ANALYSIS OF AIR QUALITY STAKEHOLDERS IN THE UPPER HUNTER

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Abstract

Air quality is an increasingly prominent issue globally, with high profile cases of poor air quality in giant capital cities often capturing mass media attention. In these situations, high population but also vehicle density and processing industries are significant in their contribution to air pollution. In local townships and regions, with much smaller populations however, air quality, associated amenity impacts, and health detrimental effects are often contentious topics, especially if considering welfare of future generations. One such region is the Upper Hunter, NSW, Australia where local air quality is affected by sources that include agriculture, resource extraction, mining, power generation and woodfire smoke, in combination with specific geology and meteorological conditions. This article presents an analysis of stakeholders affecting air quality in the Upper Hunter region. The analysis indicates key actors are industry, namely, mining companies and power producers, but also the state government. The key actors set the context and wield highest influence on local air quality, social licence and thus perceptions of air quality in the Upper Hunter but also more broadly. These perceptions are influenced by the different actors and their efforts in contributing to and managing air quality. The analysis also suggests that improving air quality in the region requires a multi-disciplinary and multi-stakeholder approach, utilising latest technology and methods, supported by government, industry, but also the local community.

Keywords: air quality, Upper Hunter, stakeholder analysis, political economy

1. Introduction

The Upper Hunter is situated in the Great Dividing Range, NSW, Australia, where mining and electricity generation scatters across an area of approximately 20,000 km^2 housing a population of over 50,000, (HJOC, 2018). In this region, natural resources have transformed into economically profitable products through conflicts, land boundaries formal and informal practices, (McManus, 2008). Mining supports over 30,000 full time jobs, contributing around $24 billion to the state economy, almost $6 billion in taxes and royalties, accompanied by thousands of mining related businesses, (NSW Mining, 2024). This revenue supports government services and infrastructure delivered by regional councils, (Mills, 2019) and consequently, government support for local industry and community services and infrastructure through initiatives including sponsorships and funds, (NSW Government, 2024). These economic benefits positively impact regional communities and can stimulate growth that decreases vulnerability. On the other hand, negative impacts can include pollution, rising living costs, reduced housing affordability, high unemployment, and poverty in disadvantaged local communities, (Cottle & Keys, 2014).

Air quality in the region is impacted by topography, meteorology, industry but also weather patterns and climate change, (Climate and Health Alliance, 2015, Hibberd et al, 2013). Main sources of emissions include wood smoke, soil, petrol and diesel vehicles, sea spray and secondary sulfate, (Hibberd et al, 2013). This has resulted in air quality governance often presenting as a contentious topic, involving local, state, federal governments, communities and industry, (Ferro & Zeederberg, 2021, McCarthy, 2018). Poor air quality is a significant health risk, (Dalton, 2014, Hendrix et al, 2020) and differentially relevant to diverse stakeholders, however, in the largest townships such as Muswellbrook and Singleton, with populations below 25,000, relevance is often lost in discourse across local, state, and national scale. Community fervour coincides with growing pressure on government and industry, by individual and small group activism such as Lock the Gate Alliance, Climate and Health Alliance, Doctors for the Environment Australia. With 80% of NSW electricity dependent on coal, strategic frameworks for coal exploration and mining, and transition away from fossil fuelled energy supply, are being developed and/or implemented, (Australian Government, 2023, NSW Government, 2022),

2. Methodology and Approach

This study assesses the topic of air quality in the Upper Hunter using a political economy analysis framework described by the Department for International Development, DFID, (2009). A stakeholder analysis using the approach documented in Reed at al. (2009), is used to interrogate the structures, institutions, and agents. Here, structures are the long-term factors, not easily influenced, that provide the political and economic context (e.g. historical links between mining and the state). Institutions are formal (legislation, market) and informal (political, social, and cultural norms). Agents include internal (politicians and parties, business associations and civil society organisations) and external (foreign governments, multinational corporations, and regional organisations). Analysis and narrative centre on the fundamental question: *How can the topic of air quality be less contentious?* The analysis interrogates the mining and resources sector through vertical and horizontal scales, (Reed and Bruyneel, 2010) to identify the factors (drivers of change) and incentives for improving air quality over short, medium, and long terms, (DFID, 2009). A conceptualisation of the framework is presented in **Error! Reference source not found.** and is followed by assessment of the power relations that arise from sectoral interactions and between different sets of factors.

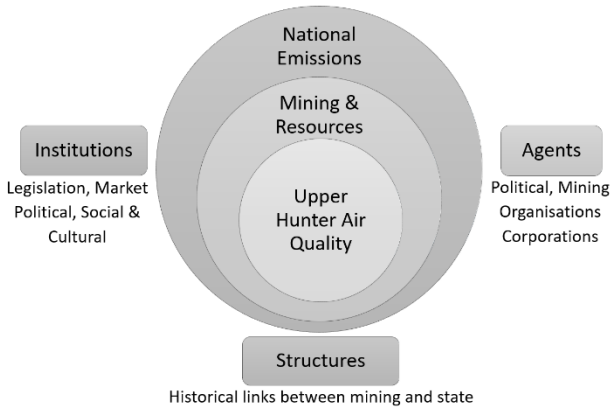

Figure 1. Conceptual framework for analysis

3. Stakeholders

Major stakeholders are summarised in **Error! Reference source not found.** on the next page. They include industry associations, mining companies (incl. supply chain), power producers, mining equipment technology services (METS), other businesses [e.g. agriculture, viticulture, equine, air quality consultancies], regional councils, community groups, business development organisations, health and safety, trade unions, local, state, and federal governments, education providers, advisory committees, Indigenous groups, activist organisations, and residents.

4. Analysis and Discussion

Referring to the analysis of stakeholders presented in the Appendix, the following discussion includes legislation and regulation, governance, drivers of change and economics.

4.1. Legislation and Regulation

The federal government sets the ambient air quality emissions standards through the National Environment Protection Measure, NEPM, (2021). The state government regulates NEPM standards through policy and legislation, namely the Environmental Protection Licence (EPL), however, in general, economic considerations are often prioritised over health impacts, resulting in subsidies to the polluters (Dobbie and Green, 2015). The pollution reduction programs, introduced by the NSW EPA (2014) influenced compliance through policy, resulting in the mining industry targeting specific emissions reductions and adopting improved practices, (NSW Mining, 2024). This coincided with improvements identified as best practice dust emissions management, (Katestone 2011, 2014). Similarly, coal-fired electricity generation shifted towards increased efficiency and investment in renewables, emissions mitigation technologies and planned closures, (e.g., AGL, 2015). However, the topic of air quality involves considerations of socio-economic benefits and adverse socio-environmental impacts, with disparity illustrated by fines of $15,000 for exceeding daily emissions, (Newcastle Herald, 2019), while annual economic health burden due to fine particle pollution from mining in the area has been estimated at around $65 million, (Climate Health Alliance, 2015).

Since 2012, the NSW Minerals Council has administered the Upper Hunter Mining Dialogue (UHMD) and similarly, in collaboration with the mining and electricity sector, the state government has managed the Upper Hunter Air Quality Monitoring Network (UHAQMN). The Protection of the Environment Operations (General) Regulation, PEO, (2009), under the Protection of the Environment Operations Act, PEO, (1997) underpin the funding, administration, and maintenance of the UHAQMN. Further to emissions, legislation associated with planning and approval processes for the development, extraction and allocation of resources is influenced by the political power of industry. In particular, the NSW coal industry wields significant influence which is often seen as prioritising short-term economic gains over long-term sustainable resource use, maintaining, or reducing environmental impact and diversification,

(Colagiuri and Morrice, 2015). This demonstrates the subtleties of political capital reach into air quality governance, locally, regionally, and nationally.

Table 1. Stakeholder Identification

Stakeholder	**Example Entities (non-exhaustive)**
Industry Associations	NSW Minerals Council, Minerals Council of Australia, Australian Coal Association
Mining Companies	Muswellbrook Coal, Bengalla, BHP, Glencore, MACH Energy, Yancoal, Bloomfield Group, Malabar Coal, NuCoal Resources, Australian Pacific Coal, Peabody Energy, Vale Integra
Mining Supply Chain	Port Waratah Coal Services, Newcastle Coal Infrastructure Group, Port Authority of NSW, Hunter Valley Coal Chain Co-ordinator, Aurizon, Pacific National
Power Producers	AGL Macquarie, Liddell and Bayswater Power Stations
Mining Businesses	Environmental Services, Mining Equipment & Technology Services (METS)
Other Businesses	Equine Industry, Agricultural Industry, Construction, Tradesmen, Other non-mining. Consultancies - including air quality.
Regional Councils (Local Government)	Councils of Muswellbrook, Singleton, Dungog, Upper Hunter Shire, Hunter Joint Organisation of Councils
Community Groups	Doctors for the Environment, Lock the Gate Alliance, Climate and Health Alliance, Singleton Shire Healthy Environment Group, Denman, Aberdeen, Muswellbrook, and Scone Healthy Environment Group
Business Organisations	Hunter Business Chamber, Muswellbrook Chamber of Commerce and Industry, Singleton Business Chamber, Dungog District Chamber of Commerce, Master Builders Association, Hunter Region Business, Business Enterprise Centre, Workers Educational Association (WEA), HunterNet
Health and Safety	Coal Services, Hunter New England Local Health District, Medical Centres, SafeWork, icare, Humanomics
Unions	Australian Council of Trade Unions, Construction, Forestry, Maritime, Mining and Energy Union, Australian Services Union
State Government	Independent planning commission, Department of Climate Change, Energy, the Environment and Water, Environmental Protection Authority (EPA), Health Ministry, Local Land Services
Federal Government	Department of Infrastructure, Transport, Regional Development and Communications, Regional Development Australia, Department of Agriculture, Water, and the Environment, Bureau of Meteorology, National Environment Protection Council, Department of Health, SafeWork Australia
Education Providers	Schools and Colleges, Higher Education Providers (HEP's)
Advisory Committees	Newcastle Community Consultative Committee on the Environment, Upper Hunter Air Quality Advisory Committee, Air Pollution Expert Advisory Committee
Indigenous Groups	Wonnarua People, Wonnarua Nation Aboriginal Corporation
Residents	Large towns in the region include Muswellbrook, Singleton, Dungog, and Scone

4.2. Governance

Due to increased involvement of mining companies, local government has reconfigured in the delivery of services and decision-making processes and competition for institutional capacity alongside regional bodies, state and federal government, unions, and multinational companies, (Cheshire et al, 2014). This reconfiguration includes responding to and advocating interests of the local population, however, the ability of local government is constrained by low formal regulatory and planning authority over resource use and development. The fragmented, embedded, and multiple organisational governance landscape inhibits strategic, long-term planning and lacks a clear definition of authority and accountability. Tensions exist between transnational policy development and its translation to existing sub-national contexts (e.g. regional development, planning structures and processes), (McManus, 2008). This results in a void of institutional capacity prevalent in Australian regional governance,

(Cheshire et al, 2014). In mining intense regions, demonstrated by groups of "somewhat" organised actors, corporate interests can skew prioritisation of the rules and expectations that surround accountability and responsibility. This can result in adverse consequences for the local and regional communities, and in the case of the Hunter Valley, inconsistencies surrounding the topic of air quality.

4.3. Drivers of Structural Change

Apart from monitoring air quality, the role of the UHAQMN is to increase transparency and accountability, however, vocalisation of environmental injustice, (e.g., Environmental Justice Australia, 2014, Higginbotham et al, 2010) has evolved through individual and small community group "green" activism, (Connor et al, 2009). This has impacted the mining industry's social landscape, with environmentalist groups challenging the sector's social licence to operate and legitimacy, (Laurence, 2020). The global reach into the region's governance of air quality is illustrated by previous financial support from transnational environmental NGOs including WWF and Greenpeace, (Connor et al, 2009).

Reducing contentiousness of the topic of air quality in the Upper Hunter requires a holistic approach to national emissions regulation, legislation, and climate change policy. The transboundary nature of the global commons' limits national level jurisdiction to territorial borders, at state level to prioritising industry and mining interests, thus resulting in local government observing alongside uninfluential citizens. Such mismatches in interests, access, and power raise questions about the mix of diplomacy, politics, legislation, investment, and activism necessary for impactful change across different scales. Lack of government influence on better shaping outcomes could arguably be seen as apathy within a modern technocratic society, where local environmental groups contest state and corporate funded scientific knowledge that shapes narrative and political purpose, (Connor, 2012). Recent analysis describes discourse in the region as influenced by coalitions such as anti-coal vs anti-renewables, occurring through civil but focused criticism and outrage, (Arranz et al, 2024).

4.4. Economics

The mining industry is integral to the identity of the Upper Hunter, (McManus, 2008), however 85% of mined coal is exported to Asia, (NSW Government, 2022). In 2012-13, NSW coal royalties accounted for 2-3% of the Gross State Product (GSP), employing 1.4% of the workforce, contributing 22% to the state's exports, (Campbell, 2014). In 2022-23, the NSW mining industry contributed to 7.3% of GSP, supporting 5.6% of total employment in NSW (NSW Minerals Council, 2023). Lobbying promotes this impact to regional, state, and national economies, polarising governments across scale, in the process shaping public opinion including national ownership and significance, (Campbell, 2014). Overall, Australia's mining industry enjoys almost 90% foreign ownership, where over $500 million is spent on lobbying Australian governments, with most funds obtained through transnational company memberships, while expenses are tax deductible (Aulby, 2017).

Political donations and lobbying influence and steer Australian government decisions, which can be perceived to prioritise corporate interests to the detriment of local communities, the environment and non-mining industries. Decision making can be perceived to be dominated by representatives of foreign owned companies and a "revolving door" between government and industry, (Aulby, 2017, Knaus, 2019). Such perception can significantly distort the soundness and consistency of policies associated with not only air quality, but broadly development from local to national scale.

5. Opportunities and Constraints

Using the prior discussion and analysis presented in the Appendix, according to the methods outlined in Reed et al (2009), stakeholders are categorised based on their level of interest and capability to influence the topic of air quality in the region. Figure 2 presents these relationships, categorised by crowd (low interest and power to influence), subjects (high interest but low power to influence), key players (high interest and power to influence) and context setters (low interest but high power to influence).

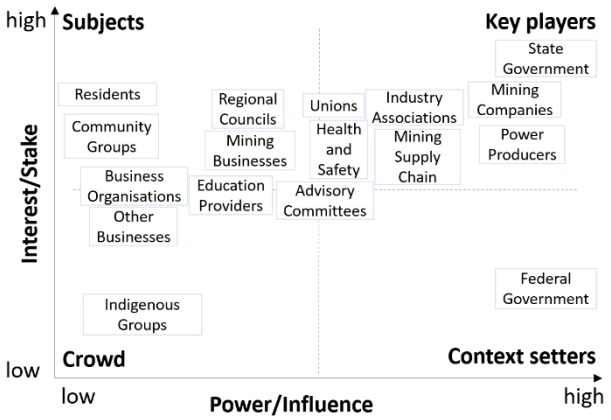

Figure 2. Interest/Influence Matrix of Stakeholders

Referring to Figure 2, a key player is the State Government issuing an EPL to the Mining Companies. An overlooked player in this case is an air quality consultancy that is typically engaged to evaluate and/or advise on impacts. In the present analysis, air quality consultancy has been

categorised under Other Business, however, air quality consultancies arguably rival power of Advisory Committees or Industry Associations and/or are situated in a pivotal role, especially in relation to approvals of new or extended development and tenure. On the other hand, residents are subjects, exposed to changes in air quality by the Mining Companies and Power Producers, with limited ability to influence change. Not clear from Figure 2 is the effect of collaboration and/or coalitions of actors to drive change. One example of this includes the State Government collaborating with the Mining Companies and Power Producers to create the UHAQMN. Another example that could produce significant impact and a step change to discourse and/or management of air quality in the region is an Education Provider (e.g. University) working with a Mining Company that is supported by the State Government through integration and alignment with regulatory practice. This could be coupled with a Mining Business, or Other Business that could provide actual technology. For example, such a relationship could be facilitated by the Federal Government through the Australian Research Council.

The Hunter's identity has shaped through historical ties between the state government and the mining and resources sector and structurally, it has strengthened following corporatisation and privatisation of state-owned power plants (in the mid-1990s) and coal mines (early 2000s). As major local governments Singleton and Muswellbrook are the major contributors to state royalties, state embeddedness must be considered, (Higginbotham et al, 2010). It is of additional interest to contrast the state's "hollowing out", (Catney and Doyle, 2011) and devolved power by scaling down, with the diminishing influence of the Minerals Council of Australia and the increased power of entities such as the NSW Minerals Council, (Aulby, 2017). This illuminate's state government control of land rights and access to uninterrupted development of resources. Scaling out horizontally further reveals incompatibility with Indigenous interests and because of pre-empted agreements, mining lease impairment of native title rights is indemnified from state compensation. Through policy, legislation, and market-based instruments the federal government shapes the interrelationships and the wider political landscape between resource development, government, and Indigenous landowners by specifically and directly affecting rights and bargaining positions (O'Faircheallaigh, 2006). Drawing together environmental activism and justice, native title, and legislation to drive reform in policies aimed at influencing "corporate social responsibility' creates new opportunities for structural reform thus reducing contentiousness of the topic of air quality.

6. Conclusions

The topic of air quality in the Upper Hunter Valley in NSW is important and complex. This study has identified the relevant stakeholders involved in shaping this topic and an analysis of their relationships and power to influence perception, discourse, and approach to air quality in the region is presented. Key players include the state and federal governments, mining companies and power producers. The presented preliminary analysis shows that the influence on the topic of air quality in the region requires and will obtain greatest benefit from multi-disciplinary, multiple collaborations and/or coalitions across private, social and market partnerships. This is supported by Arranz et al (2024) who suggest that for a sustainable transition, public dissemination of technological choices should be supported by scientific reasoning, targeted, and aligned positioning.

Improving air quality in the Upper Hunter requires joint action and coordination from top-down and bottom-up across different spheres of government, but also horizontally outwards to non-state actors, forming alliances to bring about change within the existing resource development framework, (O'Faircheallaigh, 2006). This "meta-governance", (Cheshire et al, 2014) brings together local and regional stakeholders to better and more strategically coordinate resource development with state and federal governments.

The topic of air quality could be less contentious by aligned pathways towards a less carbon intensive society and strengthened holistic commitment of various actors to reducing the region's reliance on traditional resources for economic benefits and electricity generation. The Hunter's struggle to reduce contestation of air quality as a common pool resource is an illustration of a transition and/or restructuring of a global capital-centric economic system and institutions through internalisation of social and environmental costs and promotion of "equity and precautionary principles of sustainability", (Evans, 2008).

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Appendix – Stakeholder Analysis

Stakeholder	Likely perception of, and approach to issues including managing Air Quality	Relationship to Other Stakeholders and the Region	Interest/Stake in Air Quality and the Region	Power/Influence
Industry Associations	Reactive to regulatory legislation changes. Likely perceive as cost first then social benefits later.	Represents mining companies, their affiliates, and interests, through public policy debate. Administer UHMD, community programs. Lobbying campaigns aligned with mining priorities and benefits. Provide financial assistance, form partnerships with local communities and government.	Moderate to high interest as social discontent is detrimental to maintaining productive working relationships, could negatively impact mining interests. Support productive relationships between the industry, government, local groups, and the community.	Moderate to High as acting on behalf of mining companies. Influences through UHMD, community programs, lobbying government, environmental management priorities and initiatives.
Mining Companies	Reactive based on financial incentive or regulatory requirements. Monitors and reports publicly. Sets targets to "as low as economically practicable". Employs management plans in accordance with development, EPL conditions and pollution reduction programs. Monitors emissions and report. Created UHAQMN with power stations and government.	Provide regional, state, national economic benefits, employment, infrastructure, partnerships, and community support. Impact air quality via emissions resulting in health issues, medical and insurance costs. Incentivise environmental and climate activism. Work with others to manage and/or limit emissions.	Moderate to high interest as poor air quality can negatively impact profits, health of workers, community perception and acceptance of performance. High stake through economic development initiatives, partnerships, and programs.	Very High as can lead air quality management via advanced technology and new methods. Business as usual approach may lead to fines, but poor air quality effects may be long term, difficult to recover.
Mining Supply Chain	Reactive, like mining companies.	Provide a logistics service to the mining companies	Lower interest than mining companies, as not in the region.	Lower influence than mining companies.
Power Producers	Reactive bound by legislative requirements and financial incentive. Monitors air emissions reporting publicly. Implements pollution management plans. Created the UHAQMN in partnership with the mining industry and state government.	Provide employment opportunities, producing access to electricity. Generate emissions and reduce air quality.	Similar interest and power to the mining companies.	Similar power and influence (high) to the mining companies. Long term diversification strategy to reduce emissions.
Mining Businesses	Reactive. Proactive for financial incentive.	Service the mining companies and provide employment opportunities	Moderate interest in air quality as in the area.	Moderate influence and power
Other Businesses	Reactive to poor air quality, if impacting economics, social well-being.	Provide services to residents, but also to industry and government.	Generally low interest if unaffected. Can be high if air quality related.	Low influence but could be moderate to high.
Regional Councils (Local Government)	Reactive to regulatory updates and policy setting of state and federal government. Follow response of mining companies, business and state/federal government.	Strengthen relationships between businesses and the community, and economic interest. Promotes and encourages business enterprise.	Promotes business and economy, long-term sustainable and diversified growth, development. Moderate interest as discontent may impact.	Moderate but reliant on mining companies and/or government.
Community Groups	Proactively represent negative aspects of mining. View air quality and environmental degradation as outweighing benefits.	Lobby and campaign against mining and adverse effects of air pollution.	Moderate to high interest in air quality.	Low influence and power alone, could be significant through partnerships
Business Organisations	Neutral, represent economic interests of businesses.	Disseminate information including welfare and development.	Low interest in air quality unless impacted.	Low influence and power.

Health and Safety	Reactive to poor health, provide insurance, medical services, monitoring of workers. Provide research funding such as Coal and Services Health and Safety Trust and icare Dust Diseases Board.	Health and safety schemes including surveillance and coordination of dust monitoring. Facilitate medical centres.	Moderate to high interest due to economic burden of adverse health.	Moderate influence and power due to association with mining companies and/or government
Unions	Reactive to employee health, safety in the workplace and economic benefits. Pro-active if financial interest.	Advocate for workers' rights, benefits, maximising earning, and income.	Moderate to high interest as good air quality linked to work environment.	Moderate to high influence and power.
State Government	Administers and sets Laws, Policy and Regulates based on evidence (e.g. safe minimum standards). Created the UHAQMN with the mining and power industry. Provides financial opportunities for research (e.g. NSW Environmental Trust). Oversee UHAQMN, monitors and reports data. Sets acceptable pollution standards.	Reports on air quality in the region and Regulates. Guides environmental performance. Provides health and public services. Approves land use developments, resource extraction tenure and sets EPL's. Influences and incentivises standards of mining, power generation and industry performance.	High interest in air quality as emission impacts result in public economic burden. Interest in maintaining industry for economic benefits, social welfare, and development of communities, especially regional.	Very high as set emissions limits, standards, and decide if mining companies continue with operations.
Federal Government	Proactive setting Laws, Policy, Standards including emissions e.g., safe minimum level or "as low as practicable". Sets air quality National Environment Protection Measures (NEPM) and assesses implementation and effectiveness. Provides opportunities for innovation, advancement, and improvement through research (e.g. ARENA, Australian Research Council, Medical Research Future Fund).	Works with and supports state governments, industry, and community. Designs and implements policies and programmes to protect air quality. Provides services to inform decisions. Develops and delivers health related programs including quality of services, prevention, and insurance.	Low interest due to many other considerations incl. immigration, biodiversity conservation, land contamination, water use, urban environment, national economic priorities.	Very High as set national emissions standards and protection measures.
Education Providers	Proactive in research/identifying knowledge gaps. Develop scientific evidence for policy, industry practices. Build knowledge across multiple sectors. Aligned to government priorities e.g., silicosis, bushfire smoke	Disseminate scientific evidence to community, industry, and government. Raise awareness and influence policy, impact innovation in mining, power generation and air quality management.	Moderate to high interest based on opportunities e.g., financial, interest from industry and social and government requirements.	Low to moderate influence alone, increases through partnerships with government, industry, and community
Advisory Committees	Pro and reactive. Provide advice to Government.	Represent the wide-ranging interests and views of the community.	Moderate interest based on range of concerns and prioritisation.	Moderate influence
Indigenous Groups	Mostly neutral, primary concern and perception related to struggle for acceptance, linked with historical identity, colonisation, and land use.	Title holders, rights to land. Form agreements and partnerships with mining companies. Provide support services, employment opportunities.	Generally low interest unless evidently impacted.	Low influence, but could increase
Residents	Reactive to poor air quality. Naturally blame coal, power companies and/or local, state federal government.	Work and live in the region, rely on mining companies for economic benefits. Negatively impacted by poor air quality (health, ecologically and economically).	High interest living in the area.	Limited influence and power