

Geographical Dynamics of Environmental Service Firms at Metropolitan and National Scales in the United States: The Case of Pittsburgh, Pennsylvania

James T. Hathaway

James T. Hathaway, Department of Geography, Geology and the Environment, Slippery Rock University, Slippery Rock, USA

Abstract

A close look at Pittsburgh's environmental service firms in recent decades provides insight into the locational dynamics and trends of the United States environmental industry and insight into forces underlying this broad ranging sector of the economy. For my purposes, I place environmental services into two categories of producer services: professional services (e.g., environmental consulting or engineering) and environmental contractors (e.g., remediation, emergency response) while the third category lies in the realm of consumer services: operation and maintenance services (e.g., waste collection, treatment and disposal). I will provide portraits of these businesses by describing their revenues, employment, labor characteristics, clientele, and overall nature. My sources of information include trade publications and business databases, census data, content from firm websites, and personal interviews. I use a political economy perspective 1) to illuminate the forces affecting the locational dynamics and evolution of environmental service firms at metropolitan, national, and global scales and 2) to see what an analysis of environmental firms can contribute to debates on such processes as agglomeration and dispersal, outsourcing, the changing regulatory environment, and the "greening" of industry. Large manufacturing job declines have stimulated a move in the Pittsburgh area toward the environmental sector, but some environmental service industries have had turbulent trajectories. Pittsburgh's environmental service firms have benefited from the region's long history of struggling with environmental issues and by national trends including the public sector's retreat from the provision of services and the "greening" of industry.

Keywords: environmental services, producer services, locational dynamics, political economy, Pittsburgh, USA

Introduction

A close look at Pittsburgh's environmental service firms since the 1970s provides insight into the evolution of the complex environmental industry. This analysis shows how broad national and local processes intertwine in a setting of attempted reinvigoration of established metropolitan economic spaces. Like many older industrial metropolitan areas in the United States, Pittsburgh has been restructuring its economy after suffering large declines in manufacturing employment in the 1980s. By the 1990s the environmental sector was seen as a partial replacement for Pittsburgh's reduced steel industry. A local business newspaper stated that "city and regional leaders have touted southwestern Pennsylvania as a new environmental mecca" (Antonelli 1997). The Pittsburgh Technology Council includes environmental technology as one of the four primary clusters of the technology industry that have reached a critical mass. I will examine how environmental services, the largest segment of the environmental industry, have evolved in Pittsburgh and the US. Environmental services broadly consist of consulting and remediation on the one hand and wastewater treatment and solid waste management on the other.

Method and Context

Telling the story of environmental services in Pittsburgh and the US involves describing their revenues, labour characteristics, role in the public and private sectors, and overall nature. Sources of information include environmental historical research on Pittsburgh, trade publications and business databases, and personal interviews with industry workers. A fundamental assumption is that our economy is on an unsustainable path and that improving the environmental performance of production, distribution, and consumption is important. By definition environmental firms should help lead the effort to change directions. Despite the significance of the environmental industry, it is rarely investigated in geography with important exceptions including Schoenberger (2003) and Schulz (2005), both of whom focus on international aspects. My analysis of environmental service firms since the 1970s will try to provide insight into the geographical dynamics of environmental service firms at metropolitan and national scales. I approach the topic from a political economy perspective, recognizing both the value of an historical approach to understand geographical dynamics and the irrevocable linking of the political and the economic. Following Tickell (2001), I hope that my work at the interface of political economy and the service sector can illuminate larger processes at work in our society.

Environmental issues now have a higher profile in economic geography research. Traditionally playing a peripheral role in postwar economic geography, environmental issues are the focus of the new subfield of environmental economic geography (Bridge 2008; Hayter 2008). My work aligns with an approach in environmental economic geography Angel identifies as the greening of industry, i.e., the efforts of individual firms and industries to improve environmental performance. The scope and scale of greening is largely unknown (Angel 2006, 131). My empirical work begins to address this gap. Gibbs (2006) notes an overemphasis on research about production pollution compared to consumption pollution. My attention to wastewater and solid waste, the final phases of consumption, deals with this research lacuna. Furthermore my work contributes to the geography of services project that analyses the growth and locational behaviour of producer services (Bryson, et al. 2004). The remainder of this paper treats definitional issues; then traces the interplay of the state, the market, and the industry at several scales; and ends with some thoughts on the industry's future.

Definition and scope of US environmental service firms

Organized environmental services originated in the urban sanitary movements of the nineteenth century and underwent a transformation in the 1970s. An environmental consultant noted in 2001 that his profession largely did not exist thirty years earlier. He continued, “‘sanitary engineers,’ as many of our colleagues were once called, have been succeeded by a wide range of disciplines and expertise” (MacLean 2003). For my purposes, I place environmental services into two categories of producer services consisting of 1) professional services (e.g., architectural and engineering, environmental consulting, geotechnical) and 2) environmental contractors (e.g., remediation), while a third category lies within consumer services, which are operation and maintenance services (e.g., waste collection, treatment, disposal) (adapted from Cox et al. 2005).

US environmental service firms had \$147 billion in revenues in 2008 (Table 1). These firms vary from large corporations to boutique operations. Divisions within large engineering and contracting firms conduct much environmental work. The twenty largest environmental firms had \$29.8 billion in environmental revenues in 2009, and

for twelve firms less than half of their revenue was environmental (Staff 2010). Also, only two of the top twenty were all-environmental firms.

Having put tentative boundaries around the industry, I'll now turn to its evolution in Pittsburgh and the US.

Table 1: Environmental Services—Revenues by Industry Segment: 1980 to 2008

Industry Segment	Revenue (bil. dol.)				Per cent increase		
	1980	1990	2000	2008	1980-90	1990-2000	2000-2008
Wastewater treatment works	9.2	18.4	28.7	40.8	100.0	56.0	42.2
Solid waste management	8.5	26.1	39.4	55.3	207.1	51.0	40.6
Environmental testing, analytical services	0.4	2.1	1.8	1.9	425.0	-14.3	5.6
Hazardous waste management	0.6	6.7	8.2	9.2	1016.7	22.4	12.2
Remediation/industrial services	0.4	9.9	10.1	12.7	2375.0	2.0	25.7
Consulting & engineering	1.5	12.5	17.4	27.1	733.3	39.2	55.7
Total	20.6	75.7	105.6	147	267.5	39.5	39.2

Source: US Census Bureau (2010).

Environmental services: origins and boom

After World War II it became apparent that Pittsburgh's industrial progress had exacted a heavy environmental toll. The subsequent engagement with these environmental problems became the basis of the region's environmental technological capabilities. Known as the "Smoky City," Pittsburgh was grimy, with streetlights occasionally on during the day because of the thick haze, valleys filled with slag, contaminated industrial sites, and rivers brimming with industrial waste and residential sewage. Internal and external forces eventually led to a cleaner environment helping Pittsburgh to be named "America's Most Liveable City" in 1985 and 2007 by *Places Rated Almanac*. The sheer scale of the cleanup effort contributed to the development of Pittsburgh's disproportionately large environmental industry. Another contributing factor was that the steel industry generated an allied engineering sector, and many of these engineering firms moved into environmental work when steel declined (DeRosa 2008).

The roots of Pittsburgh's current environmental industry precede World War II. The city had anti-dumping ordinances as early as 1800. Like other large American cities, Pittsburgh systematically addressed water supply, sewage systems, and refuse management from 1880 to 1920. American cities embraced the Progressive idea that "government—and not free enterprise—was responsible for public health and should exercise that responsibility in the matter of refuse" (Strasser 2000, 120).

Before the 1970s, the Pittsburgh region's public sector conducted most environmental services, such as refuse management. The provision of infrastructure was contracted out to engineering firms. A prime example is the Allegheny County Sanitary Authority (ALCOSAN), which acted to end the disgorging of raw sewage into Pittsburgh's rivers.

The environmental movements of the 1960s and 1970s and the ensuing environmental regulations helped environmental businesses to grow rapidly. Important here was the creation in 1970 of both the federal level Environmental Protection Agency (EPA) and Council for Environmental Quality. The passage of clean air and water pollution control acts led to new types of private businesses such as environmental consulting and engineering services, sophisticated environmental instrumentation and testing services, hazardous waste management, and remediation services (Berg and Ferrier, 1998). Pittsburgh was a little ahead of the curve: ALCOSAN's sewage project occurred some years earlier, and the region reduced air pollution significantly beginning in 1941, when the city enacted a tough smoke control ordinance.

The existing federal pollution laws dealt with gross contaminants in the air and water, but analytical technology improved such that minute amounts of toxic contaminants could be detected. Laws, policies, and regulations passed in the 1980s involving toxic contaminants marked a major turning point. The EPA and state governments took on a "command and control" function, but rather than "creating more public-sector infrastructure, this system depended on private-sector industries to provide the products and services needed for regulatory compliance". Demand for environmental services surged as companies sought to "avoid fines, shutdowns, and the wrath of environmentally sensitive consumers and public officials" (Berg and Ferrier 1998, 11). In Pittsburgh, environmental businesses did grow, but local officials were becoming less supportive of an environmental agenda. For example, a local power company had installed sulphur-dioxide "scrubber" technology on two of its local power plants but declined to install them on a third plant despite an earlier agreement to do so. The county health department approved this change. As of the late 1970s, industry became "a much more dominant influence in air pollution matters and the County Commissioners and the health department both became far more inclined to protect industry from advanced control requirements than to foster them" (Hays 2003, 199).

A preference for the private sector also developed in the US wastewater treatment industry. Wastewater treatment was a traditional municipal operation rather than one created by new environmental legislation. Privatisation of US wastewater facilities began in the 1980s, due in part to "declining resources, increasing needs, a desire to reduce the role of government, and faith in the efficiency of private markets" (Heilman and Johnson 1992, 191). The feeling is caught by President Reagan's comment from his 1981 inaugural address: "government is not the solution to our problem; government is the problem." Further impetus for privatisation came from federal tax law changes in 1981 and 1982 that promoted private sector investment in infrastructural projects. These changes were scaled back in 1986, but project costs were still reduced to public authorities (Heilman and Johnson 1992).

US environmental services grew rapidly in the 1980s. The two segments consisting mostly of consumer services had the largest revenues and had decadal growth rates around 100% and 207% (Table 1). Despite growing opposition to landfills and concern over the environment, personal and commercial waste volumes grew rapidly. The producer service segments had explosive growth, although starting from lower bases (Table 1). As with solid waste, hazardous waste grew at record rates in the 1980s. The federal Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (also known as Superfund) allocated \$9.6 billion for hazardous waste cleanup in the 1980s, and much of this went to environmental contractors, engineers, consultants, and lawyers. Also, the federal government required companies to spend additional billions to recover toxic waste sites.

Pittsburgh area environmental service firms participated in this growth. In 1990, the seven-county metropolitan area had five hazardous waste facilities, nine transporters, two spill response firms, twelve labs, three specialized well drillers, and 35 environmental consulting firms. The consulting firms had approximately 2,025 fulltime environmental staff and thousands more additional employees (EI Environmental Services Directory 1991).

A mature industry at age twenty

The breakneck growth of the environmental industry slowed considerably in the 1990s, with producer services now mostly growing slower than consumer services (Table 1). A realization that US air and water quality had reversed a century-long decline by the 1990s combined with increased “antiregulatory rhetoric from the industrial community and a growing cry of ‘unfunded mandates’ by local governments” contributed to decreased environmental regulatory activity, enforcement, and in some instances, deterioration in environmental quality (Berg and Ferrier 1998, 11-12). The production of Superfund sites fell off, asbestos was no longer used, and most new industrial facilities incorporated increased material efficiency and pollution prevention. In just twenty years of existence, much of the environmental industry showed signs of maturation such as decelerating growth, heightened competition, growing sophistication among its clients, greater emphasis on marketing, and consolidation of market share by larger players (Berg and Ferrier, 1998). For example, 511 out of 3,392 environmental professional service firms closed in 1997-1998 (Environmental Information 1999). Meanwhile the largest firms mostly prospered. Among the top 200 firms providing profitability information, 175 reported making a profit in 1995; 19 reported that they did not. Many top firms participated in the booming international market that saw revenues go from \$2 billion in 1995 to \$4.5 billion in 2000 (Rubin et al. 1996; 2001).

Pittsburgh’s environmental service businesses slowed during the 1990s, but probably suffered less than those in other metropolitan areas. Pittsburgh’s experience provides additional insight into the environmental sector’s slowdown. A local official noted that when the federal clean air and water acts passed, violating companies had to act quickly, which meant a lot of business for environmental companies. Once the companies achieved the minimum requirement needed, business fell off (Antonelli 1997). Heightened competition drove down revenues. For example, an important piece of environmental consulting is the Phase I Environmental Site Assessment, which includes analysis of hazardous substances and petroleum products. In the early 1990s in Pittsburgh, this assessment cost \$3,000-\$3,500 or more. Fifteen years later, the price was \$1,500-\$2,000 (DeRosa 2007). These new fees are now typical nationwide.

The passage of the Pennsylvania Land Recycling and Environmental Remediation Standards Act in 1995 helped Pittsburgh’s environmental sector. This state legislation encourages the redevelopment of old industrial sites. It provides potential developers with clear cleanup standards based on risk and provides an end to liability when that cleanup standard is achieved. Several redeveloped brownfields along Pittsburgh’s rivers on former steel sites, a former livestock yard, and other sites have real estate values exceeding \$1 billion. The scale and creativity of Pittsburgh’s brownfield recycling make Pittsburgh a national leader. The federal Small Business Liability Relief and Brownfields Revitalization Act of 2002 was modelled after Pennsylvania’s legislation. This act modified Superfund by providing funds for cleanup and clarifying liability protections. It is a complex process to recycle a brownfield, and from the description below of a former slag dump in Pittsburgh shows the role of consultants from a developer’s perspective.

“Schneider cited multiple levels of uncoordinated, redundant review for Summerset at Frick Park that he alleged made the project far more complex than it needed to be: ‘We had our own environmental experts. Our lenders had their own environmental experts. We had DEP (the Pennsylvania Department of Environmental Protection) opining on this for Act II of the consent order. URA (the Urban Redevelopment Authority of Pittsburgh), which was the landowner, had its own consultants. The Allegheny County Health Department reviewed this. The state health department was brought in by ATSDR (the U.S. Agency for Toxic Substances and Disease Registries) because EPA (the U.S. Environmental Protection Agency) got a complaint from somebody who wanted to stop the project. We had seven ATSDR public health advisories, and also the URA ended up paying for a separate consultant to work with the community group to overview all this work’” (Goldstein et al., 2003).

Redefining environmental service firms

The federal Pollution Prevention Act of 1990 marked a shift from “end-of-pipe” solutions of the 1970s and 1980s to pollution prevention. This approach is more policy driven than regulatory. Policies emphasize technical assistance, grants, partnerships, and voluntary efforts. While “end-of-pipe” work continued in the 1990s new business practices such as environmental management systems (EMS) gained ground. An EMS is a set of processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency. The paperwork-intensive EMS includes an environmental policy; considers the environmental impact of products, activities, and services; sets environmental objectives; meets legal and regulatory requirements; trains employees; and provides for oversight and auditing procedures. The de facto framework for implementing an EMS is the International Standards Organization (ISO) 14000 standard. ISO 14000 is underused by US firms compared to other countries, but this is changing. For instance, US firms with European operations must comply with ISO 14000.

A practice related to an EMS is FIN 47, a new accounting rule produced by the national Financial Accounting Standards Board specifying how companies should account for the retirement of assets on their balance sheets. FIN 47 and pollution liability insurance accelerated the development of contaminated sites in Pittsburgh, but this consulting work tends to be performed by the larger firms (DeRosa 2007).

These developments helped rejuvenate environmental consulting and partly explain a 55.7 percent increase in revenues for environmental consulting and engineering firms from 2000-2008 (Table 1). The very largest firms continued to prosper. The top 200 firms increased their revenues by 10% in 2007 to \$46.3 billion. Cleanup firms focusing on US markets are facing challenges, but overall, firms are buoyed by heightened environmental awareness in the US. One executive said that growing public awareness about climate change and increasing energy costs are pushing "a more sustainable approach to infrastructure and building design." Public agencies are beginning to address climate change issues in their procurements. Finally, the amount of international revenue that firms reported grew 48% in 2007, to \$8.6 billion (Rubin 2008).

Pittsburgh’s environmental service firms have experienced turbulence. The area’s largest firm in 2000, the \$1 billion IT Group, was near bankruptcy. A Louisiana firm purchased it, laid off more than 400 employees, and six years later it had only \$38

million in revenues. Twelve firms disappeared from Pittsburgh's top 25 between 1999 and 2005, which indicates substantial turnover. However, twelve of the top fourteen in 2005 appeared in the 1999 top 25, so the turnover in firms occurred almost totally in the bottom half of the top 25. One local observer sees three things happening. Firms have merged into larger ones, they have downsized, or they went out of business or closed the local office (DeRosa 2007).

Many of Pittsburgh's environmental workers are not sanguine about their prospects. Pittsburgh's lagging economy sometimes means less money for environmental issues. Superfund funding has declined in recent years, contributing to the decline in site assessments. Some positive developments are that air pollution work remains strong, both locally and nationally (DeRosa 2007; Rubin 2008). Smaller Pittsburgh firms are finding niches such as ISO 14000 or emergency response work funded by Homeland Security. A big development is the EPA-driven \$3 billion plus overhaul of ALCOSAN.

Pittsburgh has a \$2 billion environmental service industry. Environmental consulting and solid waste management are the largest segments, with revenues of \$828 million and \$578 million respectively (D&B 2008; Pittsburgh Business Times 2008). The next largest segments are environmental engineering (\$178 million) and remediation (\$161 million). Almost all environmental services in Pittsburgh are conducted by the private sector. Exceptions include a few non-profit environmental consulting firms and waste collection in the City of Pittsburgh. Only seven percent of waste collection revenues in the Pittsburgh region remain in the public sector. A typical story for the region occurred recently in Uniontown. The Uniontown City Council awarded its garbage-collection contract to an international conglomerate. Ten union workers who formerly collected trash lost their jobs (Zemba 2008).

Viewed nationally the Pittsburgh region has a significant cluster of environmental services. Locally, firms in all segments are dispersed although the reasons vary by segment. Many firms can be footloose in their location because they have low barriers to entry, tend to be small, and their clients are dispersed. Professional service firms prefer high amenity locations while contractors are in industrial areas. Firms with larger capital requirements need space for their equipment and avoid higher cost locations. The largest firms show a slight tendency to locate downtown, with five of the top 25 in 2009 in or near downtown. Industrial waste collection firms choose industrial areas. Finally, wastewater and residential waste collection are mostly tied to municipal locations throughout the metropolitan area.

Final thoughts

When assessing Pittsburgh's environmental services we can begin with the loss of at least 100,000 thousand manufacturing jobs in the region since 1970. Environmental services have only replaced a small fraction of these, but 6,000 new jobs are a significant achievement. Pittsburgh is a leader in brownfield development but it does not have one of the largest clusters of environmental service industries, having none of the nation's thirteen firms that exceed \$1 billion in revenues. Pittsburgh's largest firm ranked 71st in the US in 2009. Pittsburgh compares very well, though, to nine other metropolitan areas of similar size in part because of the scale of its cleanup requirements and the shift of engineering firms from steel toward environmental work (Table 2).

Table 2: Selected characteristics for the Top 25 Environmental Firms in Selected US Cities, 2005 or 2006.

Metropolitan Area	Metro population	Year	Environmental Revenues (mil. dol.)	Per cent of firms led by females
Pittsburgh	2,370,776	2005	463.2	8.3
Seattle	3,263,497	2006	345.9	12
Oakland	2,392,557	2006	296.7	40
Cincinnati	2,104,218	2006	288.1	8.3
Washington, DC	5,290,400	2005	284.4	15
St. Louis	2,796,368	2006	232.5	3.7
Sacramento	2,067,117	2006	208.2	8.8
Austin	1,513,565	2006	157.3	16
Orlando	1,984,855	2006	136.1	15.4
Jacksonville	1,277,997	2006	128.3	8

Sources: American City Business Journals (2008) and D&B (2008).

Where are Pittsburgh and US environmental services headed? The polarization in which big firms are getting larger and small firms are increasing in number that occurred in the 2000s seems likely to continue. Merger and acquisition activity in 2009 was near the twenty year highs in 2007 and 2008. Individuals or groups continue to spin off of larger firms to start their own businesses (DeRosa 2007). Industry surveys routinely place the recruitment of qualified staff as their largest or one of their largest challenges. One observer adds, “as long as there is a capacity constraint on talent, you’ll see more M&A activity as a way to staff up” (Staff 2008). The polarization may be counteracted by two factors. Health insurance is a challenge for the industry, and this may encourage firms to outsource some employees. Much environmental work is tied to particular geographic locations and is thus hard to outsource internationally, but some skilled jobs will move offshore (MacLean 2003), and some larger firms are “moving headlong into a globalised employee base” (Rubin 2008). One engineer commented that a “continuing trend toward ‘commoditisation’ of environmental management, due to cost pressures and lack of new environmental rules . . . the result being that older, more experienced practitioners are forced out while younger, cheaper personnel combined with compliance software are deemed sufficient” (Neville 2007).

One reason for the industry’s talent shortage is that it has attracted few women and people of colour. Female environmental engineers formed 9.1% of *Pollution Engineering’s* readership in 2001, only a slight increase from 6% in 1991 (Krukowski, 2001). The average number of female top executives in environmental services for a group of ten US metropolitan areas is 13.6%, while Pittsburgh’s average was 8.3% (Table 2). Pittsburgh’s women and minority-owned firms have average sales of \$550,500 and \$890,700, respectively, compared to average sales of \$4,244,000 for all 386 firms (D&B 2008).

Returning to the industry’s future, the wastewater and solid waste sectors seem more stable. Their markets are relatively inelastic with waste production generally not subject to rapid swings. This poses a challenge to larger corporations looking for rates of growth acceptable to their investors. Thus there is a “spatial fix,” a move to find international revenues, and as Schoenberger (2003) put it, an “institutional fix,” a move to “open up the erstwhile ‘natural’ arena to private investment”. Markets for the consulting and remediation firms are more elastic. The top 200 firms have retained a 58/42 split in their government/private billings over the twelve years to 2007, although

the state and local share dropped from 33% to 17% while the federal share increased from 25% to 41% (Rubin et al. 1996; Rubin 2008). The shift away from state and local funding hurts smaller firms, because larger firms have the resources to succeed in Washington. This supports a finding of my research that, notwithstanding the turmoil of consolidation, the larger firms prosper while medium-sized and smaller firms struggle. At the local level, Pittsburgh's largest environmental firms primarily do work for large companies or the federal government, often at nonlocal sites. The smaller and one-person firms "fight over the remaining local or regional work" (DeRosa 2008).

To end, the environmental industry, more than most other economic sectors, can move society toward a sustainable path. Work in environmental economic geography should show how the environmental industry has developed across space and over time and to illuminate the character of the industry. I hope that my work is a step in that direction.

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