and the larger population of people and business reliant on the works or workers' salaries (BBC News, 2016). Although Port Talbot continues to boast a large array of sporting and social clubs, job losses and declining incomes have heralded the closure of cinemas, pubs and shops. For the town's residents, the loss of culture and leisure facilities has coincided with increasingly visible crime and drug use (Penny, 2016). Tempered by the continued presence of steel production, and other local amenities such as the seafront and surrounding mountains, the emotional impact of industrial decline remains a key component of everyday life in PT. Manifest in cynicism towards local authorities, ambivalence towards the industrial past, and an embrace of aspects of the local environment seen as untouched by industrial decline, experiences of deindustrialisation are inseparable from feelings about life in PT and prospective socio-technical change within it. In concluding, we argue it is insufficient for clean growth visions to simply evoke decarbonisation or continued industrial employment. To speak to the residents of industrial places, they must address the lingering sense of indignity and insecurity left by recent history.

2. Innovation and Clean Growth: discourse and imaginaries, demonstration and deployment

In seeking to address the needs of post-industrial and deindustrialising towns and regions, policy actors have tended to frame the public good in terms of regional productivity and economic growth. Initially articulated in the Lisbon Strategy for Jobs and Growth's focus on the knowledge-based economy (European Council, 2004), European discourses have increasingly emphasised the importance of decarbonising manufacturing and heavy industry alongside low-carbon innovation as key aims of economic governance (European Commission, 2019). In the wake of BREXIT, low-carbon innovation has also gained prominence in the UK as a means of enhancing economic productivity and growth prospects in leave voting regions seen as 'left-behind' by London-centric growth models (HM Government, 2017b; Industrial Strategy Council, 2020). In this section we briefly describe two elements within this overarching policy imaginary; smart systems flexibility, and industrial decarbonisation. We then sketch a critique of these notions of the public good as failing to attend to more fundamental questions about the economy at large and place specifically.

Smart systems flexibility refers to the increased emphasis on digital monitoring, communications, and algorithmic control technologies within energy networks, enabling real-time coordination and price signalling between generators, network managers and end-users (European Commission, 2019; HM Government, 2017a). Flexibility is thus seen as contributing to growth by driving efficiency in energy networks, permitting more rapid and granulated balancing of low-carbon electricity generation with consumer demand, and as enabling deployment of other innovations hoped to provide the low-carbon industries of the future. Industrial decarbonisation on the other hand, refers to the need to reduce or eliminate emissions from fossil fuels used in socially and strategically important manufacturing processes. This may provide competitive advantages either via the imposition of carbon tariffs (European Commission, 2019), or by building knowledge and industrial capacities which might form the basis of future export industries (HM Government, 2017a).

Clean growth discourses centred on industrial decarbonisation and smart flexibility have thus emerged as key 'imaginaries' (Jasanoff and Kim, 2009; Jessop, 2010) around which diverse coalitions of institutions, actors, technologies, infrastructures have begun to mobilise and make claims on public research, development and demonstration funding. The UK has seen devolved administrations, cities and regions competing for position at the forefront of the clean growth agenda, seeking to become sites for the development and demonstration of technologies such as Carbon Capture Utilisation and Storage (CCUS), urban heat networks, and hydrogen (for use in heating or industrial feedstocks). These projects represent key strategic priorities for enhancing economic competitiveness, and meeting other social goals from boosting employment, to improving local housing and public services (Leeds City Region Enterprise Partnership, 2016; Tees Valley Combined Authority; Welsh Government, 2014). While differentiated according to the industrial heritage and infrastructure of each region, in appealing to clean growth imaginaries each coalition seeks to equate its vision of sociotechnical change with a common conception of the public good (Griggs and Howarth, 2012; Parks and Rohracher, 2019). In so doing, such visions tend to legitimise technology and market fixes, while closing-down opportunities for critiquing the social and political circumstances underpinning unsustainable patterns of economic development (Levidow and Raman, 2020; Sadowski and Bendor, 2019).

Beyond such critiques, the demonstration and deployment of new energy and climate mitigation infrastructure has often been received locally as damaging emotionally and socially valued aspects of place, or as imposing disproportionate risks and social costs on host communities (Devine-Wright, 2009; Ey et al., 2017; Terwel et al., 2012). More broadly strategies for sustainable development and climate adaptation have often been problematised for failing to account for more dynamic

place-related and future identities (Henwood and Pidgeon, 2013), and alternative emotional and cultural values worthy of protection (Groves, 2017; Tschakert et al., 2017; Weintrobe, 2013; Crompton, 2010). If a new wave of industrial policy is to address the needs and concerns of 'left behind' communities, it may thus be prudent to look beyond issues of regional productivity, industrial and energy infrastructure assets, and instead look to the things that matter in industrial places today and may continue to matter in the future.

3. Emotion and reliance in (post) industrial places

In late capitalist societies, we tend to think of industrialisation as a process tied to the mechanisation and systematisation of production and labour, reaching its pinnacle with the Fordist settlement of the late 1960s, followed by a period of offshoring and retrenchment or deindustrialisation leading up to today (High, 2013). Arguments against this narrative point to continued mass employment in call centres, warehouse operations and service industries, and the continuation of heavy industrial production across the Global North (Kennedy, 2010). In this paper, by industrial places we refer to those areas which retain at least some heavy industry while acknowledging that in the UK at least, one would struggle to find such a place untouched by wider processes of deindustrialisation.

Beyond examinations of offshoring and the 'body count' of plant closures and job losses (Cowie and Heathcott, 2003), more recent scholarship on industrial places has examined affective and cultural aspects of industry and deindustrialisation. This has emphasised the predictability and security that often accompanied patterns of industrialisation as a foundation for the formation of social bonds, shared identities and cultural practices, extending well beyond the workplace and trade union and into the wider spheres of leisure and civic life (Dudley, 1994; Marris, 1996; Strangleman et al., 2014). In almost every retrospective study of deindustrialisation, issues of nostalgia abound (High, 2013), speaking to the pride communities take in the contribution of essential goods to the wider world, and local camaraderie engendered by the danger and physical hardship such labour often required (Linkon, 2018; Rohse et al., 2020). Sited spectacularly in the heart of communities the mine, factory and shipyard come into view as affective spectacles (Walkerdine, 2010), or 'cathedrals of the working class' (Mah, 2010), meaningful embodiments of shared labour, histories, and ways of life.

The felt significance of the cultural and social structures underpinned by heavy industry did not disappear in the wake of deindustrialisation, nor are they reducible to a single traumatic memory or stress. The 'ruins' of industrial workplaces, degraded public spaces and social infrastructure often remain materially present in the lives of impacted communities (Emery, 2020; Mah, 2010). Such remnants may provide affordances for the cultivation of continuing emotionally valued attachments to reassuring affective memories, social and class identities damaged by economic change (Meier, 2013). However, they may also be experienced as a form of slow violence (Nixon, 2011), a chronic and ongoing process of ruination, the trauma of which continues long after the faster violence of plant or mine closure (Emery, 2020).

Focusing solely on industrial nostalgia also risks ignoring the detriments of heavy industry and the experience of those glad to see the back of the pollution, dangerous conditions and other indignities it often entailed (Dudley, 1994; High, 2013). While industrial sites may be cathedrals to some, Irwin et al. (1999) detail how senses habituated to such environments become attuned to signs of abnormality in the plant and surrounding environment, while local memory recalls past casualties, accidents, and moments of industrial strife. While industrial hardware may blend into the background of everyday life, signs of abnormality can trigger this cultural memory as residents momentarily confront the ever-present risks such objects pose (Bickerstaff and Simmons, 2009; Parkhill et al., 2010). In her study of a former steel town, Walkerdine (2016) describes how a 'second skin' of rigid rules of conduct, strong

communal bonds and identifications with place had developed in response to the economic and physical insecurities accumulated over 200 years of industrial activity. Following the plant's closure, these bonds continued to provide a containing function, a sense of emotional and social security which helped the community confront the drastic change in the town's fortunes. At the same time, the collective trauma of this experience was also manifest in distrust of outsiders, unwillingness to move, and continued insistence on rigid gendered practices which no longer fit with the new realities of the town.

Industrial places thus constitute more than historically contingent formations of infrastructure, capital, and labour. Like any other kind of place, they also represent assemblages of embodied and emotional relationships between infrastructure and local people, within which everyday life is produced (Richards, 2018; Rohse et al., 2020). In this sense they resemble the 'holding environment' in developmental psychology; a series of safe spaces expanding from an initial reliance upon a parent figure to encompass other objects and relationships that accumulate over time, providing the sense of security needed to manage uncomfortable emotions and exercise agency (Applegate, 1997). As subjects who move through the world, we gradually incorporate a wider series of objects and relationships into our sense of self. Ideas, social groups, practices and aspects of place all have the capacity to become internal resources, providing the material, cultural and emotional capacities we rely on in making sense of uncertainty and responding to change (Marris, 1996; Philips, 1988). Such attachments are not solely private. For Honig (2017), 'public things' are widely-shared objects of emotional attachment that are durable enough to remain reliable through periodic crises, animating the public realm in the process with meaning and emotion in ways that can be conducive to the flourishing of civic and democratic life. One of the effects of deindustrialisation is the erosion of such shared objects, which alongside reductions in social security and widening inequalities degrade the capacities of affected communities to contain and absorb the impacts of social change (Richards, 2019; Walkerdine, 2010).

We get a sense of such collective traumas in theorisations of the residual 'structures of feeling' left in deindustrialised communities (McQuarrie, 2017; Strangleman, 2016), and Linkon's (2018) notion of the 'half-life of industry' in which damaged pride persists alongside environmental harm, unemployment, and the health and social problems such legacies bequeath. Processes of industrial development and retrenchment are thus experienced across a range of temporalities; across life-courses where affective memories and emotional attachments are formed, and across generations, disrupting future expectations and the transmission of place and class identities (Emery, 2019; Gibbs, 2021). Responses to such processes thus not only incorporate feelings of mourning and loss, but also a diverse array of affective ties and registers through which individuals and communities seek to make emotional and cultural sense of their changing identities and circumstances (Ey et al., 2017; Pini et al., 2010). If past experiences of industrial infrastructure have shaped the ways communities have responded to its retrenchment and removal, it seems reasonable to expect they may also shape the way new infrastructure will be received (Rohse et al., 2020).

4. Methods: Researching desirable energy system futures

Conducted as part of a larger engineering-focussed project aiming to develop and pilot smart and flexible low carbon technologies in Port Talbot, our work took as its starting point deliberative approaches to the ethical evaluation of sociotechnical change (Pidgeon, 2020). Deliberative methodologies in which small groups convene to learn about and discuss an issue have often been recommended as a means of exploring the ethical implications of emergent technologies and infrastructures from the perspective of non-expert stakeholders (Burns and Flegal, 2015; Macnaghten, 2017; Pidgeon, 2020). There is however a risk that research of this kind can operate to reproduce unchallenged, hegemonic problem definitions and expert narratives at the expense of values and

Table 1
Scenario Summaries.

Grid Town	Industrial Hearth	Energy Island	Virtual Marketplace
1. A largely centralised energy system: electricity is still provided through the national grid, hydrogen is used in heating. 2. All electricity is from low carbon sources: large-scale wind, tidal, solar and also nuclear power plants. 3. Storage for electricity largely with warehouse-sized assemblies of batteries 4. Large-scale production of hydrogen via steam methane reforming (SMR), relying on carbon capture & storage (CCS). 5. Large utilities still dominate; smart meters in every home allow consumers to switch deals, but best deals only available to those who can adjust the times they use energy.	1. Local Council and industry have taken far more control over energy generation in the town. 2. Waste heat from Tata and other industrial sites is now used to provide heating to homes and businesses through a district heating system. 3. Most of the electricity used in the town is generated locally by solar panels and wind turbines on rooftops and in the surrounding countryside. 4. One local heat and power-company supplies heat and power to consumers, who can select from a range of pay-ahead contracts for 'warm hours' and 'power services'.	1. PT is largely separate from the national electricity grid, with all power for the town produced by decentralised solar, wind and some other sources. 2. Electricity in excess of daily needs is used to make hydrogen from water by electrolysis as an energy storage medium, stored in gas holders around the town. 3. Hydrogen is also used as a heating fuel in winter. 4. Electricity and gas bills are still a part of life but people in PT now buy their energy from one of several local suppliers rather than the national grid.	1. Most buildings in PT have their own solar panels and batteries. 2. Homes rely on electric heating, using air source heat pumps. 3. All homes and businesses in PT are now able to trade surplus energy with each other and the backbone national grid via peer-to-peer trading. Homes without solar panels can still buy energy from their neighbours or from the national grid. 4. Energy prices vary dynamically depending on supply and trading is done continually by artificial intelligences (home energy management systems or HEMS) in each home which can learn and adapt to the needs of the household.

concerns rooted in lay knowledge and everyday experience (Cherry et al., 2021; Groves et al., 2016; Pidgeon, 1998; Wynne, 2006). Significant attention has thus been paid to finding means of 'unframing' expert visions and problem definitions (Bellamy and Lezaun, 2015), and resituating deliberation in readily accessible geographic or cultural contexts (Macnaghten, 2020). Work in this vein has a strong track record of helping to inject contextualised experience, emotions and priorities into more abstract discussions of economic development and environmental risk (Davies, 2014; Henwood and Pidgeon, 2016; Irwin et al., 1999; Krzywoszynska et al., 2018).

In order to address lack of familiarity with the potential sociotechnical futures under study, we took as our starting point four place-based scenarios for energy systems change in PT. These aimed to illustrate both the broad range of technologies for heating, transport and electricity systems flexibility being investigated for potential deployment in the area, and how these might be configured and governed to deliver varying degrees of decentralisation and local control of energy services (see Table 1). However, to avoid such technology and system centric scenarios from dominating discussion, significant steps were

taken to provide space for alternative visions of Port Talbot's future to emerge.

So as to ensure discussions proceeded on the basis of shared vernacuars and understandings of local context, participants were purposively recruited to reflect distinct 'proximal relations' or points of commonality (Macnaghten, 2010). Such relations were intended to capture a diversity of place-based relationships which may have a bearing on feelings about life in the town and its future (see Table 2). Participants were recruited by a professional market research company who used a combination of face-to-face and online recruitment to reach the target groups. In total, 5 groups were convened between May and September 2019, each comprising 6–8 participants representing a diverse range of demographic characteristics (see appendix 1).

To further foreground the everyday implications of sociotechnical change that may be overlooked in more abstracted discussions of energy systems and infrastructure change (Groves, 2017), each participant was interviewed individually prior to the workshops, with interviews having a place-based focus. This enabled the workshops to begin with activities that reflected the diverse, socially and emotionally entangled contexts through which PT residents may experience and shape processes of infrastructure change and energy in their everyday lives (Henwood et al., 2016). These biographical interviews also deployed maps and stickers to mark emotionally and biographically salient areas of PT (Brown et al., 2015; Caquard, 2011; Powell, 2010), and render visible taken-for-granted aspects of place and everyday life upon which infrastructure change may impinge (Henwood et al., 2010; Henwood et al., 2018; Turner et al., 2008), forming the initial frames through which the subsequent workshop discussions proceeded.

5. Analysis

Early analytic insights emerged during fieldwork and were further elaborated via cross-sectional analysis of interview and workshop transcripts. These spoke to public things (Honig, 2017) which formed common cultural and discursive resources through which participants made sense of their relationship to PT (Taylor, 2012). Aspects of place that emerged as important were: industry, employment and pollution; the beach and mountainous region surrounding PT; the town centre, local council; and the wider community. These interconnected aspects of life in PT represented valued points of identification as well as sources of emotional reliance and sources of insecurity and anxiety (MacGill, 1987;

Table 2
Workshop Groups.

Group and abbreviation used in text	Description
Green-fingered residents (GF)	People involved with horticulture, either in private gardens, allotments, or community gardens who may have perspectives on the long-term ecosystem impacts of heavy industry in the town.
Multi-generational residents (MG)	People with longstanding family memories of and ties to place, represented by members of families who have lived in PT for at least three generations.
River users (RU)	People with a connection to the outdoor environment in Port Talbot and its coastline as users of the River Afan, its tributaries and towpaths for leisure activities (e.g. angling, boating, walking).
Steelworkers (SW)	People whose livelihoods have depended on heavy industry in PT, represented by current and retired employees or contractors for companies based on the Tata Steel site.
Young professionals (YP)	People who may have a central role in future sociotechnical changes in the town. Represented by residents aged under 30 in employment or training for engineering, IT or social service-related occupations.

Parkhill et al., 2010; Zonabend, 1993).

While the emergence of these public things were important in shaping how participants made sense of PT's future, the meanings and emotions attached to them differed. Our analysis thus involved disaggregating workshop transcripts and reassembling them into individual narratives for each participant, which subsequently could be viewed alongside interview accounts. By referring back to individual participant narratives, we sought to trace how orientations to public things shaped the meanings and desires through which participants interpreted scenarios for place-based decarbonisation. Drawing on participants' narratives and orientations-tracing, the analysis presented below aims to highlight the multiple temporalities (Fincher et al., 2014; Henwood et al., 2016) at work in local deliberations about future low carbon modes of development. More specifically we illustrate how aspects of potential low carbon economies interacted with other objects of emotional attachment within the town, and affective histories centred on industrialisation and decline, shaping perceptions of desirability. Through such contextualised engagements, we also identify the emergence during the workshop activities of a fifth scenario centred on public things that were distinct from PT's history as an industrial centre, to which scenarios focused on industrial decarbonisation and systems flexibility spoke only tangentially.

5.1. Industrial pride, uncertain futures

Across participants, the steelworks was perceived as a defining feature of PT, a brute fact of history engrained in the local landscape: "t*he town is steeped in history of iron and steel and coal. And it won't change.*" (Geoffrey, RU). The enduring nature of industry meant that for some, it continued to form an important aspect of local pride and identity:

> "*Tata has got a plant in Holland and they've got four super furnaces. We've only got one and we produce more than what they can... I think it's the ethos of PT steelworkers – is the pride people take in what we do.*"
> (Luke, SW)

For Luke, to be a PT steelworker is to carry special distinction and ethos speaking to quality and productivity. However, as an employee of a third-party contractor at the plant, Luke is neither employed by Tata Steel, nor directly engaged in the prideful task of steel production. Rather his pride in "*what we do*" derives from the associated esteem and stability with which industrial employment has historically been viewed in the town, a shared narrative of local identity from which PT's place in the world derives meaning.

The centrality of the steelworks to life in PT was underscored by the dread which often accompanied talk of its potential closure. For those who continued to identify economic security with the steelworks, its potential closure was viewed as a catastrophic endpoint beyond which any future became difficult to imagine:

> "*Heather: If that steelworks goes -*
> *Matthew: That's PT gone...*
> *Emily: That's the end of the town, yeah.*"
> (YP Workshop)

The difficulty some participants had in countenancing a future without the steelworks was particularly apparent in the widely used metaphor of PT as a "*ghost town*" (Crystal, SW), a non-place devoid of human or economic life.

Ebbs and flows (Parkhill et al., 2010) between pride, normality and potential catastrophe also accompanied descriptions of the sensory experience of the plant, characterised variously by enchantingly coloured flames, pretty lights and "*that horrendous smell*" (Monica, GF). Local practices associated with dust pollution, such as the wiping down of windowsills and washing lines, provided a means of domesticating and narrating the shared experiences of living in the shadow of the plant.

However, mention of such practices and the prideful industrial identities they helped sustain, struggled to fully contain anxieties over the plants' harmful potentialities: "*When you think about it, though, we're breathing that in*" (Reggie, MG).

When discussion turned to future scenarios, fraying identifications and broader experiences of economic uncertainty and decline were paramount in the minds of many. While few participants were prepared to advocate a severing of PT's identification with industry, all were weary of compounding the catastrophic potential of the plant's closure by adding energy to the list of public goods which might be lost should the unthinkable happen:

> "*Frank: they're going down the pan, they're not going down the pan, there's TV cameras there, there's no TV cameras there. I mean it's not a very certain future...*
> *Luke: You're just seeing the press at the moment... they wouldn't be investing as much as they are into that plant to shut it down within five years...*"
> (SW workshop)

Centred on a scenario where Tata Steel takes on growing importance for providing heat to homes in the town, the contours of the above disagreement take shape from Luke's strong identification with his career in the Steelworks, and Frank's rejection of such a career after a brief stint at the plant in the 1970s. For Frank, the intermittent presence of TV cameras reporting on the plants possible closure, and scatological phrasing ("*it's going down the pan*"), presents the works future as unstable and undignified. While still in operation, the current state of the steelworks symbolises an ongoing process of ruination as it sheds jobs and lurches from crisis to crisis, a visible source of shame and uncertainty in which Frank is unwilling to invest responsibility for the town's energy future. Initially, Luke's response is to reject aspersions of insecurity entirely, rather than a source of ruination the steelworks remains vibrant as a locus of investment, but also prideful identification worthy of defence. After further reflection, Luke returned to the painful subject, his pride unable to fully contain the risk he perceives in the town becoming more dependent on heavy industry: "*I wish I could say that I'm 100% confident that it's going to be there, but there is a large part of me that is concerned that it won't*".

The above exchange is emblematic of the shifting identificatory dynamics the steelworks evokes. It's highly visible operation and diminished status granting it a haunting quality (Meier, 2013)- at times allowing for the stabilisation of culturally valued class and place based identifications, and at others giving way to feelings of environmental and economic anxiety. Even amongst proud industrial citizens, fear or anticipation of closure intruded upon attempts to envisage the continued reproduction of long-established economic and sociocultural relationships (Gibbs, 2021), let alone their extension into new fields of energy service provision. Feelings of anxiety, uncertainty, and embarrassment regarding industry thus co-existed with more prideful affective registers, surfacing dynamically depending on the relationalities in play.

As participants engaged with future scenarios, rather than rejecting industry outright they often sought to resituate it within social relations they felt were more stable. One form this took was in attempts to find within scenarios elements pointing to futures which, while still industrial, marked a departure from the capricious decisions of a foreign owned, export-oriented industry:

> "*I do like the fact that it* [Energy Island Scenario]*'s all localised... Yeah, I prefer that if you're putting money into something, it will pay for you and be for the area rather than it be dispersed elsewhere... It's back-up isn't it, for any problems. At the same time there's more jobs if you keep them local...*" (Joey, YP)

For Joey, a 20-year-old engineering apprentice, the possibility of new industries in hydrogen energy production creating opportunities for industrial employment brought a degree of pleasure. His reference to

keeping the benefits of energy production "*local*" spoke in part to a widespread grievance that the foreign owned Tata Steel had little interest in employing PT residents and has made increasing use of contractors from outside the town. Similar concerns emerged in discussions of more centralised modes of energy production in which large energy retailers were also positioned as external agencies syphoning income from the town: "*They're being sourced from outside, people outside of Port Talbot would benefit from people's necessities within Port Talbot*" (Emma, MG). In this view, reliance on an upgraded national grid represented continuing patterns of infrastructure imposition and capital extraction which, in the absence of mass industrial employment, had come to be experienced as exploitative by some residents. By contrast, discourse around local provision of hydrogen and other energy resources saw many participants imagining a more dignified industrial future in which exploitation could be reduced via the use of local resources and know-how to meet local needs.

5.2. Authorities, cynicism and place attachments

Perceptions of underinvestment in the town centre and local amenities further contributed to feelings that in some ways PT was undergoing a process of ruination. Discourse surrounding these objects was at times prompted by discussion of reduced tourism and neglect of valued spaces: "*Margam Park* […] *is the most beautiful place in Port Talbot, we've got history as well. They* [the council] *just do not spend any money doing anything with it. It's such a waste*" (Anne, MG). However, most talk in this vein focused on the perceived decline of the seafront and town centre: "*the majority of shops have gone. They're either derelict or they're charity shops...*" (Heather, YP). When combined with pollution and wider economic insecurity, talk of decline was sometimes summed up in the stigmatising label "*Port Toilet*" which commonly arose when discussing external representations of the town. While participants vociferously disputed the accuracy of this label, knowledge of its existence underscored feelings of loss, regret at wasted opportunities, and a sense that the dignity of the once proud town had been undermined. Despite such feelings, the overwhelming majority of participants expressed strong emotional bonds to PT. As in Walkerdine's (2016) study of 'Steeltown', few expressed a desire or willingness to leave: "*I was born in PT. My family have always lived in PT, so I don't have any plans to leave. It's my home, I love it.*" (Claire, SW).

While some saw decline as reflecting national trends, a central discourse emerged blaming the local council as failing to prioritise those aspects of place that mattered most to its citizens. Many saw this as evidencing a lack of vision, or an outcome of poorly conceived town planning destroying landmarks, markets, and thoroughfares that were nostalgically remembered as focal points for valued social interactions: "*It's as if they just put a coloured mark across the map and said: 'demolish that lot'.*" (Gordon, SW). Rather than any single incident, such discourses seemed to refer to patterns of careless decision-making seen as favouring now outdated forms of urban and industrial modernity while sacrificing historical objects of attachment and communal interaction.

Intermingling with frustration over council negligence, angrier affective registers also emerged, signified by talk of "*corruption*" (Harriet, RU) and "*backhanders*" (Gloria, RU) in procurement and planning decisions. Often however anger gave way to cynicism as exemplified in half-joking allusions to the rumoured involvement of the council in a series of building fires: "*they won't even fix things in this town, they set fire to them instead... [laughter]*" (Cheryl, YP). The cultivation of black humour and detached cynicism has been noted as one of the few available responses to feelings of anxiety and hopelessness in the face of deindustrialisation (Dudley, 1994), identity dislocation or exposure to other catastrophic potentialities (Giddens, 1990; Parkhill et al., 2011). In PT recourse to joke and urban legend functioned both as a means of diffusing and living with anger over local authorities' seeming inability to halt processes of decline. However, such joking never fully eclipsed more accusatory registers present in talk of corruption, back handers,

and 'the council' as other, a negative projection (Richards, 2019) which served to protect more idealised identifications with PT.

Combined with anxieties over industry, negative feelings towards the council led to significant mistrust and derision being directed at scenarios describing partnerships between the two:

> "*you're reliant on the council. We can't even fill potholes [laughter]*" (Elaine, YP).
> "*It's just another [way sic] the councils in PT are making money off you*" (Gary, RU).

For some, moving beyond reliance on the decisions of distant corporations thus required not only a renewed commitment to local production and jobs, but also civic forms of ownership and control characterised by neither negligent local authorities nor big business. Often, desires for localised control manifested in the abstract notion of '*independence*' (Sarah, MG) discussed in several groups as a positive benefit of more decentralised forms of energy production and exchange. Discourses relating to independence took firmest root in the group of Green Fingered residents, where shared identities linked to gardening and self-sufficiency led to a discourse in which localised low-carbon generation and storage took on the metaphor of "*harvesting*" (Monica, GF). In contrast with reliance on industry or a mistrusted council, discourses of independence and local energy harvesting placed their faith in identifications with the local environment and the community as the basis for a more secure, self-reliant future.

In discussing local control, several participants such as Marcus (MG), called for a revival of older institutions such as co-operative and credit unions to finance local ownership of new infrastructure assets:

> "*So, any profits that come out from that business are then put back out into the community... cooperatives used to run a lot of the things and it was a very successful business... now it seems to be big bodies are running us rather than us running ourselves*".

Equating local ownership with self-determination, Marcus called back to institutions that while not inherently industrial, were deeply intertwined with modes of collective security provision and working-class solidarity that co-evolved with 19th century industrialisation in South Wales. By recalling a more positive affective history tied to community self-reliance, participants sought to rearticulate scenario visions to rule out one-way dependence on externally owned industries which recent experience had rendered harmful. Rather than repudiating industrial identities for the town, such articulations operated to contain and channel anxieties about the steelworks and the council into creative discussions of what a desirable future might look like.

5.3. Community, ruination and care

For a minority of participants, feelings of ruination and cynicism extended beyond the council or steelworks to the wider community. Such feelings tended to be informed by visible changes such as a rise in homelessness, drug use and antisocial behaviour which have been seen to accompany the declining fortunes of the town (Penny, 2016). Among a significant minority of participants, cynical relations to the wider community were particularly prominent, as in the below quote from Barry (GF):

> "*they're gonna put at least two druggies in the street, in multi-occupied houses - and er, two families from out of the area, you know, um, disruptive people... I mean, I applaud sometimes if I'm walking through the town centre and I hear someone speaking with a local accent. And where are they gonna work?*"

For Barry, perceptions of growing social problems, attributed to the arrival of new residents appears particularly troubling. Positioning such arrivals as another council imposition, he projects concerns about rising drug use and disruption onto these external others, while differentiating

them from the older community of PT families and industrial workers with which he identifies. At the same time, his narration of events was tinged with exaggerated humour as he mimed out applause to other participants, a position serving to contain and move on from his feelings of discomfort and powerlessness at the changing social milieu.

When relationships to the town were discussed in this tone, potential future scenarios often became the subject of half-hearted jokes about how the council, untrustworthy and disruptive neighbours might bungle or abuse localised forms of energy provision to their own benefit. In one group this manifest in the imagined figure of "*Dai Smart*" (Gordon, SW) a disreputable tradesman selling and installing faulty or overpriced smart technologies to unsuspecting households. For others, concerns related to scenario visions emphasising localised forms of domestic energy production, storage and exchange:

> "*If I know my nan was down the road and she ran out* [of home battery power]… *by all means, take some of mine – you have it. But I'm not giving it to you who's just spent your last money on a ten bag* [drugs] *and now you can't afford …*"
> (Heather, YP)

The above quote from Heather emerged in the context of wider discussions of "*sharing*" excess energy from household solar and battery installations. Discussing her willingness to accept mutual reliance for energy with those she finds sympathetic, she draws in the figure of the drug user to illustrate a worry that such a system could be vulnerable to abuse in the context of her neighbourhood.

Similar concerns arose across groups, speaking to concerns about the abuse of shared resources when infrastructure is organised at the level of streets or blocks of flats. While scenario materials emphasised impersonal and algorithmic forms of grid management and exchange, for some the notion of decentralisation at this scale evoked a series of damaged local relationalities which pre-dated the introduction of scenarios and shaped interpretations of their content: "*it'd be war, absolute war*" (Elaine, YP). In this view, the trust and cooperation required made such visions appear implausible.

In some instances, cynical registers and feelings of communal ruination reinforced assumptions that status quo forms of energy provision (depicted in our Grid Town scenario) were, if not desirable, incontestable. Under more decentralised scenarios, either the steelworks would shut, leaving a hole in provision of heat or other system services, or untrusted others in the council and community would find ways to bungle or abuse decentralised systems to the detriment of more honest residents. The hopelessness of this position led to the emergence of traditional energy networks and supplier relationships as a form of negative preference: "*the supply is reliable. She doesn't have to interact with it like she does in any of the others…*" (Geoffrey, RU). For participants adopting this outlook, rejection of more territorially constrained scenarios was less an embrace of a positive future vision than a freedom to not interact further with distrusted local agencies.

While cynicism undermined faith in scenarios emphasising decentralisation and local control of energy networks by emphasising otherness and difference, this orientation was far from universal. The introduction of scenarios in many cases also elicited feelings of care for others in the community, rooted either in direct experience, or sympathy (Cherry et al., 2022). In particular, care and sympathy were expressed for groups who may be rendered vulnerable by the introduction of smart and decentralised technologies for energy production and consumption such as those on low-incomes, single parents, the elderly and those experiencing physical or mental health difficulties. We see this dynamic playing out in the following exchange between Claire, a middle-income project manager and Crystal, a lower income cleaner:

> "*Claire: A lot of people need to know their outgoings with their income. So, that would concern me, as to how they're going to benchmark it.*
> *Crystal: I'm one of those people – And as being a single parent, you know, I've got a budget… if anything fluctuates within the energy system, I've got*

to work out right, what can I leave in order to make it best for myself, to keep a roof over my head, well, my son's head, food in his belly and preferably a warm house for him. I've got to budget to that…
> *Claire: I would want there to be some governance over it.*"
> (SW Workshop)

Rather than focusing on untrustworthy others within the community, Claire problematises potential price volatility present in some visions of more localised, renewable based energy systems. Conforming to the archetype of a well-paid steelworker, Claire's concern is less for her own family than others in PT, "*a lot of people*", that she sees as less fortunate. This care points for a sense of broader communal solidarity which was as, if not more widespread than the cynical registers seen above. Indeed, the commonality of such registers likely contributed to Crystal's openness in discussing her own experiences of volatile bills. Rather than feelings of ruination and uncertainty, such registers emphasised the need to protect vulnerable sections of the community from unintended harms emerging from more localised forms of provision.

While it is tempting to attribute feelings of care for others to residual forms of working class solidarity attendant to PT's industrial history, care and concern for fairness in the treatment of vulnerable groups has been a recurrent feature in public deliberations around energy transitions and systems flexibility (cf: Thomas et al., 2020). In the case of Port Talbot, it is thus sufficient to note that care for vulnerable relatives, neighbours and unknown others was more widespread than feelings of cynicism and estrangement from the local community. Such feelings alone were sufficient to raise questions of scenarios depicting decentralised energy systems in individualised terms, where households may be expected to take on greater cost or risk from the purchase of new technologies or introduction of more variable price regimes.

5.4. Comfort, the natural environment, and post-industrial futures

Affective and identificatory dynamics around heavy industry often oscillated between cynicism, expressions of pride and desires for a more stable and dignified futures. However, in the face of industrial decline, many participants turned to the local environment as a more stable locus considering future scenarios and place identities. "*The jewel in the crown*" (Reggie, MG) of PT, Aberavon Beach emerged as a key object through which cultural and affective relationships to PT were narrated. References to its "*blue flag*" (Gary, RU), awarded for environmental quality, served to express a sense of collective pride and ownership, but also to disassociate (Bush et al., 2001) the town from the stigma of pollution and feelings of ruination associated with industry and decline. A consistent presence from childhood, the seafront was narrated as an emotionally salient location, hosting awe-inspiring encounters with wildlife and nature; family meetings and leisure activities; and a host of more communal happenings and events. It also played a role in scripting important biographical moments, from teenage mischief in the sand dunes, to marriage proposals and babies' first days out. Mountainous country to the North of PT, and Margam Park, a nearby historic estate and country park, were valued in similar ways.

One area of consensus was the affordances these objects offered for feelings of "*tranquillity*" (Dai, GF) or "*escape*" (Tommy, YP) from the pressures of daily life:

> "*I'd had, err, my god daughter and my husband with me, and she'd been going through some difficult patches and she'd come to live with us, and we took her down erm, just to get out of the house for an hour with some chips on the beach […] It's good for the soul.*"
> (Sharon, RU)

Sharon's story of a family trip to the beach is indicative of its status as an enduring aspect of PT that residents turn to, not only for leisure and sociality but also for comfort and rejuvenation in moments of crisis. While the story is personal, it is emblematic of the public nature of non-industrial objects such as the beach, park and mountains as a shared

affective infrastructure to which members of the community routinely turn at key moments. In a moment of crisis, a trip to the beach or a hike in the mountains is the Port Talbot thing to do.

The beach, park, and mountains thus emerged as anchor points for an alternative affective register distinct from cynical talk of decline or fears of ruination. In some ways talk of these objects resembled scripts of rurality discussed by Pini et al. as offering a means of transcending the emotional stress and trauma that deindustrialisation can bring. However rather than emphasising stoicism and self-reliance (Pini et al., 2010), identification with the natural environment in PT spoke to the emotionally restorative aspects of place and positive potentialities for the future to which our FLEXIS scenarios did not clearly speak.

Alongside the four scenarios presented by the research team, a fifth future vision began to emerge, in which emotional and cultural attachments to the beach, mountains, and Margam Park offered unexplored potential for futures built on tourism. The following extract from Richard (GF) follows on from a longer interview discussion of opportunities for cycling, canoeing and holiday parks is illustrative:

> "*What it's suffered from is, I think, a lot of people who can't see beyond coal mining and steelworks as being proper jobs for proper people. Tourism and the like might not pay as well but the quality of life is so much better, and the length of life is usually so much better as well.*"

While talk of increased tourism benefitting PT was widespread across participants, Richard speaks to a specifically post-industrial form of identification in which perceived reliance on the steelworks prevents more positive visions of the future from being investigated. In part, this reflects wider processes of projecting the problems of decline onto the council who "can't see beyond" heavy industry. However, rather than cultivating a position of cynical detachment, Richard outlines a more positive economic potentiality rooted in the pleasures of the local landscape and positive cultural connotations associated with nature (Henwood and Pidgeon, 2001; Roberts et al., 2020). He is able to do this, partly due to his relative lack of emotional and social connections to the steelworks, but also by drawing on positive affective and emotional relationships to the local landscape he has formed as a canoeist, cyclist, community gardener and hiker over decades living in the area.

While Richard's vision of tourism is partially based on a rejection of industrial futures, participants displaying stronger attachments to industrial identities also sensed that: "*the future of this town is in tourism*" (Geoffrey, RU), if only as an additional source of income or hedge against the fears of the steelworks closing: "*we'd be putting less eggs in one basket*" (Davey, YP). The most widespread influence of identifications with outdoor spaces and tourism came in discussions of scenarios entailing significant landscape impacts. Visions including tanks for storing hydrogen or carbon capture, and new warehousing for batteries came under scrutiny as potentially expanding industrial infrastructure into parts of the town and surrounding countryside in undesirable ways:

> "*…the steelworks isn't the prettiest thing to look at but it's a landmark for the people who are working there and… [we] accept that it's part of our town. To add more iron and steel into our town where it isn't now, it's extending what it is and you're turning it into something that nobody's going to want.*" (Luke, SW).

In such instances, it was not the introduction of new infrastructure per se, but concern over industrial encroachment into places representing other identities and potentialities such as the mountains or "*miles of golden sand*" (Jennifer, RU) of Aberavon Beach. Like the rejection of scenarios in which energy supplies depended on the steelworks, this feeling was uniform across participants, irrespective of their attachments to industry.

Beyond concerns over expanding the industrial feel of PT, the four FLEXIS scenarios were rarely seen as speaking to wider desires for tourist futures built on an improved local environment, and were instead discussed separately. Generally, this went unacknowledged in workshop discussions, although in the River Users group, where more cynical

orientations to PT's future were most dominant, this disjuncture became explicit:

> "*Gloria: The energy wouldn't make any difference to the tourist or the shopper…*
> *Rory: Yeah, same thing. I don't think, again, a blind bit of difference.*"

While most participants did not draw equivalences between scenarios and desires for tourist futures, they often gravitated towards scenario elements emphasising local renewables which were seen as more in keeping with environmental improvement and non-industrial aspects of place. However even here such discourses tended towards the abstract: "*Well, it's healthier, innit? It's[…] friendlier- with these things, they, they look really friendly […] it's all healthy and clean, it's nice. It's not like it's an eyesore*" (Rhiannon, GF). Characteristics such as friendliness, health and cleanliness spoke to attributes participants felt PT had lost over the years, save for public things that were so often spoken of as points of stability in the midst of industrial decline. However, in the absence of concrete experiences or proposals to work with, participants often struggled to articulate how smart, decentralised energy might interact with local objects of attachment, save for abstracted notions of naturalness or friendliness.

6. Discussion: Neglect, trust, and hope for the future in post-industrial places

In examining relationships to place and changing infrastructure in PT, our analysis finds much common ground with established literatures on the affective and relational impacts of deindustrialisation (Strangleman et al., 2014; Walkerdine, 2016). While PT itself remains heavily industrialised, discourses of decline spoke to a damaged sense of industrial identity, anxieties over environmental quality, and feelings of betrayal by authorities charged with stewarding the town's prosperity. Residual pride in steel-making heritage, the status which continues to be accorded to industrial labour among residents, and affectionate memories tied to the strange sights and smells of the plant speak to the reassurance many residents gain from its continued operation. However, few participants were left unaffected by the economic insecurity hanging over the plant. The fear of becoming '*a ghost town*' formed a background presence in many conversations about PT's future. These insecurities provided openings for discussion of alternative possibilities for the town and the ills of pollution and ugliness the plant's presence brings. As in Dudley's (1994) study of the former auto-town of Kenosha, such narratives often emerged from more affluent participants and those with higher educational or professional accreditations, who were not, and in some cases had never been reliant on the steelworks. However, talk of non-industrial futures tended to be framed not in terms of resentment or condescension, but rather in terms of the vulnerability an unplanned closure of the plant may bring, and shared identifications with the beach and mountains which may provide alternative economic potentialities.

Our analysis thus illustrates the multiple temporalities at play in public deliberations over future economies. Visions of the future are not interpreted solely in the light of the problems they aim to address, but also through a host of past and present-day identifications, feelings and experiences that are themselves dynamic and prone to flux. While contemporary green growth strategies have emphasised decarbonisation as a means of revitalising declining industrial regions (HM Government, 2017b), in PT the insecure structures of feeling surrounding steel making rendered such renewed industrial visions implausible for many. Having experienced reliance on heavy industry giving way to fewer jobs and a declining high-street, our participants were near uniform in rejecting a future reliance on heavy industry. This was seen most prominently in discussion of our industrial hearth scenario, where reliance on the plant for heating was viewed as an intolerable extension of the town's overdependence on externally owned industry. In grounding

discussion of future growth imaginaries in notions of industrial renewal and technological innovation, clean growth strategies, as envisaged and enacted within the FLEXIS Project risk overlooking how experiences of industrial decline to date may undermine support for the kinds of visions they offer.

The cynicism and detachment with which a sizeable minority of our participants constructed their relationships to PT and its future, was particularly telling in the sense that it drastically constrained views on what the future for PT may hold. Industrial decline, insecurity, and a sense that valued aspects of PT have long been neglected or sacrificed to the benefit of industry gave rise to a sense of hopelessness that any intervention may invite further corruption or exploitation of PTs honest inhabitants. While valuable as a means of containing anxieties relating to decline (Richards, 2019; Walkerdine, 2010), projecting the town's ills onto the maleficence of others also had the effect of making almost any change for the better appear implausible, unworkable, or untrustworthy. Indeed, part of the appeal of the status quo reliance on the national grid, and futures rooted in environmental improvement and tourism may have been the escape these visions offered from contemporary aspects of place deemed to be corrupt or disruptive to earlier, nostalgic identifications. Such findings illustrate that nostalgia for industrial economies and communities of the past is no guarantee of support for future proposals for green industrialisation. Interactions between a nostalgically remembered past and more recent experiences of decline and neglect, may undermine faith and participation in proposed low-carbon transitions, particularly in cases where the pioneers of such scenarios are seen to represent the same forces which contributed to a past decline.

Our research has also demonstrated how encounters between place-based scenarios for industrial decarbonisation and energy systems change can help open-up more contextualised discussions of local desires (Dal Gobbo, 2020; Henwood, 2019) and conditions (Butler et al., 2015) upon which the acceptability of decarbonisation strategies may rest. These conditions centred upon the protection of those non-industrial 'public things' (Honig, 2017) which have remained as stable points of identification and communal life in PT, and a reduced role for industry and local authorities deemed to have been corrupt or negligent. Such conditions tended to prescribe varying degrees of communal control and ownership, and new trajectories for urban and industrial development embracing the local landscape for the benefit of residents rather than exploitative external industries. Combined with a care and concern for vulnerable neighbours and members of the community, an affective register not so easily reduced to place-based experiences of industry alone, such conditionalities provide a broader basis for considering what industrial renewal or just socio-technical transitions might look like in practice.

Outside of the four FLEXIS scenarios, a fifth desired future emerged from interview and workshop discussions. Centred upon the unused potential of the beach, mountains and Margam Park, this future was less a well-specified scenario, than a collection of orientations to place associated with shared familial and leisure practices and feelings of tranquillity in the midst of industrial life. Identification of the town's future with these objects played a vital role across workshops as a means of reasserting positive place-based identifications, containing traumas associated with industrial decline, and in opening up new possibilities for the future in the face of that decline. However, beyond participants gravitating towards scenarios which seemed compatible with these affective registers, the public things at their core were seen as distinct from infrastructure change. Clean growth and attendance to locally valued objects and priorities are not necessarily mutually exclusive ends, however the confines of one-day workshops provided limited scope for participants to outline potential synergies beyond abstract associations with health and naturalness. Future work in this area might build on the kinds of emotional deliberation we have undertaken with more participatory approaches to community development or policy design where participants take on a greater role in developing projects (Cameron and Gibson, 2005; Krzywoszynska et al., 2018), or shaping the governance of expert-initiated projects (Bellamy and Lezaun, 2015). Nevertheless, the emergence of a fifth scenario in this project suggests that if clean growth strategies are to meet the needs and desires of deindustrialised and deindustrialising communities, they cannot simply be seen as replicating insecure patterns of dependence on heavy industry or unresponsive forms of local governance. Rather, they would do well to engage with how the sociotechnical assemblages of clean growth may be adapted to serve aspects of community and place in which alternative cultural identifications and hopes for the future may be invested.

Appendix 1. . Demographic Profile of Participants

Gender Profile:	Women	18	Home council ward	Aberavon	5	Education Profile	None	3
	Men	19		Baglan	7		GSCEs	11
				Margam	3		A Levels	7
Age Profile	20–29	9		Taibach	3		HND or NVQs	7
	30–39	9		Central	3		Bachelor's Degree	7
	40–49	6		Sandfields	7		Master's Degree	2
	50–59	4		Cwmafan	2			
	60–69	8		Wider region	7			
	70+	1						

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