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Movements, mobilities and the politics of hazardous waste

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Global flows of hazardous waste and waste management technologies are major sources of environmental contestation. They reflect political structures and struggles within, and between, developed and less developed countries. The ‘new mobilities paradigm’ is tested using two cases of protest in Malaysia and East Germany. Focusing on the conjunctures of various (im)mobilities, the ways in which political circumstances combine with the materialities of wastes and technologies are shown to affect the trajectories and outcomes of environmental protest. This challenges assumptions that mobilities of objects, people and ideas inevitably undermine governmentality. While the merits of ‘mobilities’ as a lens for inquiry are acknowledged, greater attention should be paid to the politics of (im)mobilisations.

Keywords: mobilities; authoritarian regimes; hazardous waste; Malaysia; Germany

Introduction

We consider the mobilisation of technology, capital and waste in the context of waste infrastructure development in Malaysia and East Germany and examine people’s responses to the arrival of technologies and wastes in their localities. Contrasting the relative mobilities of things with the relative immobilities of people and place, we will specify particular conjunctures of (im)mobilities that constitute key sites of environmental contestation. We draw upon the ‘new mobilities paradigm’ (e.g. Urry 2000, 2007, Cresswell 2006) and show its relevance to the study of environmental protest, but also problematise, extend and politicise its current scope. Our analysis of environmental contestation centres on the complex interactions between the specific materialities of waste and socio-cultural and political changes.

The mobilities paradigm raises questions about ‘too little movement for some or too much for others or of the wrong sort or at the wrong time’ (Urry 2007, p. 6). According to Urry (2007, p. 11), ‘analysing ... mobilities involves

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examining many consequences for different people and places that can [be] said to be in the fast and slow lanes of social life. There is a proliferation of places, technologies and “gates” that enhance the mobilities of some and reinforce the immobilities of others’. Laws and state policies regulating hazardous waste might be considered an example of such ‘gates’ which both enable and constrain the movement of waste. At the same time, these mobilities act as catalysts for collective responses when mobile waste and waste technologies arrive in particular localities.

While the focus on mobilities offers significant opportunities to re-think the politics of waste, more emphasis should be placed on (im)mobility, (in)equality and (im)mobilisation and their inherently political and contested nature. The substantive approach pursued here treats mobilities as a novel analytical perspective which complements existing work on social movements rather than a new paradigm. It asks what *kinds of (im)mobilities* are involved in environmental contestation and protest. Our examination of ‘negative mobilities’ centres on the particular nature of hazardous wastes and the impossibility of their disposal. Their impact on people and places raises political and ethical questions about the distribution of environmental burdens and consequences when mobile wastes are immobilised. A politicisation of the mobilities paradigm follows necessarily from such an analysis of the material dimensions of mobilities and their social consequences.

The two historic cases – Morsleben in East Germany and Bukit Nenas in Malaysia – draw attention to the limits of the ‘new mobilities paradigm’ by highlighting East–West and South–North flows. This opens up a ‘view from the slow lane’ of local environmental protest and its national and global connections and moves the analysis beyond a Western or Eurocentric focus. The case studies illustrate how structural transformations such as German unification and ‘Asian Tiger’ economic growth changed the economic and political landscape of these countries and profoundly affected the structures of environmental contestation.

In what follows, we will focus on the complexities surrounding community mobilisation in opposition to hazardous waste management facilities. An initial discussion of the merits and limitations of the ‘new mobilities paradigm’ for the analysis of environmental contestation in section two will be followed by an in-depth exploration of our two cases. In section five we compare and contrast mobilities and (im)mobilisations in the two cases. In conclusion we will argue for a greater emphasis on the materialities and politics affecting interdependent mobilities in social scientific investigations of environmental protest and green political movements.

Merits and limitations of the ‘new mobilities paradigm’

Material and virtual mobilities – global flows of people, goods and information – are transforming the subject matter of (Western) sociology, that is, societies as territorially defined nation-states which effectively regulate these

flows. For example, strategies deployed by individual nation-states for (not) dealing with waste materials result in the global circulation of materials, money and disposal technologies (e.g. shipping hazardous waste or transferring environmental technologies to poorer regions). However, these flows end somewhere, presenting examples of *problematic immobility* that both reflect and reproduce global patterns of social and environmental injustice. What is driving the movement of technology and where does the waste stop? How does it become embodied in those communities that are the recipients of waste and waste management technologies? What kinds of community mobilisation arise in response, and what kinds of material and political limits are placed on these responses? Finally, to what extent can the 'new mobilities paradigm' capture these (im)mobilities and the ways that they are shaped by power, coercion and consent?

Urry (2007, p. 9) uses metaphors of mobility as the vehicle for developing a 'sociology beyond societies'. His conceptual response to an increasingly globalised world is to focus on movement, mobility and contingency and attempts to move social theorising beyond stasis, structure and social order. Urry (2000, p. 1 ff.) advances a 'new paradigm' for sociology based on the idea of 'diverse mobilities of peoples, objects, images, information and *wastes*'; and of complex interdependencies between, and social consequences of, these diverse mobilities' (emphasis added).

In contrast, Bauman (2004, p. 69) also uses the notion of 'waste' as a powerful metaphor, but for 'human waste ... or wasted humans', describing the irreducible segment of human society that can be neither accommodated nor moved: the human casualties of globalisation. In the past, power differentials between modernised and underdeveloped regions functioned as a 'safety valve', protecting the modernising regions by using the rest of the planet as a dumping ground for their toxic waste. Globalisation has blurred the division between centre and periphery as 'the global spread of the modern way of life has now reached the furthest limits of the planet' (Bauman 2004, p. 69). Bauman's (2004, p. 5) assertion that '[t]he planet is full' is thus not a *technical* statement, but a *sociological and political* one about the human costs of globalisation and the inevitability of contestation. Here we illustrate Bauman's analysis of the human costs, by focusing on hazardous wastes which pose particular dangers to human bodies.

Urry (2000, 2007) highlights the de-politicising consequences of globalisation's new mobilities. He suggests that social governmentality, that is, *politics*, is undermined by mobilities of objects, bodies, representations, virtual technologies and information flows (Urry 2007, p. 47). His 'new mobilities paradigm' emphasises the centrality of movement, travel and communication. His interest in the imaginative and virtual realms downplays concrete and embodied materialities as a source of contention. We use examples of hazardous waste management and protest from Malaysia and East Germany to show that politics is both *source* and *product* of concrete (im)mobilities. Politics, like waste, can be mobilised or displaced, but does not go away. This

confirms Rootes' (2007, p. 722) contention that local campaigns 'serve as reminders ... that environmental issues have not been quietly absorbed by bureaucratic administration and representative democratic politics but remain as matters of fundamental contention'. This clearly challenges the view that political structures matter much less in an increasingly mobile world. The western liberal assumptions of the mobilities paradigm are therefore undermined as we reframe the mobilities of environmental goods and bads as problems of contestation. Urry's (2007, p. 47) five interdependent mobilities thus not only produce and shape social life, they also are intrinsically political.

Reconstructing the social as mobility provides a useful entry point to the study of waste and its contestation. Our cases show that rapid changes to material realities as well as political structures can serve to either fuel or demobilise political action and protest, sometimes in unpredictable ways. The mobilities perspective highlights the processual and contingent character of politics which contrasts with the depiction, in social movements literature, of collective mobilisation as a derivative of fixed political structures. We concur with Rootes (1997) that many aspects of political context can be relatively unstable and contingent (see also Rucht 1990). Mobilities of people and technologies may drive the emergence of new structures of collective action, as is exemplified by NGO activity in Malaysia and East Germany. Our two examples of (semi) authoritarian states show that political structures may *immobilise* civil society through surveillance, restrictions on movement and civil liberties (compare Foweraker 1997). However, even these immobilities are subject to change, as their effects can rebound on society and the political system, leading to significant transformation.

We illustrate and expand the mobilities analysis by focusing on trans-boundary and global trade in hazardous waste. While the 'new mobilities paradigm' tends to privilege the transcendence of territory and spatial boundaries, the politics of mobilisation highlights the importance of material reality, locality and nationality, even in the context of globalisation. Disputes over the (un)just (im)mobilisation of hazardous waste exemplify the persistence of local protests in the face of transnational waste flows and the growing regulation, bureaucratisation and eco-modernisation of waste disposal. The cases presented in the following sections of this paper – the Bukit Nenas hazardous waste facility in Malaysia and the Morsleben nuclear waste repository in East Germany – illustrate these limits to 'problem displacement'. They also emphasise the importance of the particularities of place, culture and identity in the mobilisation of local resistance to hazardous waste disposal facilities.

Hazardous waste, community mobilisation and economic growth in Malaysia

The generation and treatment of hazardous waste are contentious issues that form key focal points for the global environmental justice movement, especially when wastes and technologies are seen to flow in one

direction – from developed countries in the ‘North’ to less developed ones in the ‘South’. Hazardous waste incineration has played a key role in both transnational environmental mobilisation and local protests around the world. Concerns about Persistent Organic Pollutants (POPs), a by-product of waste incineration, link anti-incinerator protests in Malaysia to long-standing international campaigns about toxics and pesticides. POPs represent mobility and immobilisation as they are transmitted through milk and accumulated in tissue. The Stockholm Convention on POPs lists 12 main types of POPs (the ‘dirty dozen’). These include dioxins, furans, Polychlorinated Biphenyls (PCB), Hexachlorobenzene (HCB) and the pesticides dieldrin and DDT which became notorious following the publication of Rachel Carson’s bestseller *Silent Spring* in 1962. How have political and institutional structures, historical circumstances and mobilities (virtual and material) combined to influence environmental mobilisation in Malaysia against these pollutants? The discussion in this section uses published documents and fieldwork conducted in the Bukit Nenas area, with the assistance of Consumers Association of Penang (CAP) activists.

Background: economic development and the demobilisation of Malaysian civil society

The Malaysian context is one of rapid economic development, population growth, and structural transformation. At independence in 1957, Malaysia was a primary commodity producer with a relatively small, mainly rural population of 7 million. Today Malaysia is industrialised, with manufactures accounting for over 75% of exports. Its predominantly urban population now exceeds 27 million. It has practised a ‘develop first, clean up later’ model of development. However, as environmental pressures have increased, authoritarian ‘brown modernisation’ has given way to a pragmatic and market-led version of ‘green modernisation’.

Economic liberalisation measures are often credited as the engine of growth and structural transformation in Malaysia (Salleh and Meyanathan 1993). From the late 1980s, Malaysia adopted liberalised export-oriented industrialisation policies, with a drive to create ‘Malaysia Inc.’ through privatisation (Standing 1993, p.42). The liberalisation of finance and investment was accompanied by efforts to deepen domestic participation and localise industry, effectively blurring the distinctions between foreign and domestic and between state and corporate interests. Liberalisation means that much of the responsibility for environmental protection is devolved to private corporations, such as Kualiti Alam (see below). The latter is lauded by the government as an example of ‘green capitalism’, fostering eco-efficiency and corporate social responsibility.

During the 1980s and early 1990s Malaysian civil society was weak and ethnically divided (Loh and Khoo 2002, Verma 2004) and presided over by a semi-authoritarian ‘repressive-responsive regime’ which became increasingly hostile to NGOs (Crouch 1996). The Malaysian state co-opted, repressed or

demobilised any political activities which it considered to be potentially oppositional. Authoritarian measures were introduced in 1970 when constitutional amendments restricted civil and political liberties, including freedom of speech, freedom of information and freedom of assembly. This authoritarian tendency increased under Mahathir's government in the 1980s, culminating in mass arrests of community activists and politicians in 1987 (see Means 1991, International Bar Association *et al.* 2000, Verma 2004). In response, NGOs built coalitions to oppose the increasing authoritarianism of the executive and the politicised and nepotistic awarding of contracts to favoured companies (Means 1991, Gomez 1994, Gomez and Jomo 1999). Environmental campaigning mainly centred around large infrastructural projects and the development of environmental technologies such as waste incineration.

Despite these constraints, Malaysian environmental NGOs developed considerable capacity to mobilise campaigns. Some, like CAP and SAM (*Sahabat Alam Malaysia*, Friends of the Earth Malaysia) became professionalised and internationalised since the early 1980s, which saw the rise of a core group of expert and outward-looking Malaysian activists with a global perspective. Malaysian environmental NGOs illustrated the 'boomerang effect' (Keck and Sikkink 1998), whereby domestic repression or passivity forces the internationalisation of local campaigning. By linking with international networks, Malaysian NGOs were able to mobilise information, expertise and funding to increase their standing and credibility, rebounding on the national context as international leverage.

A brief history of CAP, anti-toxics campaigns and the Bukit Nenas waste facility

One of the most active and established environmental organisations in Malaysia is CAP and its sister organisation, SAM. Since the late 1970s, CAP/SAM has been an important national and regional actor in global environment, development and anti-toxics campaigns. CAP combines strong grass-roots campaigning experience with a broad-based approach that integrates consumer, development and environmental issues. These include public and occupational health, indigenous people's survival, citizen rights, education and protest against large-scale projects such as dams and incinerators. It also provides public information about incineration, toxicity and pollution, within a wider context of product safety, testing and awareness-raising.

CAP/SAM works with community groups such as farmers, plantation workers and villagers, as well as in a more structured fashion with schools, government departments and employers. Its relationship with government ranges from critical collaboration to radical opposition. CAP's independent stance, bottom-up approach and explicitly *Southern*, 'value for people' orientation contrast with the 'value for money' approach pursued by many Northern consumer associations (Fazal 1982). It uses consumer protection issues to mobilise people, with the aim of changing the model of development

towards more people-centred, participatory and sustainable approaches, and provides expert and legal advice to community groups to contest cases.

From the late 1970s, CAP/SAM became involved in international toxics campaigns through work with farmers and plantation workers on dangerous pesticides. In the 1980s and early 1990s, Malaysian anti-toxics campaigning predominantly centred around an emerging Southern consensus about the problem of toxic 'dumping' – the export of waste and outdated, polluting technology from the North to the South (e.g. Third World Network 1988, UNEP 2004). The 1992 Basel Convention enshrined this consensus by attempting to immobilise transboundary waste exports. However, poor countries are left with the problem of safe disposal for existing hazardous waste. This can lead to a scenario where the waste is immobilised in the poor country with no indigenous capacity for treatment developed, while local contention is immobilised through neglect or repression.

In 1979, the Malaysian government began to take a more 'green modernisation' approach and initiated legislation governing hazardous or 'Scheduled Waste'. In the 1980s, a potential site for a hazardous waste treatment facility had been identified within rubber plantation lands at Bukit Nenas in rural Negeri Sembilan. In the late 1980s liberalisation and privatisation policies meant that the facility would most likely be developed by a private concessionaire. Government legislation, in the form of the Scheduled Waste Act 1989 was drafted in consultation with business interests. The legislation was modelled on Danish legislation, with technical assistance from Danish Cooperation for Environment and Development (DANCED). The Bukit Nenas plant was modelled on the Kommunekemi project in Nyborg, Denmark, cited by international environmental activists at the time as an example of 'good practice' in separation and treatment of hazardous wastes (Meadows 1991, p. 185). In 1991 Kualiti Alam, a Danish–Malaysian consortium, was awarded a 15-year concession to build and operate the hazardous waste separation, treatment and incineration facility, at a cost of US\$70 million.

CAP's objections to the incinerator at Bukit Nenas centred around flaws in the Environmental Impact Assessment, human health and environmental safety concerns, especially dioxin emissions and the potential for groundwater contamination. They also criticised the lack of public accountability and consultation surrounding the project and the lack of discussion of any alternatives to incineration. Its stance was influenced by its wider links to international environmental and health activism on toxics, incineration, pesticides, and baby milk. CAP estimated that the proposed plant would directly affect 1879 families from seven Chinese New Villages and five Malay villages, with a further warning that up to 50,000 people in the district could be affected. After considerable awareness-raising and guidance from CAP, Malay and Chinese villagers formed an Anti-Toxic Waste Committee in 1991. Pressure from the campaign led to a 'public meeting' with the Minister for Science, Technology and Environment, but there was no opportunity for

public participation and the frustrated residents resorted to picketing, but the protest was muted due to the presence of riot police.

Mobilisation against the incinerator at Bukit Nenas stagnated as the project did not proceed until 1995. By this time, the anti-toxic waste committee formed in 1991 had been substantially demobilised in various ways. Active committee members had lost their positions on their respective village committees. Discussions between Malay and Chinese village heads had become politicised in other ways, and the members felt reluctant to act decisively as they feared that mobilising opposition to the incinerator might unintentionally inflame underlying ethnic tensions. The affected villagers included Chinese pig farmers, whose farms were sources of ethno-religious contention.¹ The Chinese community leader who served as Chairman of the Anti-Toxic Waste Committee was also understandably reticent since he had previously been imprisoned without trial under Malaysia's draconian Internal Security Act, and feared reprisal if he was branded as an 'anti-development agitator'.

Concepts of economic progress and 'development' were used to demobilise the protest at Bukit Nenas by reframing the project as 'bringing development'. The Malay villagers were encouraged to individually 'participate in development' by acquiring shares in Kualiti Alam as part of the government's affirmative action scheme to promote Malay ownership of corporate equity (see Gomez and Jomo 1999). The rezoning of agricultural land into industrial land led to the co-optation of the main landowner, the rubber plantation company, Guthrie, as well as some landowning villagers. Guthrie initially opposed the project from 1991 to 1993 but by 1995 the company agreed to support the project. Construction of the project proceeded in earnest after a controlling stake in Kualiti Alam was bought by the powerful, ruling party-dominated conglomerate, United Engineers Malaysia (UEM), meaning that powerful political-business interests were now behind the project (Gomez 1994, p. 90–94).

Since the late 1990s, capital and technology flows have displaced authoritarianism as the major forces immobilising protest around the Bukit Nenas site. This is partly due to the necessity created by increasing quantities of hazardous waste, which are mobilised and accumulated by high-growth industrial development. Capital-intensive, high-technology solutions are increasingly preferred by Malaysia's developmental state and the politically powerful concessionaires who have won contracts to provide the means to reduce and immobilise waste problems. As more hazardous waste is generated nationally, waste management becomes both necessary and highly profitable. Kualiti Alam now claims that it provides one of the most comprehensive waste management facilities in Southeast Asia. As the Bukit Nenas plant has now been working for a decade, it is recognised that it provides the 'right way' to dispose of hazardous waste, in comparison with illegal dumping, which is emerging as a worse option (Cruetz 2006).

Between 1987 and 1994 when the Kualiti Alam facility at Bukit Nenas became fully operational, 125,000 tonnes of toxic waste had already accumulated for disposal. According to the Basel Convention country reports

for Malaysia, amounts of scheduled waste more than doubled between 2003 and 2006. About 15% of this scheduled waste was imported from abroad in 2006, and multinational operations in Malaysia accounted for 40% of the waste processed by Kualiti Alam. Although transboundary movement is somewhat significant, the major issue is not that Malaysia is acting as a pollution haven for 'Northern' toxic dumping, but that it is generating ever larger quantities of hazardous waste through its own indigenous economic development.

In upwardly-mobile industrialising countries like Malaysia, the differences between North and South have blurred. Since the later 1990s, the debate has moved towards a partial acceptance of 'clean technologies', compliance with international agreements and the development of appropriate Southern environmental expertise (e.g. Third World Network 2001). Liberalisation and privatisation have driven a corporate view of waste disposal as a profitable industry in itself, with increasing emphasis on corporate social responsibility within a privatised market model.

The 'technology transfer' advocated by Southern NGOs and governments has undoubtedly taken place to a significant extent. High-tech industrialisation and technology transfer objectives have dominated the 'Malaysia Inc.' vision, leading the country to invest in developing industrial capability in incineration. Malaysia is a relatively large importer of high-tech incineration plant. However, by 2007, Kualiti Alam was aiming to provide 70% of the design and development of a range of incinerators, with 30% technology transfer and design certification provided by Danish engineers (Bernama 2007).

NGOs like CAP continue to advocate against industry-driven high-tech waste management, arguing instead for an alternative approach that focuses on waste reduction and the elimination of toxics. They emphasise the precautionary principle, pointing to the fact that pollutants are produced even by improved incineration technology, and these pollutants are difficult to monitor (Greenaction/Gaia 2008). NGOS can continue to play an important role in developing expertise, monitoring and compliance. Since 2004, CAP has been involved in the International POPs Elimination Project (IPEN) which monitors Persistent Organic Pollutants under the auspices of UNIDO (United Nations

Table 1. Malaysia: Scheduled wastes produced, imported and exported.

	Scheduled waste produced (metric tons)	Scheduled waste exported	Scheduled waste imported
1987–1994 (accumulated)	125,000	No data	No data
1995–1999 (est)	431,000	No data	No data
2003	460,866	2,363	305,398
2006	1,103,456	5,806	172,151

Sources: Consumers Association of Penang 2005, Basel Convention Malaysia Country reports 2003 and 2006.

Industrial Development Organization) and UNEP (United Nations Environmental Programme).

The (im)mobilisation of radioactive waste: environmental protest in East Germany

The more recent history of German environmentalism has been inextricably linked to struggles over the (im)mobilisation of nuclear waste. Large-scale campaigns to stop CASTOR² transports to radioactive waste storage facilities in Gorleben and other key sites have come to symbolise grassroots resistance and environmental contestation in post-unification Germany (Blowers and Lowry 1997, Fischer and Boehnke 2004). Here we focus on the evolution of local protest in and around Morsleben, a former salt-mining village in East Germany, and the location of a final repository (Morsleben – ERAM) for low- and intermediate-level, non-heat-generating radioactive waste. It will address the question how political and institutional structures, historical circumstances *and* multiple material and virtual mobilities combine to create context-specific conditions for grassroots mobilisation and collective action. The changing politics of (radioactive) waste before and after German unification (late 1960s to early 2000s) and the resulting patterns of (im)mobilisation of people and waste form the backdrop to this instance of environmental contestation. Using published reports and original documents, including a detailed history of the ERAM facility (Beyer 2004, 2005) and web-based material, the account will highlight some of the specificities of East and West German environmental mobilisation which can only be understood if placed in their historical and political context.

Old burdens and lasting problems: a brief history of the Morsleben repository (ERAM)

Morsleben repository (ERAM, Endlager für Radioaktive Abfälle Morsleben) was previously a rock salt mine in Saxony-Anhalt near the former border between East and West Germany. It was chosen in the late 1960s by the GDR government (German Democratic Republic, 1949–1990) as the disposal site for low- and medium-level radioactive waste. The decision to open ERAM was connected to the construction of nuclear power plants in Rheinsberg (near Berlin) and Greifswald-Lubmin and a research reactor in Rossendorf near Dresden. This was indicative of the GDR's commitment to the development of nuclear technology for energy generation. During its service life from 1971 to 1998, ERAM received almost 37,000 cubic metres of both solid and liquid low- and medium-level radioactive waste from various sources (see Table 2). The first deliveries of radioactive waste arrived in Morsleben as early as 1971, 10 years prior to the completion and full licensing of the facility. Between 1971 and 1991 approximately 14,400 m³ of radioactive waste and more than 6000 radioactive sources were stored in Morsleben (see Beyer 2004 for a detailed account).

Table 2. Disposal of waste in Morsleben – sources and volumes.

Waste producer group	Volume in m ³
Nuclear power plants	23,816
Decommissioned nuclear power plants	6,528
Research institutions	2,592
Nuclear industry	159
State collecting facilities	3,090
Others	523
Reprocessing	45
Total	36,753

Source: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) 2006.

After German unification, ERAM was temporarily shut down in 1991. However, the then Minister for the Environment Klaus Töpfer invoked a special clause in the German Unification Treaty (*Einigungsvertrag*) to re-open the facility in 1992. This clause guaranteed the continued use of ERAM (and other East German industrial facilities) until 2000 (Beyer 2005). According to Greenpeace (2003), between January 1994 and September 1998, 22,320 m³ of radioactive waste, mostly from West German nuclear and interim storage facilities, were brought to Morsleben. This included the surface-level interim storage of wastes which could be classified as high-level radioactive (e.g. containers with Caesium-137). The exact amount and location of radioactive waste within the ERAM facility remains subject to debate and there have been repeated finds of previously undocumented material (Beyer 2005, p. 20). Speculations that the GDR government may have accepted nuclear waste from West Germany prior to 1989 to generate income have not been confirmed by any reliable documentation.

The re-opening of ERAM led to local protests and disputes between environmental activists and the BfS (*Bundesamt für Strahlenschutz*, Federal Office for Radiation Protection in Germany, responsible for Morsleben and other nuclear waste repositories). Sustained pressure from local, regional and national environmental groups and legal action taken by Germany's largest environmental NGO, BUND (Bund für Umwelt und Naturschutz Deutschland, German branch of Friends of the Earth International) and Greenpeace led to the eventual closure of ERAM in 1998. More recently, the Morsleben facility has been the subject of renewed criticism and environmental protest after it emerged that the structural integrity of the central area of the mine was compromised, when debris fell on top of the waste containers (Greenpeace 2003). This also confirmed previous safety concerns, including those raised by East German scientists in the 1970s and 1980s (Greenpeace 2003, Lindemann 2007). Furthermore, a report published by Greenpeace in 1997 claimed that Morsleben posed a much greater threat to local and regional watercourses than previously anticipated (Greenpeace 1997). Plans are currently under way to

permanently close and seal the ERAM site. Some environmental activists have challenged this decision, calling for greater transparency and an in-depth exploration of all possible closure options, including the retrieval of all wastes from the salt mine to avoid long-term radioactive pollution of watercourses. The planning process for the closure of ERAM is ongoing, and environmental campaigns continue to take place in and around Morsleben (see Lindemann 2007).

Crossing the border: German unification and the transformation of the environmental protest in Morsleben

What can the Morsleben case reveal about the political-institutional determinants of environmental contestation and their transformation over time? A direct comparison of local opposition to ERAM in East and West Germany before and after German unification in 1990 illustrates the importance of political systems and structures for the formation of environmental movements (see Beyer 2004 for a detailed and well researched account). Resistance to ERAM in the East German part of the Morsleben area was minimal due to lack of information. Historical documents reveal that most people in Morsleben knew very little about the scale of the ERAM repository and its inherent health and environmental risks. ERAM was subject to intense secret police activity (by the *Staatssicherheit* or *Stasi*), including reports on the overall mood of the public in the Morsleben area regarding the repository (Beyer 2004, p. 55, cf. Bastian 1996). ERAM's location near the inner-German border was the result of a strategic decision by the GDR authorities to facilitate and justify above-average levels of surveillance in this high-security area. The transportation of nuclear waste material to Morsleben was also strictly controlled. Everyday life in Morsleben prior to 1989 was thus shaped by various *immobilities* arising from state control and surveillance and this clearly limited opportunities for dissent and environmental protest.

In contrast, there was considerable disquiet among people in the Helmstedt area, a West German border town less than 5 kilometres away from Morsleben. During the 1980s, people in Helmstedt expressed their concerns about possible radioactive contamination of local wells caused by ERAM. An article published on 3 August 1987 in the regional West German newspaper *Hannoversche Allgemeine Zeitung* covered local concerns about potential water pollution and the lack of reliable information about ERAM. West German authorities unsuccessfully requested more detailed information on ERAM from their East German counterparts (Hänel 1998), and this information deficit further contributed to growing concerns in the Western part of the Morsleben area about potential health risks.

Rapid changes in political structures in 1989–1990 associated with the collapse of the Eastern bloc and German unification opened up considerable opportunities for environmental protest against the Morsleben facility. In November 1990 a citizens' initiative (*Initiative gegen das Atommüllendlager*

Morsleben) brought together concerned citizens from both sides of the former inner-German border to campaign for the immediate closure of ERAM. Established West German environmental groups based in Gorleben/Wendland (*Bürgerinitiative Umweltschutz Lüchow Dannenberg*), Salzgitter (*AG Schacht Konrad*) and other locations in the region that had previously been affected by radioactive and toxic waste issues extended their protest to Morsleben. In 1990 the *AG Schacht Konrad* and the *Bürgerinitiative Umweltschutz Lüchow Dannenberg* initiated events in Morsleben to inform and mobilise local people, including a 'Sunday walk' to the ERAM facility and a 'wedding-eve party' (*Polterabend*) on 2 October 1990 to draw attention to the 'unification' of Germany's radioactive waste problem. In November 1993, Greenpeace organised a large-scale event (*Morsleben Aktion Stilllegung*) to highlight the dangers of the ERAM repository. In September 1995, a new environmental group – Greenkids e.V. – was set up in Magdeburg (capital city of Saxony Anhalt in East Germany, near Morsleben) and immediately initiated protests against the ERAM facility (Greenkids e.V. 2008). Greenkids activists also organised a mobile exhibition on Morsleben (*Morsleben – Geschichte eines umstrittenen Atomprojekts*), and collected, archived and published previously inaccessible information about ERAM (e.g. Beyer 2004). The formation of a regional network of anti-CASTOR groups and activists (*AntiCastorNetz Magdeburg*) marked another milestone in the development of environmental protest in the Morsleben region.

Sustained pressure and legal action taken by environmental groups eventually led to the closure of ERAM in 1998 and initiated heated debates about the future of the facility. The ERAM closure coincided with significant changes in the political landscape in Germany: the end of the 'Kohl era' in 1998. The new red-green coalition government of SPD and *Bündnis 90/Die Grünen* introduced legislation (*Atomkonsens*) to gradually phase out nuclear energy in Germany and to ban construction of any new nuclear power plants. However, serious problems regarding storage of radioactive waste remain. The search for a final storage facility (*Endlager*) in Germany continues and has led to environmental protests in Morsleben, Gorleben and other locations. Legal challenges and debates in the media about the merits and limitations of the *Atomkonsens* and the apparent revival of pro-nuclear arguments worldwide (Scully 2008) have accompanied these protests. Recent exports of German radioactive waste to La Hague (France) and Sellafield (UK) for re-processing have again highlighted the global dimensions of the radioactive waste problem.

The Morsleben case illustrates the significance of political and institutional structures for the emergence of a protest movement against hazardous waste facilities in Germany. It confirms Rucht's (2003) assertion that the very limited comparability of pre-1989 East and West German social movements can be attributed to differences in political system, state structure and discursive opportunities. The complete absence of local resistance in East Germany to ERAM prior to German unification contrasts with diverse activities in the West German part of the Morsleben region in the 1980s. However, economic

and political 'tipping points' such as German unification in 1990 and the end of the 'Kohl era' in 1998 coincided with rapid changes in the structure and formation of local and regional environmental networks. Almost immediately after the fall of the Berlin Wall, West German environmental groups deployed their expertise and political action repertoires to draw attention to the ERAM case and mobilise support in East Germany. This created some tensions between more established West German environmental groups and activists from the former GDR. This also reflected the complex and oftentimes problematic convergence of East and West German Green movements which continues to date (Jones 1993, Gerber 1999, Rucht 2003). Local initiatives and groups such as Greenkids e.V. formed, some of which developed strong regional and even international links while others focused more on local issues. This suggests that the presence and direction of environmental contestation cannot be solely attributed to (un)favourable political structures. Contextual conditions including the dynamics of local social networks, the presence or otherwise of key activists and geographical proximity play a significant role too.

Mobilities, materialities and the transformations of environmental protest

How useful is the 'new mobilities paradigm' for understanding the trajectories and outcomes of our two cases? An initial focus on more visible mobilities such as the movement of wastes and the circulation of information among activists serves to highlight the complexities of material flows (see Table 3). A cursory examination of our two cases demonstrates the relevance of the types of mobilities outlined in section one. For example, the NGOs and community groups in both cases utilised information and communications technology and traditional media such as newspapers, flyers and radio to coordinate local and regional protests. German and Malaysian NGOs were similarly integrated in global networks, notably Friends of the Earth International, which facilitated exchange of information, sharing of expertise and coordination of campaigns.

But the physical movement of people and objects does not itself determine whether or not spaces become (de-)politicised. Instead, the comparative analysis of mobilisations in Morsleben and Bukit Nenas reveals complex interrelationships between material conditions, political structures, cultural factors and power relations. We must, therefore, move beyond the 'new mobilities paradigm' and emphasise the political nature of mobility. In Germany, unification resulted in changed state structures that allowed for more open contestation and mobilisation. High-profile actions like the spectacular occupation of ERAM (*Morsleben Aktion Stillebung*) by Greenpeace activists in 1993 were complemented by local initiatives such as the mobile exhibition by Greenkids e.V. In contrast, in Malaysia, CAP/SAM's attempts to unite local communities through grassroots mobilisation were hampered by state restrictions. This partly resembled the situation in pre-unification

Table 3. (Im)mobilities and environmental contestation in Germany and Malaysia.

	Morsleben	Bukit Nenas
Physical movement of objects	<ul style="list-style-type: none"> • Transport of radioactive waste • Release of pollutants (radiation) • CASTOR 	<ul style="list-style-type: none"> • Separation and transfer of hazardous waste • Release of pollutants (dioxins) • Incineration plant • Movement of investment
Corporeal travel	<ul style="list-style-type: none"> • (Restrictions on) movement across inner-German border • Travel to/from demonstrations and protests • (In)voluntary immobilisation of anti-CASTOR protesters • Meetings between activists in the region 	<ul style="list-style-type: none"> • (Restrictions on) assembly and protest • Travel of CAP workers to area to mobilise and inform local people • Detention of activists • Policing of protesters • Meetings of international activists
Imaginative and virtual travel	<ul style="list-style-type: none"> • Internet forums and user groups (e.g. Indymedia community) • Networking of different campaigns 	<ul style="list-style-type: none"> • International networking • Internet forums (e.g. POPs forums) • Networking of different campaigns
Communicative travel	<ul style="list-style-type: none"> • Use of ICT to inform and mobilise activists and supporters • Media coverage • Mobile exhibition organised by Greenkids e.V. 	<ul style="list-style-type: none"> • Production and dissemination of information (e.g. newsletters) • Local education campaigns • Kualiti Alam website

Morsleben. However, Malaysian campaigners faced additional barriers to mobilisation in the form of ethnic, cultural and religious divisions which had a 'chilling' effect on environmental campaigning.

De-activation of community resistance, including attempts at co-optation, were also features of both cases. In Malaysia, the agenda of development and the promotion of hazardous waste incineration as a 'green technology' and profitable investment enabled the co-optation of locals. In Germany, a recent decision to keep radioactive waste near existing nuclear power plants and avoid the controversial and expensive CASTOR transports exploits the greater acceptance of radioactive risks among people who live near such plants.

What is notable in both cases is the continued importance of the state, but also its contradictory role as 'gatekeeper' of mobilities (of people, waste and information). In the Morsleben case, the East German state sought to

simultaneously immobilise public opinion and contain radioactive waste generated by its nuclear energy programme. However, the suppression of dissent proved unsustainable in the long term, contributing to the eventual collapse of the GDR. After unification, transfers from West to East Germany exacerbated the insoluble waste problem, creating a lasting legacy but also providing a continued opportunity for collective action. In Bukit Nenas, attempts by the Malaysian state to regulate hazardous waste coincided with privatisation and the transfer of technology and regulatory frameworks from North to South. However, economic liberalisation was not accompanied by greater political openness. Instead the state effectively demobilised civil society, even as it began to mobilise inward flows of capital and technology to facilitate high-tech treatment for hazardous waste.

The two cases bring us back to a discussion of the inherently political nature of 'wastes on the move'. Contestation occurs whenever waste finally comes to rest: the storage and treatment of waste in specific locales creates opportunities for local and global protest to focus and converge, change direction, or perhaps runs its course and disintegrate (unlike most of the waste). The irreducible nature of radioactive waste in Morsleben contrasts with the partially successful reduction of hazardous waste through high-tech incineration in Malaysia. What matters is not just how mobile they are but also their material characteristics, which are inextricably linked to their political and socio-cultural valency. More toxic and persistent wastes like radioactive waste may have a higher potential for mobilising contestation than wastes that can be reduced through the application of technology. The ERAM case illustrates that nuclear waste retains its mobilisation potential precisely because of its immutably toxic properties. While high-tech incineration in Malaysia produces some toxic residues, they also reduce the bigger problem. The mobilisation potential of incinerator is lessened as the demand for hazardous waste solutions increases.

The two cases illustrate that the effects of political change differ according to the context. In the Malaysian case we can observe a gradual transformation from 'brown authoritarianism' to 'green modernisation' under the auspices of a pragmatic developmental state. The mobilisation of popular contestation is replaced by the mobilisation of technology and of individuals as investors and property owners. Commitment to a high growth model since the late 1980s has led to ever-increasing amounts of waste, pushing the state towards high-tech incineration. This green modernisation process coincided with a discernible shift in public attitudes accepting the introduction of environmental technologies. Shared understandings of environmental threats were weakened once the threats of detention and underlying ethnic tensions were invoked (see Verma 2004, p. 136). The fragmentation of local environmental protest shows the limitations of CAP's bottom-up mobilisation strategy. Despite their continuing opposition to toxics and incineration, they have been left with a technical monitoring role, which is arguably complementary rather than oppositional to high-tech green modernisation. This also shows the relevance

of established and newly emerging cultural norms regarding waste and waste management.

The German case, on the other hand, illustrates the importance of distinct political moments or 'tipping points' which radically change the parameters of contestation. The collapse of the Eastern bloc in 1989 and German unification in 1990 led to greater interaction between East and West German green movements, with attendant contradictions. This led to an increase in protest activity around contested sites such as Morsleben but also to the diversification of environmental struggles. The end of the Kohl era and the formation of a red-green coalition government in 1998 initiated a significant shift in nuclear policy which de-prioritised nuclear energy. The *Atomkonsens* restricted the expansion of the nuclear waste problem, but also resulted in a shift in the focus of anti-nuclear protest.

Conclusions: moving beyond the North-South divide: mobilities, transitions and structural transformations

We have explored both the possibilities and limitations of the 'new mobilities paradigm' for analysing environmental contestation, using two case studies from Malaysia and East Germany. By emphasising the materialities of different kinds of hazardous waste, we suggest that they have differing mobilisation potentials. The substantive approach pursued here combines with a focus on mobilities to place the problem of hazardous waste within broader structural and political transformations. The conventional wisdom is that wastes should be immobilised within the country or region of their origin. However, the same conventional wisdom holds that waste treatment technologies should be mobile and their transfer encouraged. The prevailing conceptualisation of technology transfer characterises the relationships in terms of sender and receiver, the latter being seen as passive and in need of development while the former is active and able to assist. The Basel Convention recognises the potential for environmental injustice to result from the movement of hazardous waste from rich industrialised countries or regions to poor and less industrialised ones. This interpretation is also underpinned by Principle Seven of the Rio Declaration concerning 'common, but differentiated responsibility', which sees developed countries as more responsible for environmental degradation and tasks them to provide technology and finance to address global environmental degradation (UNEP 1992). Our substantive focus on intra-national economic and political transitions offers an important corrective to the assumption that hazardous wastes and the technologies to deal with them flow in only one direction – from the industrialised North to the less-developed South.

We noticed that there are at least four problems which become more visible through the lens of mobilities: the assumption that a material disconnection between waste and waste management technology is possible; the belief that less developed countries or regions do not have a waste problem

and will continue not to do so as long as they do not receive any imports; the generalisation that the industrialised or developing countries are homogeneously developed or underdeveloped, ignoring internal disparities and transfers; economic growth is not regarded as problematic.

The two case studies take us beyond these assumptions by challenging each of them in turn. Both cases show that a material disconnect between the waste problems and their solutions is impossible. The more developed countries or regions (in these cases, West Germany and Denmark) tend to be the sources of hazardous waste and waste management technologies, and more broadly a mentality of waste management as a governance strategy. However, the inability of the 'more developed' West to deal with its own hazardous waste shows the material limitations of displacement as solution. As regards the belief that less development means no waste problems, both cases illustrate that this is misleading. In Morsleben, a large proportion of the radioactive waste came from West Germany, but East German power plants also produced waste that required disposal. In Malaysia rapid development led to imports of technology and hazardous waste from the North but, although the country is still a net importer of hazardous waste, the proportion of imports is now dwarfed by domestic waste generation.

In relation to the transfer of wastes and associated risks within a country or region, both cases highlight structural inequalities determining the location of waste infrastructure. The Morsleben case shows the structural inequalities inherent *within* the North, coinciding with West–East transfers of environmental bads. In the Malaysian case, the country has begun to converge with the advanced North in terms of waste treatment technology but has experienced high levels of economic development and structural transformation within a fairly authoritarian model. Opportunities for resistance and contention over where wastes are located are circumscribed and the scales are tipped towards state and business interests and against local and disempowered communities.

Finally, the cases cause us to critically question unsustainable models for economic growth. The Malaysian case has followed the green modernisation template, as the government has pursued economic and structural mobility with the ultimate aim of reaching the status of a 'fully developed country' by the year 2020. In pursuit of this vision, it has acquired the latest technologies. However, the expansion of hazardous waste is unsustainable. Despite improved technology, concerns about the toxicity of POPs and the difficulty of monitoring them persist. In the German case, recent statements indicating a possible reversal of the *Atomkonsens* due to increased demands for cheap energy highlight once again the impossibility of dealing with radioactive waste.

According to Sacquet (2005, pp. 48–49), the future of waste is its disappearance. Yet the materiality of waste points to the impossibility of this. Current models of economic development continue to generate unsustainable quantities of waste. We have shown that different wastes do have different mobilisation potentials. While some hazardous wastes can be reduced through the application of 'green' technologies, these treatment methods support

unsustainable growth and still produce toxic residues. The longevity and risks associated with nuclear waste mean that they retain their contentiousness. The refusal of waste problems to go away ensures that contestations around waste and waste infrastructure will continue.

Notes

1. Muslim Malays consider pigs to be not only physically but also culturally polluting.
2. CASTOR is an acronym for 'cask for storage and transport of radioactive material'.

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