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Environmental Politics

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title-content=t713635072>

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Online Publication Date: 01 December 2003

To cite this Article Scheinberg, Anne(2003)'The proof of the pudding: urban recycling in North America as a process of ecological modernisation',*Environmental Politics*,12:4,49 — 75

To link to this Article: DOI: 10.1080/09644010412331308374

URL: <http://dx.doi.org/10.1080/09644010412331308374>

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The Proof of the Pudding: Urban Recycling in North America as a Process of Ecological Modernisation

ANNE SCHEINBERG

This essay analyses the history of the development of municipal recycling in the United States between 1970 and 1996 as a case of Ecological Modernisation. Using the framework of Ecological Modernisation Theory (EMT), the essay examines the predecessor institutions to modern recycling, showing how environmental policy and politics in the US in the 1970s stimulated a process that altered the technologies, institutions, and environmental impacts of waste management; affected the industrial use of resources; and created many policy and socio-technical innovations. The resulting discipline, integrated waste management, shows a modernised structure, new technology, and an almost completely new discourse, representing a clear break with pre-modernised systems. The essay begins by contesting conclusions from the work of Allen Schnaiberg, David Pellow and Adam Weinberg, and concludes with proposed feedback to EMT on the nature and locus of environmental change outside of EMT's core geographic areas of North-western Europe.

Ecological Modernisation and North American Urban Recycling

Ecological Modernisation Theory: Emergence And Debates

The German political scientist Martin Jänicke is credited with launching the concept of Ecological Modernisation. While serving as a representative in the Berlin Municipal Council in the late 1970s, he argued for the ecological modernisation of Berlin's development path. Although it took some time before the concepts invaded the academic social sciences [see *Mol and Sonnenfeld, 2000*, for a historic analysis], the ideas planted by Jänicke now occupy a solid position in the environmental social sciences, under the name Ecological Modernisation Theory (EMT). With the emergence and maturation of the ideas and concepts of ecological modernisation in the 1990s, we witness a growing diversity in approaches, and a strong debate about the usefulness of the theory.

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Environmental Politics, Vol.12, No.4, Winter 2003, pp.49-75
PUBLISHED BY FRANK CASS, LONDON

Recent literature on EMT demonstrates a great richness and variety of approaches and interpretations, some based in system theory [e.g. *Huber, 1995, 1991a*]; discourse analyses [e.g. *Weale, 1992; Hajer, 1995*]; others from institutional analysis [e.g. *Mol, 1995; Smink, 2002*]. The processes of change under scrutiny also differ considerably, in parallel with the various theoretical approaches: policy making [*Jänicke et al. 1992; Andersen, 1994; Lundqvist, 2000*]; economic production [e.g. *Orssatto, 2001; Smink, 2003*]; lifestyles and consumption [*Spaargaren and van Vliet, 2000; Cohen, 2000*]; new social movements and their ideas and ideologies [*Rinckevicius, 1998; Mol, 2000*]; and international arrangements [*Mol, 2001*].

National and continental orientations and unity of vision can be seen among scholars from Germany, the Netherlands and Scandinavian countries, and in limited measure from the UK. Themes are also identifiable in groupings of American scholars including Fred Buttel, Bill Freudenburg and Dana Fisher; Australians including John Dryzek and Peter Christoff; and Asian researchers [*Zhang, 2002; Sonnenfeld, 2000; Phung Thuy Phuong, 2002*]. Mol and Spaargaren [2000] make the case that these geographically dispersed contributions share important underpinnings and form a single, coherent school of thought.

At the same time, several, predominantly theoretical critiques of EMT focus on its limited geographical reach, its technological optimism, its reformist (versus radical) outlook; its blindness to power relations and social inequalities, and its realist (versus social constructivist) perspective [see *Blowers, 1997; Blühdorn, 2000; Wehling, 1992; Buttel, 2002; Dryzek, 1997; also Mol and Spaargaren, 2000; Pellow, Schnaiberg and Weinberg 2000; Weinberg et al. 2000*], are among the few scholars to challenge the value of ecological modernisation based on empirical examples. In celebrating a Treadmill of Production (ToP) perspective in analysing the failure of recycling in Chicago they have especially criticised Mol and Spaargaren's interpretation of EMT.

While disagreeing with some of the theoretical claims presented in several works of Allen Schnaiberg, David Pellow and Adam Weinberg, this paper accepts their viewpoint that the development of recycling in North America in the 1980s and 1990s represents an interesting opportunity to apply EMT in practice. This paper seeks to enrich our understanding of environmentally focused social change, and of Ecological Modernisation theory as a heuristic and a normative theoretical basis for understanding that change.

Recycling and Ecological Modernisation

In a number of articles, but especially in their article 'Putting the Ecological Modernisation Theory to the Test: The Promises and Performances of Urban Recycling', Pellow, Schnaiberg and Weinberg assert that recycling

development as represented by the Chicago case, represents a failure of policy, modernisation, and in fact, a failure of change. These claims can be summarised as follows:

- The recycling development process is: (1) a failure to change; (2) a failure of modernisation and therefore; (3) a failure of reform. Reality fails to validate the idea that ecological modernisation produces fundamental and irreversible change in a reformist direction.
- Recycling development represents, not ecological gains, but rather environmental losses. In Chicago, the 'blue bag' system was less ecologically sound than the forms of recycling, as represented by the community-based recycling system of the Resource Centre, that preceded it. The development of recycling is therefore not only a failure of modernisation, but a failure of ecologisation. EMT which would expect forward and progressive movement in the direction of improved environmental performance; the Chicago case shows just the opposite.

Overview of the Development of Modern Recycling in North America

The modernisation of North American waste management practice and institutions occurred between 1970 to 1996. We divide this into four periods:

- (1) the baseline period, in the era before earth day in 1970;
- (2) the pre-modern period, 1970 to 1980, a period in which the conditions for modernisation were put into place;
- (3) the transition period, 1980 to 1984–5–6,¹ a somewhat truncated period of simple modernisation; and
- (4) the modernisation period, 1984 to 1996, a period of reflexive modernisation and rapid social and technical change.

Beginning in about 1996, it is possible to look at the institutional and technical basis of urban waste management in North America and call it a modernised system.²

The Baseline Era Pre-1970, Parent Institutions to Modern Recycling

The entire recycling development process can perhaps be most elegantly characterised as a coming together of a number of parent institutions to form the modern waste management system. Prior to the onset of this process, these organisations would not have recognised that they had anything to do with each other; by the end of it, they mostly acknowledged that they could not do without each other.

Prior to 1970, the date of the first 'Earth Day', and, not coincidentally, the date of the passage of the Clean Water Act, there were two institutional forms of recycling in North America, one industrial – the scrap metal and paper recycling industry – and the other, from civil society, the volunteer civic association recycling drive.

These two forms of recycling formed two parts of the foundation on which the modernisation process was based. In the developments leading up to 1970, the activist impulse created a third type, the activist-community development recycling centre, of which the Resource Centre (founded in 1968) represents a typical form.

Other 'stones' in the foundation include urban cleansing departments and the urban waste sector on the one hand, and the institutions and organisations created by national environmental policy- and law-making, on the other.

The Pre-Modern Period, 1970–80, the Beginning of Simple Modernisation

We use the term 'simple modernisation', to refer to the primarily 'technocratic development path' [Mol and Sonnenfeld, 2000] that characterised the first line of responses to the growing perception of the pollution problems in the 1970s and 1980s. This period recalls Huber's definition of modernisation as follows:

Modernisation is a social process, which mainly relies on science (what is called nowadays science and technology), on market economy, on money and credit economy, on modern state building (or state administration), on modern law (public and private) and on an ethic of individualism. [Huber 1991b: 1].

Prior to 1980 the private scrap industry in North America consisted largely of three sub-branches: the ferrous metal processors, who focused on scrap automobiles and other iron and steel scrap; the non-ferrous or 'coloured metal' industry, which handled everything from molybdenum to gold; and the secondary or waste paper industry.

In the industrialising cities of the East and West coasts, and Great Lakes areas of North America, largely family-owned,³ low profile, high risk scrap yards, founded in the 1880s, were overwhelmingly in the hands of Italian, Eastern European or Ashkenazi Jewish families. Prior to 1980, most recyclable materials came from industries, from urban scavengers, and in relatively small quantities from civic organisations. The significant attribute of these recycling businesses is that they were completely isolated from the urban waste management system, although both had their origins with the rag-pickers and ash collectors of the 1890s [Melosi, 1981: 1–15].

Civic organisations included boy- and girl-scout troops, and garden

clubs which held an annual or semi-annual paper drive, a kind of social remnant of wartime metal or paper collections. Both of these types of organisations had social, rather than political goals and can be contrasted with 'activist' organisations discussed below. Importantly, for our analysis, the civic organisations were also free of any institutional or commercial connection to urban waste management as a business, an institution, or a form of governance. Their connection to the private recycling industry was episodic and unreflective and consisted of brief transactions for selling paper. Later in the pre-modern period, they began to make alliances with progressive public works directors or with the activist recycling centres.

The publication of Rachel Carson's *The Silent Spring*, and developments in environmental thinking, created the first Earth Day in 1970, a defining moment for the North American environmental movement. The public in the US responded rapidly and in force to this information (which reached the organs of government much later), directing its energy into environmental activist organisations, lobbying, citizen monitoring, and direct action. One important form of direct action, the community recycling centre, was distinguished from the scrap dealers and civic organisations in being new, non-traditional, and highly politicised, with a clear activist agenda seeking to create broad socio-political changes which challenged the dominant capitalist paradigm. The Chicago-based Resource Centre (cited by Pellow *et al.*) represented the typical combination of community activism and recycling that is also found in several widely dispersed organisations elsewhere in the US. Each of these was closely associated with an activist-founder.⁴

Pre-modern activist recycling organisations were the forerunners of eco-modernist developments in that they relied upon innovation to address the waste management crisis. They succeeded in changing the discourse about waste management to include more issues, and a different emphasis, and an acceptance of a mixed system as a solution, creating reflexivity where there had been none before. This is consistent with Hajer:

The strength of the eco-modernist story lines is that they bring to life a new way of seeing, with new constraints and new opportunities, that is then recognised and interpreted by various actors within the environmental domain, which leads subsequently to all sorts of adjustments in institutional practices ... [Hajer, 1995: 262].

Community recycling initiatives mostly matured around 1980, usually including: (1) depots where people could drop recyclables paper, aluminium cans and glass; (2) urban buy-back centres, buying recyclables for cash; (3) collection routes, collecting from households or businesses using vans or small trucks; and (4) some financial relationship with the municipality, such

as in-kind use of a premises and/or vehicles, some operating subsidy or grant, or a contract for certain kinds of services, such as public education programmes or information campaigns. As 'full-grown' programmes, they collected substantial volumes of recyclables on a regular basis, and then prepared and sold them to industrial end-user clients. The maturation of these programmes to professionalised collection and marketing entities marked what we will call the transitional phase of urban recycling.

The scrap industry viewed this post-Earth Day interest in recycling as dangerous interference in its private business, since better collection systems meant increases in supply of waste metals and paper, which threatened to depress prices. Scrap businesses straddle the boundary between the formal and informal commercial-industrial sector, and neither their environmental record, nor their health practices, nor their devotion to tax and zoning laws can bear very close scrutiny. They responded to these new developments with hostility and attempted to undermine development through price manipulation. However, beginning in the early 1980s, they joined and actively participated in stakeholder forums like the New Jersey Recycling Forum.

Together, these three pre-modern types of programmes were responsible for many of the innovations that came to be hallmarks of modern integrated recycling systems, and which support the claim that recycling development is in fact a case of ecological modernisation. The first mandatory recycling ordinances (i.e. local laws) in the US were passed by one of these programmes, and this represented an important legal and institutional innovation that further stimulated modernisation. Another experimented with differentiated fee systems at a landfill, and this work laid the basis for volume-based fees for waste collection. The Institute for Local Self-Reliance, in Washington, DC was responsible for some of the earliest community buy-back centres; Resource Integration Systems in Toronto made a major technical breakthrough when they pioneered the 'blue box' set-out containers.

From an EMT perspective, these are all examples of technical solutions playing a role in environmental problem solving. Second, all were social movements, reaching beyond lobbying to practical operations, many with an increasing economic stake in these operations. In all cases, the discourse changed relative to the role of recycling in waste management, towards integration into mainstream waste management, in a process of de- and re-institutionalisation:

After all, the success of ecological modernisation did not mean that the institutions of society suddenly collectively decided to take the very same ecological turn and are now marching together in the direction of a green society. It is much more appropriate to see the

significance of eco-modernist discourse as generating a process of de- and re-institutionalisation, of disembedding and re-embedding ... [Hajer 1995: 263].

Political Modernisation of Environmental Policy in the US

The 1970s saw a political modernisation of environmental policy at the national level which occurred in parallel with the largely localised process of innovating recycling. This influenced the development of recycling indirectly, but powerfully. The Clean Water Act of 1972, the Clean Air Act of 1972, and, later, the Resource Conservation and Recovery Act (RCRA, 1976) significantly changed the conditions surrounding waste management.

These developments reflected the early stages of the ecological modernisation of the US political systems:

The achievement of political modernisation requires the development of new relationships between state industry and state non-governmental actors, with a more decentralised, flexible, and consensus-oriented governance style. The emergence of economic and communicative approaches in environmental policy making is an indication of this changing role of the state and state policy. [Phung Thuy Phuong: 120].

These water and air protection laws contained provisions which allowed citizens to monitor and report emissions, to initiate legal action, to participate in public hearings, to serve on advisory committees, raising the status of citizens (and civil society and activist organisations) to active stakeholders in environmental planning and management processes. The term 'intervenor status' was taken up in laws on environmental impact analysis to describe the legal niche created for citizen-activists in this era [Enck, 1994, *personal communication*], amplifying the effect of the laws themselves. This fed the modernisation processes by legitimising the activist discourse and inviting activists into the policy making community, a process which also stimulated many activists either to shift to becoming professional insiders, or to take a more accommodationist stance [Mol 2000].

The Period of Transition, 1980–86, a Period of Simple Modernisation

The generation of laws passed in the early 1970s became operational only in the period 1980–86, after the states passed their own laws and developed regulations. These began to shift the boundary conditions surrounding municipal waste disposal and signalled the beginning of the period of transition.

Behind these laws was an increasing scientific appreciation of the difficulties with non-point source pollution (from landfills). Landfill

operators were pressured to install liners and leachate collection and treatment technology, or to close and shift to regional disposal. Regionalisation stimulated new institutional forms like multi-county authorities. But larger landfills increased political resistance to landfill siting, since now the 'host community' or 'abutters' would be next door to a large, fenced, noisy, landfill, presumed to be taking waste from a large area, not merely from their town.

The transition period created a crucible for change in the direction of simple, or technology-based, modernisation. If civic organisations, activist recyclers, and the scrap industry were inside the crucible, it was the political modernisation of environmental policy in North America which fuelled and fired it. The economic effect of the landfill crisis was the introduction of tipping fees, an example of the economisation of the environmental impulse to protect groundwater. Environmental protection measures, new transport requirements, and legal strategies to overcome resistance drove up costs and accelerated the internalising of the environmental externalities of disposal. Disposal, which had been municipal, informal, unpriced, and unnoticed, became highly organised, privatised or regional, very expensive, and the subject of intense political and economic dispute – in effect a classic eco-modernist discourse on the nature of economic and environmental realities. The rising cost of landfilling and the closing of local landfills drove increasing numbers of municipalities towards alternative approaches; stimulating the creation of modern recycling systems; and setting the stage for the large-scale (ecological) modernisation of waste management in the US and Canada.

The three pre-modern institutions, the civic organisations, the activist recyclers, and the scrap industry, entered the transition period as marginal actors, but emerged in the mid-1980s as central to the modernisation process. They had opportunities to see their ideas and goals taken up by the mainstream, to see their projects adequately funded, and to test the implementation of their ideas on a larger scale. They also saw clear threats: they could no longer remain simply activists, civic organisations, or scrap industry. The choice to stay the same simply did not exist any more, and any attempt to do so spelled marginalisation.

The scrap industry, for example, learned that resistance was not useful. In 1984, a representative of the American Paper Institute stood up at the National Recycling Congress in Ohio and told the audience that municipal paper recycling had to stop, because there was no capacity to take it, and 'none of the mills planned for construction in North America will take waste paper'. In 1990, Charles Post's MSc thesis [Post, 1990] was able to show that *all* of the planned capacity for new paper mills in North America was designed to take waste paper [Ibid.]. By 1990, it is fair to say that the *scrap*

industry in the US was dead, and in its place, the *recycling* industry was flourishing, yet another example of the shifting discourse.

The leadership of both the activist and the civic organisations were likewise confronted with a situation in which they had the choice to institutionalise their programmes and integrate them with the changing formal waste management system, or risk becoming marginalised. In ecological modernisation terms, they needed to emancipate themselves from the political or civic agendas of their founders, and integrate – EMT would say ‘re-imbed’ – into the prevailing urban service system. Those that did emerge changed, and in the process profoundly altered their host solid waste management systems. They became agents of ecological modernisation, and their aims – often explicitly articulated – were to change the way resources were used and materials were managed [Schall and Scheinberg, 1986]. Those which held to the principles of resistance isolated themselves from the modernisation process, and ended up at odds with it.

The Period of Modernisation and Integration, 1984⁵–96, a Period of Reflexive Modernisation

The year 1984 witnessed the passage of the first state-level recycling strategy, the New Jersey Recycling Act, ushering in the era of modern recycling. ‘Bottle Bills’ in New York and Massachusetts and recycling laws in California and Oregon were passed at around the same time. By 1984, Massachusetts had the first State Recycling Director and regional recycling strategy; by 1986, Rhode Island had passed the nation’s first ‘state-wide mandatory recycling law’.

The modernisation period was characterised by rapid technological innovation; by development of the institutions of recycling, and by the transformation and professionalisation of the existing recycling actors – the scrap industry, the activists, and the civic organisations, which together matured into a professionalised, integrated urban waste management sector. Kerbside recycling initiatives – a modernised approach to capture of materials – elevated participation rates from 15 per cent to 80 per cent, and achieved diversion rates (the percent of wastes diverted from disposal and directed to recycling) of 15 per cent and above.

This period shows many characteristics of reflexive modernisation [Giddens, 1994: 2–7] or ecological modernisation [Mol and Sonnenfeld, 2000]. Kerbside recycling fits the eco-modernist model of reflexive modernity by demanding of households that they engage reflexively with their own waste – related behaviour, avoiding habitual responses and choosing to comply with policies and programmes. Second, it uses an innovation and technology based approach to handle the technological waste problems, in a situation where a counter-productivity or de-

industrialisation stance would work on preventing or inhibiting consumption.

Recycling is seen as eco-modernist precisely because it undercuts the debate on lowering consumption or de-materialising society, showing that it is possible, through increased recycling activity, to de-couple the rate of consumption from the environmental effects of disposal and resource withdrawals. During the period described, consumption levels increased, and so did the rate of waste generation in the US and Canada [USEPA/Franklin Associates, 1994; 1996]. In this, recycling conforms to the view of ecological modernisation, in that it is generally optimistic, reformist rather than revolutionary, and that it prefers to use technology to mitigate the effects of technology on the environment [Mol and Sonnenfeld, 2000].

Ecological modernisation changed the relationship of local government to waste management and the private sector. Towns, cities and counties seeking to lower their reliance on landfilling adopted recycling ordinances, passed local laws, bought recycling vehicles, and instituted collection programmes.

The private sector innovated the development of divided collection vehicles, represented by the Eager Beaver trailer, LoDal recyclers, and LaBrie trucks, which were designed for separate collection of recyclables, or in some cases for integrated collection of recyclables and mixed waste. By the late 1980s, competition between several firms sharpened the market response to tenders for public procurements, and the technical developments created new institutional challenges. Municipalities with better collection systems had to work harder to sell materials to industrial recycling markets. This triggered another technical innovation – the Materials Recovery Facility, or MRF.

MRFs are small industrial facilities which take in mixed whole recyclables – glass containers, steel and aluminium cans ('tins'), newspaper, other kinds of paper, and, more recently, a wide variety of rigid and flexible plastics. On the US East Coast, two competing models for MRFs were developed and tested in the mid-1980s, one, in Groton, Connecticut (Resource Recycling Systems, RRS), working from the civic organisation side, and the other in Oxford, Massachusetts (Recycling Enterprises Inc.), working from the scrap industry side. Together, these technical approaches contributed to the rates of recovery, that is, the ability to meet the end-user industries' demand standards through producing materials of reliable quality.

New communication approaches, in combination with the set-out containers, were increasingly understood to be essential to achieving high rates of participation, that is, reliably increasing the numbers of households who follow the rules for recycling. Monitoring to meet legislative goals

required refined measuring instruments to characterise the waste stream and predict the amounts of recyclables that could be captured and recovered. It was in this era that the USEPA began to issue their publication, 'Characterization of Municipal Waste Management in the United States', working with Franklin Associates to track waste characterisation, composition, and recovery statistics.

A key public management innovation, consistent with EMT theory, was the municipal recycling co-ordinator, which brought young professionals into public works and public cleansing departments, where they could facilitate information exchange and act as insider change agents. Many recycling co-ordinators came into local government from the activist sector, shifting human resources from civil society into local government, also consistent with the changing role of activist organisations in a modernisation process [Mol, 2000]. The term 'municipal recycling co-ordinator' points to the shifting discourse: recycling was already an activity requiring co-ordination in the sphere of local governance. The function and role of the state were changing – only here, this means local government, since the Federal government is not the relevant authority.

This period was one of unprecedented consultation, a rapidly changing discourse on recycling and municipal waste management, and the formation of remarkable alliances between activists, government and industry. Under the leadership of Garden State Paper's CEO, Fred Schmidt, the New Jersey Recycling Forum represented one of the earliest attempts to create a stakeholders' forum, bringing together recycling activists, civic recyclers, leaders from the paper, glass, and metal industry, waste collection companies, municipalities, and state regulators. The National Recycling Coalition held its first National Congress in 1982. These platforms provided a forum for the new discourse about recycling as a discipline, as a form of public-private co-operation, and as an activity of government. In these meetings, a whole new terminology of recycling emerged, was discussed, and finally became institutionalised in publications, reports, and articles in *Resource Recycling* and *Biocycle*. Integrated solid waste management, a new discipline with a new name, a new jargon, and an almost unrecognisably changed discourse, replaced urban cleansing as the umbrella for solid waste activities.

This 'modernised' integrated solid waste management (ISWM) paradigm had by 1996 largely stabilised in North America, although this approach was (and remains) unevenly distributed, being concentrated in the highly populated and urbanised Northeast states, on the West coast (and in Ontario and British Columbia in Canada), across the industrialised Northern mid-west (Canadian provinces of Manitoba and Alberta); but present only in progressive pockets in the largely agricultural states of the central mid-

west, deep South, and South-western US (and the Canadian Maritimes and Saskatchewan). Thus, it is possible to speak of trends that affected most of the major population and urbanisation centres of the US (and Canada), but not all states in equal measure [Brewer 2002, *personal communication*].

Epilogue: Developments Since 1996: a Case of Anomie?

Before closing the discussion of the modernisation period, it is perhaps useful to mention what has happened in the intervening years [*ibid.*] While recycling remains widespread and institutionalised, it has in effect become re-integrated into the overall economic system. In particular, decisions made in response to recycling development in the steel and paper industries in North America are now being modified in response to the influence of globalisation, threatening some of the ecological gains [Kinsella, 2002, *personal communication*]. The integration of recycling into the more general economy has also resulted in a spate of mergers and acquisitions, in the course of which some of the landmark innovations have been submerged into larger commercial strategies. While these are consistent with the 'economisation of ecology', they may seem to be motion in reverse. As a result, Chicago (presented by Pellow *et al.* as the proof that recycling failed) is among several large cities where integrated municipal waste management has failed. Weinberg [1998] provides a useful framework for seeing these as characteristics of the process of maturation of change:

The tension between growing and staying green is a good point for analysis, because it captures struggles over anomie [Durkheim, 1951] ... how people come to act when the normal means of achieving accepted goals conflict with reality. This is precisely the tension driving green businesses [and the recycling sector]. The accepted ecological goals of the green business community inevitably conflict with the social reality of achieving growth in a market system. Firms are trying to meet a goal (of being green) with a means (of economic growth) that is not well suited to realising that goal [Weinberg 1998: 242–3].

The Environmental Effects of Modernisation

This section looks at seven indicators of change, which are chosen to illustrate the breadth, depth, nature, and irreversibility of change. The first two, tons recycled and numbers of kerbside recycling programmes, are used by Pellow *et al.* in their paper. The number of MRFs is an indication of depth of change, since these are major pieces of urban infrastructure. The number of materials targeted by recycling programmes is an indicator of breadth, as it shows that the recycling development process, has continued to innovate and expand its reach.

Participation and diversion rates are indicators of effectiveness, and relate to resource impacts of recycling and, ultimately, to ecological gains. The growth of pay-as-you-throw payment systems is an indicator showing degree of re-embedding or integration of recycling into the host waste management system, as well as a measure of the integration of ecological change into the economic system.

Tons Recycled

Table 1 interprets statistics offered by Pellow *et al.* about tons recycled [Pellow *et al.* 1997: 115–6].

TABLE 1
MATERIALS RECYCLED, INCINERATED AND LANDFILLED FROM THE
MUNICIPAL SOLID WASTE STREAM IN THE US (IN THOUSANDS OF TONS) AND
PERCENTAGE TOTAL GENERATION 1960–96
(after Pellow, Schnaiberg and Weinberg [1997: 115–16])

	1960	1970	Year 1980	1990	1996
Recycled (1,000 tons) per cent	5,610 (6.4%)	8,020 (6.6%)	14,520 (9.6%)	29,650 (15%)	46,610 (21.9%)
Incinerated (1,000 tons) per cent	27,000 (30.6%)	25,100 (20.7%)	13,700 (9%)	31,900 (16.2%)	36,090 (17.2%)
Landfilled (1,000 tons) per cent	55,510 (63%)	87,940 (72.6%)	123,420 (81.4%)	131,550 (66.7%)	116,240 (55.4%)
Modernisation period	pre-modern	pre-modern	transition	modern	modern

Source: Franklin Associates Ltd as quoted in Pellow *et al.* 1997.

Prior to 1980, recycling by the civic and scrap sectors captured a small but consistent percentage of the waste. The rise to nearly 10 per cent in 1980 reflects the incremental effects of the entry of the post-Earth Day activist organisations.

The impact of the early municipally sponsored recycling systems begins to show its effect in the 1990 figures, and by 1996 has exceeded 20 per cent.

Number of Kerbside Recycling Programmes in the US

By 1996, there were 8,817 municipal recycling kerbside collection programmes, as opposed to 2,700 in 1980 [Pellow *et al.*, Table 2], representing the impacts of a basic a change in the system of waste management to include recycling.

Number of Materials Recovery Facilities (MRFs)

Berenyi [1999] shows that the overall number of materials recovery

facilities (MRFs) – capital facilities which indicate a change in investment patterns – grew from 104 in 1991 to 468 by the beginning of 1999, without counting the ‘dirty MRFs’ or mixed waste processing facilities. The percentage of these ‘dirty MRFs’ has remained *at 14 per cent of total, or 66 facilities nationwide [Berenyi, 1999: 12]*.

Materials Targeted

According to Folz [1998], the number of materials targeted for recycling also increased. In 1989, relatively early in the modernisation period, most programmes collected newspaper, aluminium, and glass bottles. By 1999, when modernisation had fully matured, as Table 2 shows, each of the listed materials was included in at least 60 per cent of recycling programmes [Folz, 1998: 28].

TABLE 2
MATERIALS INCLUDED IN PERCENTAGE OF US RECYCLING PROGRAMMES
(after Folz [1998])

Material	percent of programmes including this material in 1989	percent of programmes including this material in 1996
	%	%
Newspaper	97	99
Aluminium	97	99
Glass bottles	94	98
Tin/other metals	46	92
Old corrugated containers	58	90
Plastics	64	83
High-grade paper	41	78
Mixed paper	30	75
Yard and garden wastes	50	66
Used crankcase oil	44	61

Source: David Folz, 1998.

Significantly, this suggests that the industrial recycling infrastructure was changing since, in order for these materials to be collected, there had to be markets for them.

Participation and Diversion Rates

The participation rate is the percentage of total households which participate in recycling – that is, which separate the designated materials and set them out for separate collection. According to Folz [*ibid.*], the mean participation rate for the 158 cities in 25 states in his survey was 54 per cent in 1989 and 73 per cent in 1996. This means that changing the collection system in the cities surveyed had successfully modified the behaviour in the target populations.

The diversion rate is the percentage of total waste generated which has been diverted from disposal and directed to recycling. Changes in diversion rate represent effects that are felt in the modes of provision [*Spaargaren and van Vliet, 2000*], that is, the formal system provided by the municipality to serve households. When this diversion reaches the point where the waste disposal routes can be consolidated and re-oriented because of the shrinking volumes, the change has been felt in the mode of production [*ibid.*]. The diversion rate in 1989 was 16 per cent in the 25 states and had more than doubled, to 33 per cent, by 1996. Both of these rates are indicators that recycling is far more than window dressing, and has significantly changed the management of waste materials.

Solid Waste Payment and Fee Systems

Variable rates, or pay-as-you-throw fee systems,⁶ are used when a municipality wants to support or institutionalise a shift of emphasis from mixed waste collection and disposal to separate collection and recycling. A waste fee is charged for the mixed waste, and collection of source separated recyclables is usually free of charge. Variable rate programmes are one of the best indicators of the integration of recycling into mainstream solid waste management, or its emancipation from its activist political origins on the one hand, and its civic or scrap industry forebears on the other, and its re-embedding in an integrated waste management system. They are also consistent with what Ecological Modernisation Theory (EMT) labels 'the economisation (sic) of ecology and the ecologisation (sic) of the economy' [*Mol, 1995*].

The first variable rate systems were introduced in the Pacific Northwest in the early 1980s. By 1997, Skumatz, Truitt and Green [*1997*] report a total of 4,400 communities in the US and Canada with variable rate programmes, and a growth rate calculated at 10 per cent per year [*Skumatz et al. 1997: 31–2*]. The state of Illinois, where Chicago is located, had 132 municipalities with variable rate programmes in 1996 [*ibid.*: 32].

An EMT Analysis of Recycling Development in North America

Ecological Modernisation and Environmentally Driven Change

For a summary of EMT as a theory of change, we quote at length Mol and Sonnenfeld [*2000: 6–7*] for the following six characteristics of ecological modernisation:

1. 'Changing role of science and technology, ... [which come to be] valued for their role in curing or preventing [environmental problems]. ...

Traditional curative and repair options are replaced by preventative socio-technical approaches incorporating environmental considerations from the design stage ... Six specific socio-technical approaches, generally innovated between 1984 and 1986, can be identified in the development of recycling:

- (a) refinements and improvements in processing (MRF) technology, mostly initiated by the recycling industry;
 - (b) development of new separate collection vehicles, initiated mostly by local experts working with private collectors;
 - (c) development of the new technology of household separation, a joint project of the activists, the local experts, and the municipalities;
 - (d) refinement of the legal instruments, including landfill bans and recycling ordinances;
 - (e) refinement of the whole area of municipal composting, especially turning machines, initiated by municipalities; and
 - (f) development of new marketing arrangements and forms, a joint effort of municipalities, the recycling industry, and the stakeholders' forums like the New Jersey Recycling Forum.
2. 'Increasing importance of market dynamics and economic agents ... as carriers of ecological reform (in addition to the more conventional categories of state agencies and new social movements that prevail in almost all social theories of the environment)'.

Beginning already in 1984, state policy makers, and their municipalities, realised that they could not collect materials if there were no markets. One of the motivations behind the formation of key stakeholder platforms – the National Recycling Coalition (NRC), the New Jersey Recycling Forum, the Northeast Recycling Council (NERC), to name just a few – was the perceived need to open a dialogue between public and private sector over the demand for recyclable materials. Many recycling markets experienced, and responded to, policy pressure to change their practices to support public sector recycling initiatives.

Recycling became 'emancipated' from the market Mol [1995], during the period 1980–86 to the extent that it became an activity having a logic and expertise of its own: it distanced itself from its activist and political origins, and integrated with municipal waste systems. The state laws passed in the period 1984–88 acknowledged this emancipation through numerical recycling goals and recycling requirements which were valid in their own terms, not in relation to the economy or environment. The discourse recognised this emancipation by labelling a body of technical knowledge as 'municipal recycling'; this coincides with the early modernisation period,

and the most important innovations: divided collection vehicles, 'blue box' set-out containers, state recycling laws, and MRFs.

After 1988, recycling increasingly 're-embedded' [*Mol 1995: 29–30*] into the larger socio-technical sphere of integrated waste management, a term that was coined to describe the results of this re-integration, and the related evolution in the host urban waste management system. In this process in both the host system and the innovations themselves are changed:

To restore the balance between nature and modern society a kind of 're-embedding' should take place ... But modern social relations and practices cannot be re-embedded in traditional and local structures and contexts ... [EMT] states that re-embedding contemporary economic practices with the aim of respecting ecological limits cannot be a reversal of the historical disembedding process. Contemporary economic practices are firmly rooted in modernity, characterised by a high level of time-space *distanciation* and a relatively independent economic rationality and connected with modern scientific-technical and state institutions. ... Consequently the ecological modernisation theory only sees possibilities for – and contributes to – a process of a 're-embedding' of economic practices – in view of their ecological dimension – *within* the institutions of modernity. [*Mol 1995* (emphasis in the original)].

Re-integration on the public sector side took the form of long-term alterations in local governance and city cleansing practice, stimulated and supported by changes in state law and enforcement of, and high profile attention to, state recycling goals, by the return of cost-benefit criteria to solid waste decision making, and by corporation mergers and acquisitions, so that entrepreneurial firms end up as part of the larger firms which today dominate the field [*Berenyi, 1999*].

3. 'Transformations in the role of the nation state ... more opportunities for non-state actors to assume traditional administrative, regulatory, managerial, corporate, and mediating functions...'

In the US and Canada, these shifts took a different form than in the Northern European model. The policy, legal and institutional role attributed by EMT to the nation state in was largely assigned to states and provinces, whose roles changed after 1984. New Jersey, California and Oregon transformed their roles dramatically in this period, passing legislation and taking significant control of the process of disposal of waste. Cities and towns relinquished their role in providing disposal, giving this authority to counties, multi-region authorities, or in some cases to the private sector,

while at the same time assuming new enforcement functions. Municipalities took on roles in relation to the collection and marketing of recyclables which had, prior to 1980, been the exclusive charge of the private recycling sector. The private recycling sector also began to take on roles in relation to collection and processing of recyclables which had previously not existed. The new stakeholder platforms and a growing cadre of recycling professionals took on new mediating and information functions. In all of this shifting, there were a wide variety of institutional and legal innovations, which, as a body, combined to support recycling and increase its viability.

4. 'Modifications in the position, role, and ideology of social movements, [which become] involved in public and private decision making institutions regarding environmental reforms, in contrast to having [previously] been limited to the periphery...'

The activist organisations retained their role as advocates, but increased their legitimacy and access, and by 1990 were insiders and collaborators in the making of local, national and state policy. Some community recycling organisations moved to new economic and operations niches, professionalising their recycling operations and becoming community-based businesses. Others retained their social mission, combining it where possible with practical activities. A few simply refused to change, and became marginalised, losing their niches to other organisations or the private sector.

5. 'Changing discursive practices and emerging new ideologies [in which the formerly radical positions are broadly accepted as legitimate, that is, a shift of the centre].' [*Mol and Sonnenfeld, 2000: 6–7* (emphasis in the original).]

One change in discursive practices was signalled by the rise of the city or county or provincial 'Recycling Plan' or the 'Integrated Solid Waste Plan'. The simple fact that, after 1986, it became possible to speak of – and to hire consultants to prepare – a 'recycling plan' indicates how rapidly the discourse around recycling changed. The idea of 'integrated solid waste management' represented a key new ideology that emerged around 1988, marking the point at which the discourse had already shifted to define solid waste management as an entire system including recycling, composting, public education, fee structures, and the like.

In recycling development, there was a period of increased reflexivity, in which the discourse itself came to rely on a high level of engagement; this ushered in a period in which technical innovation or hyper-modernisation

was applied in the effort to transform the waste and packaging problem, which is seen as a product of modernisation. This corresponds nicely to Giddens' interpretation of *reflexivity* as meaning the end of tradition [Giddens, 1994: 6].

Reference to Buttel [2000] strengthens the case that the development of recycling is typical of a process of reflexive modernisation:

... most sociological proponents of ecological modernisation strongly concur with the ... constituent notions of reflexive modernisation: ...the solutions to environmental problems will lie in a progressive modernisation of societies (rather than the de-modernisation or counter modernisation that is advocated within radical environmentalism). [Buttel, 2000: 29.]

The introduction and dissemination of recycling can be seen as discourse-intensive initiatives, where stakeholders relied on disrupting habitual patterns of thinking (a characteristic of reflexivity) to trigger the discursive attention of households and businesses. Public communication differs from the discourse and rhetoric of environmental activism, in that it stimulates households and individuals to adjust their behaviour to be compatible with the new technical innovations. This contrasts with environmental activism (following Pellow *et al.*, and others) a de-industrialisation or counter-productivity political impulse, which asks people to consume fewer products and less packaging, in effect, to de-modernise. Thus, although many integrated waste management programmes come to the point of convincing consumers to purchase less, recycling professionals focused consistently on new technological and institutional 'end of life' strategies to minimise disposal. Giving households a set-out container is nothing like telling them not to consume. Recycling seen this way follows core eco-modernist concepts, finding solutions to the problems of modernisation in yet more innovation and modernisation.

EMT and the Locus and Nature of Change

EMT's European theoreticians relate eco-modernist trends to the change in relations between industry and the nation state, but this does not work in the North American case. Christoff [1996] finds the focus of EMT on the nation state also too narrow, although he focuses 'up' to its failure to look at international institutions; in North America, this failure is 'down' from the level of the nation state to that of state, province, county and municipality.

... Given this predominantly nation statist view of EM, discussion of the emergent international institutions for environmental regulation and protection, and of environmental trends, remains underdeveloped where it occurs in the EM literature [Christoff 1996: 487].

Eco-modernist theories suggest that political modernisation at the level of the nation state might have – in Europe – resulted in the nation state relinquishing its management role, and instead working on the boundary conditions. But federal governments in the US and Canada already worked on boundary conditions, and did not have responsibility for operational functions at all. The EMT analyst in North America thus needs to seek his or her evidence for changes in governance at the level of the state or province and below, and indeed, to develop a theoretical perspective on how to ‘see’ this type of institutional change in the North American context.

Typical of the North American version of EMT’s changing state–industrial relations was the large-scale exit of local authorities from managing landfills. Municipalities simply chose to give up the disposal business, first closing landfills, then privatising collection. Under many of the new state solid waste laws, counties were newly required to take increased responsibility for planning and siting of disposal facilities, becoming a third stakeholder on the waste management scene. Private waste management companies, which were interested in developing private landfills or incinerators, could achieve the larger economies of scale of the new landfills through privatised regionalisation, thus implicating new market actors.

EMT could also benefit from seeking aggregate, rather than individual case-based, evidence of changing regulatory and legal environments. The fact that recycling in Chicago failed (or that Berkeley went much further than other cities) influences but does not change the overall trend towards modernisation of solid waste systems; it only shows that there can be special cases. Documentary evidence cited above shows collective and aggregated changes in the practice and norms of municipalities in relation to solid waste management over the period 1980–96: numbers of recycling programmes; tons recycled; cities with variable rate systems; and states in this period with recycling targets of 25 per cent and above [*Post*, 1990]. While the details of ground breaking experimentation, action and, in some cases, deliberate inaction are technically interesting, the overall trends do more to show how municipal waste management was changing, and it is these trends that provide the evidence of an eco-modernist process. The extent of the change cannot really be captured by case studies of large cities like Seattle or San Francisco (or Chicago), because each individual case was the product of its own particular history, and also because the largest cities were often the most deviant examples.

In a country as large and diverse as the US or Canada (or Russia or China or Brazil or India), this is an especially important point for EMT. When the USEPA or other institutions measure the effects of change, they do it by aggregating tonnages, or counting MRFs and variable rate programs, or

surveying municipalities or waste collection companies. It is the aggregation of all the small- and medium-scale efforts that gives the picture of ecological modernisation North American style. The locus of change is the municipality, and the evidence is dispersed. Thus the evidence gathering for changes associated with ecological modernisation is fundamentally a different project in North America (or in other large countries) than it is in the relatively smaller, more homogeneous nation states of Northern Europe, something which EMT would do well to acknowledge.

Epilogue: Recycling in North America and the Claims of Pellow, Schnaiberg, and Weinberg

Pellow *et al* offer three fundamental critiques to EMT, based on this history. In this paper, we focus on critiques 1 and 2, which relate more to the case of recycling. We leave aside critique 3, whose focus is that recycling had negative social consequences, and that a modernisation theory which does not 'incorporate issues of social equity and political-economic power' [111] is not an adequate social theory, as falling outside the scope of this essay. Moreover, Mol and Sonnenfeld [2000: 6–8], state that a response to this critique has been incorporated in the more recent formulations of ecological modernisation.

Critique 1

There is no compelling evidence that the ecological sphere has been emancipated from the economic sphere in decision-making criteria. In this case, it appears that prior social and ecological spheres have been suppressed under a narrow economic agenda. We note the robust character of capitalism has shaped [sic] the modernising recycling industry in at least two respects: (1) the ability of market criteria to dominate the agenda, even in the face of strong public support for ecological protection, and (2) the inability of ecological interests to penetrate the organisational logics [sic] even when market opportunities exist. [Pellow *et al.* 1997: 125.]

According to the authors, critique 1 asserts a failure of modernisation, since market criteria emerged as dominant in the field of urban waste management in Chicago. The main response to critique number 1 is that Pellow and his fellow authors have the phasing wrong in their analysis: the reintroduction of economic criteria occur in Chicago at precisely the moment that EMT would suggest that re-integration should occur.

EMT suggests that re-integration of the ecological domain into the larger economy – already well under way by 1990 – can be expected to re-

subordinate processes to economic criteria of the dominant system. In Chicago, once the ecological modernisation process was mature, market criteria re-intervened in the process, just at the point where one would expect a process of re-integration, an ecologisation of the economy and an economisation of the environment.

The historical record does not accord with critique 1, but suggests, in contrast, that an important process of ecological modernisation did take place.

Critique 2

Critique 2 claims not a failure of modernisation, but a failure of ecologisation; that is, that the modernisation processes failed to solve the environmental problems or to solve them in any significant way:

The modernisation of recycling appears to lead only minimally to a very narrow set of ecological gains. Many reviewers of our work have commented that, despite our critique, there *are* ecological gains none the less associated with municipal recycling practices, like Waste Management's blue bag. This is true, but such gains are minimal. [*ibid.*: 127, *emphasis in the original*].

Resource conservation is not the only – or perhaps even the major – potential source of ecological gain. Critique 2 can be challenged in two principal areas: ecological (largely, but not completely resource) gains in the recycling process, and ecological and efficiency (not especially resource) gains in the environmental performance of municipal waste management systems

Gains in relation to the environmental effects of the use of recycled materials occur predominantly in savings of energy, and secondarily in savings of materials. Secondary manufacturing processes use far less energy than those using primary (virgin) materials. In the case of glass, for example, the energy use in container manufacturing is 90 per cent less when using secondary cullet (New Jersey Recycling Act publicity materials, 1985–88). Reduced energy use is also characteristic of the use of ferrous scrap as compared to virgin ores; of secondary fibre in comparison to trees; and of secondary textile fibre compared to virgin wool or cotton. There are also energy gains from separate collection of yard waste and other compostables when the rest of the non-compostable waste goes to an incinerator, since the rest-fraction burns better and makes more energy if the compostables, which have a high moisture content, are no longer present.

Second, many manufacturing processes based on secondary production can use cleaner production technologies than those using primary resources. Paper mills using secondary fibre avoid chemically intense and hazardous use of corrosive black liquors and chlorine bleaches, some of the heaviest

environmental pollutants from paper making. And there is an important doppler effect: any policy stimulus to use more secondary materials also triggers discursive attention in manufacturing enterprises, so that they may identify additional gains (and savings) as a result of altering their systems.

The modernisation process triggers cumulative changes in the investment and resource use patterns of industry to more efficient, more ecological processes based on primary use of secondary, not primary, resources. The American paper industry's investment strategy shifted from wood-based mills to recycling mills between 1984 and 1990, due largely to the large and reliable supply of secondary fibre that was being made available from new municipal recycling initiatives [*Post, 1990*]. The steel industry shifted to more energy-efficient mini-mills in the same period (Michael Simpson, personal communication). The environmental impacts of recycling need to be evaluated here, where the host industrial system modifies its fundamental relation to resource withdrawals.

On the solid waste management side, recycling system development offers additional small gains in energy efficiency and pollution avoidance. The introduction or expansion of separate collection programmes often provides municipalities with a reflexive opportunity to optimise their routing and capture efficiency and scale gains, which can contribute to rationalised routing of all forms of waste collection in the system. Such gains reduce energy and decrease vehicle deterioration.

Moreover, separate collection routes usually go to a MRF or composting site located in the city centre, or in a nearby industrial zone, rather than to the landfill or incinerator which are further away. There are thus energy gains in transport as well.

Conclusions

First, the development of recycling is sufficiently consistent with the context, framework, and descriptive predictions of ecological modernisation theory to be characterised as a process of ecological modernisation. The general direction of change, the phasing, and the practical experiences provide strong empirical support for EMT's theoretical claims.

Second, while the changes appear solidly institutionalised and therefore irreversible, there is still some dynamism in the system. The 'proof of the pudding' is not in the emancipation of recycling, but rather in its re-integration. If changes are ephemeral, they simply disappear, and re-integration is not necessary. The fact that re-integration occurs suggests strong validation of the claim for change.

Third, we can conclude that specific indicators of change and benchmarks for identifying new situations differ between EMT's 'cradle' in North-western Europe and other *loci* of change. In the North American context it is not industry–nation state relationships that are changed, but the relationships between industry and *government*, which, in the US context, means state, county and local government.

NOTES

1. While certain events as early as 1984 (discussed below) ushered in the period of modernisation, the characteristics of the modernised waste management did not become fully clear until around 1986.
2. The author of this paper participated in the development of recycling as a technical and policy consultant and practitioner between 1979 and 1992, when she left the US. She participated in many of the developments presented here as a protagonist. Sections which are not footnoted reflect this direct experience.
3. Family ownership was a defence against employee theft. By their very nature, scrap businesses have an undefined, and indefinable, inventory which is vulnerable to theft. Theft within the family is at least minimised (Jack Levin, personal communication, 1984).
4. For example: Michael Anderson's Santa Rosa (California) Garbage Reincarnation, Nancy Wolf's New York City Environmental Action Coalition, Dan Knapp and Mary Lou van Deventer's Berkeley Urban Ore, Neil Seldman's Washington DC Institute for Local Self-Reliance, Pete Grogan's Boulder Colorado Ecocycle; Derek Stephenson's Resource Integration Systems (RIS) in Toronto, and David Muchnick's Bronx 2000/R2B2 in the Bronx (New York City). There were in fact other organisations in other states, probably as many as 25. This list is just a sample, but it shows the dispersion of these developments to East-Coast, West-Coast and Midwestern organisations, those from large urban and medium-sized rural municipalities, as well as at least one in Canada.
5. There was a certain overlap between the end of the transition period, around 1986 (and even later in some places), and the beginning of the modernisation period, which began in 1984, with the passage of both the New Jersey Recycling Act and the Oregon Recycling Opportunity Act.
6. In urban areas, variable rate programmes usually assess a fee per waste can, per bag, or per some other measure. Residents buy a sticker or tag and have to identify their own waste. Waste which is not stickered or in a pre-labelled container is left behind. In rural areas, variable rates are often associated with weighing the waste, although some rural transfer stations also use a truck volume or bag/tag system.

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