Configuring urban carbon governance: insights from Sydney, Australia

Pauline M. McGuirk
Discipline of Geography and Environmental Studies, School of Environmental and Life Sciences, University of Newcastle, Callaghan, NSW 2308, Australia
pauline.mcguirk@newcastle.edu.au
+61 2 40215097

Harriet Bulkeley
Department of Geography, Durham University, Lower Mountjoy South Road, Durham DH1 3LE, UK
h.a.bulkeley@durham.ac.uk
44 (0) 191 33 41940

Robyn Dowling
Department of Geography and Planning, Macquarie University, North Ryde, NSW 2109, Australia
Robyn.dowling@mq.edu.au
+61 2 98509780

Abstract

In the political geography of responses to climate change, and the governance of carbon more specifically, the urban has emerged as a strategic site. While it is recognised that urban carbon governance occurs through diverse programs and projects—involving multiple actors and working through multiple sites, mechanisms, objects and subjects—surprisingly little attention has been paid to the actual processes through which these diverse elements are drawn together and held together in the exercise of governing. These processes – termed configuration – remain under-specified. This article explores urban carbon governance interventions as relational configurations, excavating how their diverse elements—human, institutional, representational, material—are assembled, drawn into relation and held together in the exercise of governing. Through an analysis of two contrasting case studies of urban carbon governance interventions in Sydney, Australia, we draw out common processes of configuring and specific sets of devices and techniques that gather, align and maintain the relations between actors and elements that constitute intervention projects. We conclude by reflecting on the implications of conceiving of governing projects as relational configurations for how we understand the nature and practice of urban carbon governance, especially by revealing the diverse modes of power at work within processes of configuring.

Key words: Geographies of urban carbon governance; Governance projects; Relational configurations; Devices and techniques; Sydney

Introduction

Cities have emerged as key strategic sites through which climate change responses are being mobilised and attempts to govern carbon operationalized (Rice 2010; Bulkeley et al. 2015). Yet how, by whom, and to what end carbon is being made into an urban problem is far from predetermined or uniform. Rather, the urban governing of carbon is characterised by a vast array of interventions and artefacts designed to reorder urban socio-material configurations in line with diverse (and sometimes conflicting) interpretations of what it might mean to respond to climate change. Governing carbon through the urban is creating a complex ecology of sites and practices, from buildings, to infrastructure, to the carbon conduct of citizens, which create a complex array of ways in which carbon comes to matter in the urban context (Moloney, Horne and Fine 2010; Paterson and Stripple 2010; McGuirk, Bulkeley, and Dowling 2014a). Among a chorus of voices attempting to understand the ways in which governing is conducted in relation to carbon, Mitchell (2011) has recently implored that we attend to the ways in which carbon is transformed through the connections and alliances it makes possible; "connections and alliances that do not respect any divide between material and ideal, economic and political, natural and social, human and nonhuman … connections [which] make it possible to translate one form of power into another" (Mitchell 2011, 7). Such connections and alliances are fundamental to governing, enabling abstract intentions to be translated into practicable interventions achievable in particular places (see Li 2007; Cupples 2011). Recent contributions specifically attending to the role and agency of objects in political geography have brought increasing focus to the actual processes through which this translation occurs by attending to the ways and means through which actors and elements are brought into and held in relation (Aylett and Rutland 2008; Müeller 2012; Meehan, Shaw, and Marston 2013; Shaw and Meehan 2013;). Notwithstanding, there is still surprisingly little attention to the particularities of how this relating is achieved and maintained. The result is that the processes through which governing is configured and enacted remain under-specified (see Barnett 2005; Cupples 2011). Why, by whom, and by what are diverse elements drawn together and held together in the exercise of urban carbon governance and, crucially, how does this occur? How, for instance, might diverse elements, such as inefficient air conditioners, solar panels, and the economics of electricity production be bought into and held in relation with one another and related to particular urban conditions to configure carbon governance interventions in particular ways?

In this paper we specifically address these questions. We draw on research undertaken in Sydney, Australia, to explore the ways and means through which processes of alignment and configuration take place and their implications for how we understand the nature and practice of governing urban carbon. Governing carbon in Australia's urban milieu, as elsewhere, has involved the mobilisation of multiple forms of power—authority and command to be sure, but also persuasion, inducement and seduction (Allen 2003)—that have enabled diverse elements and forms of agency to be gathered into heterogeneous

coalitions that become particular forms of intervention. In seeking to understand and explain how governing carbon is pursued we examine how such interventions are assembled and held together: the means through which they come to be configured, and the particular workings of the processes through which these often fragile alignments are maintained. In the first section of the article we develop a conceptual approach to these issues, situated within a broadly Foucauldian approach to the nature of governing and drawing on the concept of configuration (Suchman 2012) as well as the wider literature on the politics and practices of assemblage (Robbins and Mark 2010; Harrison and Popke 2011; Cupples 2011; Anderson et al. 2012;). We then turn to two contrasting case studies of governmental interventions designed to govern urban carbon in very different ways (for a broader discussion of the multiple rationalities behind emergent modes of urban carbon governance see McGuirk et al. 2014a). The first—Blacktown Solar City in Sydney's west—is a large scale, federally-funded project involving an urban-based consortium of local government, energy, finance, and land corporations to trial and showcase the urban integration of solar energy and demand management measures. It aims to transition the urban energy system towards reduced energy demand and emissions. In contrast, our second case—Randwick Sustainability Hub in Sydney eastern suburbs—is a small scale, state government-funded initiative resulting from the collaboration of adjacent local government authorities, and local sustainability and climate change activist groups. The Hub is made up of a retrofitted community centre and a sustainability demonstration home exhibiting domestic retrofits and permaculture practices. It works through demonstrating and educating for lower carbon deployments of domestic technologies for heating, cooling, cooking, and provisioning. In each case, the way urban carbon comes to matter is quite differently inscribed, but the choice of contrasting cases is deliberate. It allows us to tease out the specific processes, devices, and techniques of configuring through which interventions come to be composed, as problems are defined, relational interventions configured and their elements held together in the exercise of governing.

Through our analysis of these projects, we suggest that notwithstanding the different forms of improvement and program design visible in each intervention, their configuration involves common processes and particular devices that gather and align and maintain the relations between actors and elements that constitute intervention projects. These are: (i) narration that is crafted through specific storylines that gather actors and elements around an intervention and are circulated through the project through specific devices that assert project benefits and do the work to of maintaining relations between its components; and (ii) forms of ordering that deploy particular devices to channel and discipline relations and establish the appropriate socio-material arrangements that hold together the relational configuration. We conclude by reflecting on the ways in which conceiving of governing projects as relational configurations, embroidered together by ongoing labors involving particular devices, recalibrates the understanding of governance, especially by revealing the diverse modes of power at work within processes of configuring.

From governing intent to intervention: configuring urban carbon governance

Across a range of theoretical traditions within the social sciences, governing is regarded not as a matter of the design and imposition of strategies and instruments by one set of actors over another but rather as requiring that a diverse range of actors and entities are bought into agreement in order to articulate and enact particular governmental intentions in the form of programs or interventions. From neo-Gramscian analysis, to the body of work inspired by Foucault's accounts of governmentality, and to the work of science and technology scholars on actor-network theory (ANT) and assemblage theory (AT), each has pointed to (different) ways in which the bringing into alignment of diverse social and material elements is central to the practice of governing (Latour 2005; Ekers and Loftus 2008; Foucault 2009; Cupples 2011; Müller 2012; Blok 2014). Such approaches suggest that governing is a heterogeneous and dynamic activity. While often couched in broad intentions in the abstract (e.g. to respond to climate change), governing is not seamlessly implemented but comes to cohere at the level of particular interventions, shaped at particular scales through relations forged between constituent elements (see McGuirk 2004; Li 2007; Benson 2010). While taking markedly different perspectives on questions of structure, agency, intentionality, and so forth, what these approaches have in common is a concern with the ways in which the intention to govern–the will to improve (Li 2007)–comes to be made practicable and takes effect through specific interventions, actualised in particular moments and places. Yet, while drawing attention to the considerable distance traversed in translating abstract governing intentions into practicable interventions, much of the literature remains focused on either side of this divide. For example, a great deal of analytical attention has been given to the discourses, rationalities, narratives, or interests which underpin particular programs of government. Within the field of governmentality, for example, authors frequently point to the ways in which 'neoliberal' rationalities underpin and frame governmental programs, sometimes too readily assuming that such logics can be 'rolled out' at a distance to shape the actions of communities and individuals (Barnett 2005). In contrast, detailed studies have also sought to examine the workings of particular assemblages, projects or programs in situ, demonstrating their dynamics and their practical effects in terms of the territorializations and subjectivizations they seek to render, or their integration with hegemonic interests and power relations (see Rutland and Aylett, 2008; Paterson and Stripple 2010; Rice 2010; Jonas and Gibbs 2011).

In this article, we seek to contribute to and complement this broad body of work by exploring the intersection between governing intention and intervention, attending to the relational processes through which the alignments essential to actualizing governance interventions takes place and are maintained over time. In so doing, we situate our contribution with previous research that has been concerned with understanding the practices through which such forms of alignment are achieved (and resisted). Rose and Miller (2010) use the term 'translation' to describe the processual relation between

intention and intervention: "a movement from one space to another, and the expression of a particular concern in another modality" (Rose and Miller 2010, 279). Translation, they argue, takes place through "a delicate affiliation of a loose assemblage of agents and agencies into a functioning network" such that actors come to convince one another that "each can solve their difficulties or achieve their ends by joining forces or working along the same lines" (Rose and Miller 1990, 9-10). There is debate, however, about the appropriateness of the term translation, especially in its inference of a unidirectional movement from intention to intervention[1], achieved through a process of constructing allied interests that align actors together through discursive tactics of persuasion, rhetoric, intrigue, and so forth (Li 2007). In rejecting the term translation, Suchman (2012) draws from the field of actor-network studies to stress instead the importance of the ways and means through which alignments that are central to the work of accomplishing governance are forged as socio-material assemblages through processes of configuration. While scholars in the governmentality tradition have tended to focus on the importance of actors and discourse in practices of translation, configuration points to the significance of including materials, infrastructures, devices, and so on as central to the practice and work of alignment within any such analysis (Bulkeley et al. forthcoming). Noting the synergies with ANT and AT, we suggest that the notions of configuration and configuring enable additional analytical nuance that is highly productive for thinking about how governance is accomplished, and for excavating not just how the alignment of relations is achieved but the ongoing work of maintaining the relations that constitute governance projects and programs.

Configuring is concerned with the contingent connections between diverse elements: human, institutional, material, representational. The concept foregrounds processes of composing that conjoin these diverse elements and that gather, arrange, order, and hold them together such that they cohere as an identifiable coalition[2] (Wise 2005; Bennett 2010; Suchman 2012). Practices of composition or figuration have constitutive effect in that they "assign shape, designate what is to be made noticeable and consequential" and they hold "the material and semiotic together" (Suchman 2012, 49). By definition, these practices are distinctly contextual, spatially and temporally. The concept of configuring is highly productive when it comes to more fully specifying the translation between governing intent

---

[1] Notably, governmentality and ANT-informed work has been particularly cognisant of the ultimate co-constitution of governing intentions and specific interventions that reshape the objects and subjects of governing (see Rutland and Aylett 2008).

[2] Configuring resonates with notions of assembling and articulating (see Wise 2005; Featherstone 2011). Though arising from diverse traditions (ANT, and Deleuze and Guattari; Hall, and Laclau and Mouffe respectively), these concepts are connected by their basis in relational thought: the idea that social entities and social formations are made through the connection of heterogeneous components and that the form, meaning, and efficacy of entities arises from their positioning within some form of relational configuration (Bingham 2009).

around a specified 'problem' and the particular processes through which dispersed elements, capacities, and interests are articulated together, at particular scales (Benson 2010), and (provisionally) settled to create particular interventions or projects aimed to enact governing intent (see Laclau and Mouffe 1985, 112; Hall and Massey 2010). At the same time, the concept enables us to move beyond the constraints of viewing governing as all the while figured around 'problems' to consider the ways in which such practices also serve as a means through which 'opportune' moments for intervention are determined and delimited. As our cases reveal, far from being guided only in relation to the problematization of the urban in relation to carbon, interventions take hold where particular urban moments and places come to be realised as opportune–fitting, appropriate, timely, or providing favourable circumstance–in carbon terms and where carbon becomes regarded as opportune for realising an array of additional urban agendas (see also Bulkeley forthcoming).

In using configuration we are also highlighting that the relations configured between diverse elements in a governance project will always be unstable, prone to dispersing, and susceptible to being destabilised by internal tensions, or reconfigured and rearticulated to other trajectories (Li 2007, 286 and see Marcus and Saka 2006; Delanda, 2006). The practices of problematization or opportunism are not singular but ongoing, as efforts are required to hold relations in place to maintain alignments between the gathered elements and actors. Where these labors of configuring succeed, they hold assembled orders together as relative stabilities (Anderson et al. 2012). The ongoing work of configuring is as important as the provisional gathering and ordering that is initially produced (Henry and Roche 2013; Swanton 2013). The coherence of a configuration—in our case, the figure of the governance intervention or project—is an achievement and "the labor, friction and accommodation necessary for this coherence matters" (Swanton 2013, 286). The array of labors involved in maintaining relations has frequently fallen outside the analytical gaze of studies of governance. The ongoing nature of these labors is widely acknowledged in ANT and AT[3] both of which emphasise how human and material actors are bound up with each other in actor-networks/assemblages and the ongoing work required to cohere and maintain them (e.g., McFarlane 2009; Müller 2015a). Yet analyses thus far have tended to be muted when it comes to specifying the processes, practices, and devices through which this work is achieved (though see Henry and Roche, 2013). We find configuration/configuring to allow us to excavate more precisely the representational, material, and practical labors, devices, and techniques involved in orchestrating and aligning but also in maintaining the socio-material relations that compose specific interventions. As such it offers a useful corrective

---

[3] The synergies between the language and conceptual bases of AT and ANT are frequently commented upon. While there are points of distinction between the sets of theories (see Anderson et al. 2012) they are often drawn on in tandem (e.g., Müller 2015a) and assemblage is taken as a close equivalent of the actor-network (Müller 2015b).

to the inference of a unidirectional, discursively mobilized movement from intention to intervention associated with the notion of translation[4].

Such a focus, then, is highly beneficial for revealing more precisely how governing intentions might be translated from abstract, programmatic intent to be made effective through specific interventions or projects. Here, we focus on two particular sets of processes and practices through which configuration takes place, including a focus on the devices (materials, technologies, and techniques that enable representation, depiction, and ordering) through which the work of these processes and practices is achieved (see Bulkeley et al.forthcoming). The first, which we term *narration*, draws both on the wider Foucauldian conception of problematization, whereby the way issues are defined as problems in need of improvement is intricately tied to the solutions thought to be appropriate (Larner 2011), and the notion of 'storylines' as a means through which governing coalitions come to be formed[5] (Hajer 1995). Thinking configuration in these terms points to the important work of narrating problems and opportunities as moments for governing carbon in forming the alignments required to realise particular interventions. Furthermore the devices through which these processes gather and represent particular socio-material relations and their meaning, together with the ongoing practices of circulation and validation, are critical in sustaining such configurations. Narration, then, also serves to mobilize representations that depict, rehearse, rearticulate, and circulate the value of an intervention, both in terms of its validity as a solution to the problem or opportunity which the intervention articulates but also for satisfying particular interests or positions amongst constituents. As such, narration is representational, performative, and socio-material, undertaking the relational work of configuring actors and elements, suturing them together in the constitution of governing projects.

A second means through which configuration is practiced and secured is through what we term here *ordering*, devices used to establish the appropriate socio-material arrangements through which the will to govern can be realized in specific projects. Rather than focusing on

---

[4] A broadly related notion is mobilized in Gidwani's (2008) use of 'suturing' to explore the composition and ongoing governance of political-economic formations. For Gidwani suturing is, like configuration, driven by a compositional logic and committed to the historically and geographically distinct conjunctures in which governance projects must be realized. Moreover, suturing resists the inference of unidirectional movement from intention to intervention that troubles the notion of 'translation', through its receptiveness to the instability of political-economic formations and their continual need for labors of repair. However, in exploring how desired formations are sutured together via moral and economic orderings, class, gender, and political relations rendered across human and non-human circuits, suturing remains somewhat abstract and ideational. By contrast, configuration enables a focus on the detailed workings of practices involved in maintaining the relations that hold heterogeneous elements together.

[5] Following Bamberg (2011) we think of narration as a mode of discourse associated particularly with the purpose of passing on values about what is considered desirable, good, or valued or aimed at establishing (or countering) norms and conventions.

alignment, such processes, practices, and related devices attend to delimiting the configuration and maintaining particular (subject) positions, shaping what is made visible, traced, valued, or performed in and through the configuration (see Shaw and Meehan 2013). These techniques are also an important means through which the labor of accommodating frictions and facilitating the compromises to maintain the alignments between project elements is conducted (see Duinveld, VanAssche, and Beunen 2013; Swanton 2013). Such accommodations are needed to maintain the ordering of relations, to hold projects together both across tensions that arise as they are enacted and across the inevitable churn of personnel enrolled in such projects that can threaten organizations' ongoing commitment to alignment. The practices and particular devices that craft and channel project relations, orchestrating project components, are, we suggest, situational and so will vary with the specificity of the project. In the next section, we focus on these two forms of configuration, to tease out and parse the ways in which two projects serve to gather, align, and maintain the relations through which governing is exercized.

Configuring intervention in the practice of urban carbon governance

The notion of configuring a governance project sets the terms for our engagement with two projects that attempt to govern urban carbon in Sydney: Blacktown Solar City (BSC) and Randwick Sustainability Hub (RSH). These cases have been selected from wider research conducted under the Australian Cities and Carbon Reduction project [Australian Research Council Discovery Project 110100081]. This research initially involved an audit of carbon governance initiatives in Australia's capital cities and a categorization of the domains, objects, subjects, mechanisms, practices, and materialities through which these initiatives attempted to govern. Following this, we undertook detailed qualitative investigation of a series of case studies including Blacktown Solar City and Randwick Sustainability Hub. The case studies involved extensive in-depth interviewing of key informants involved in diverse aspects of these initiatives; site visits to neighborhoods, showrooms, and demonstration sites; attending events such as workshops, festivals, fairs, and information sessions; analysis of relevant regulatory and organisational frameworks; and analysis of project materials including project reports, public presentations, information packs and brochures, advertising, and media materials. In what follows we draw on these methods to explore these two projects as specific enactments of governance intent. We turn now to drawing out the processes, devices, and techniques of configuration mobilized in the projects.

Blacktown Solar City: bring the city into the grid
Our first case—Blacktown Solar City—points to the multiple forms that the 'carbon problem' takes. BSC is a particular intervention developed in response to an identified 'problem' in need of 'improvement': that of the electricity grid and the need for costly grid upgrades related to integrating decentralized renewable generation capacity in response to carbon

reduction imperatives[6] and to rising peak demand[7]. In recent years in Australia, grid upgrade costs have driven steep and deeply unpopular increases in electricity prices[8]. Governments, various elements of the electricity industry, and public interests are, therefore, collectively alive to the 'grid problem'. Following Hajer (1995), the grid can be understood as an emblematic issue within the wider problematique of carbon and climate change. As such it plays a key role in problem definition and in shaping the governance solutions visualised. In this instance, the emblematic issue of 'the grid problem' suggests (peak) energy demand reduction as a possible solution by simultaneously enabling the integration of renewables to lessen fossil-fuel dependency whilst containing peak demand, and managing the need for grid upgrades. In this way, solutions around managing urban energy demand have come to the fore. The need to realize demand reduction through local responses is one important driver of cities' increasingly important role as strategic sites and spaces in the governance of climate and energy systems (M[c]Guirk, Dowling, and Bulkeley 2014b).

This particular framing of the carbon problem as one relating to the need to transform the urban electricity supply system and manage demand was the context for the federal government's Solar Cities program which co-funded seven Solar City demonstration projects across Australia designed to trial new sustainable models for urban electricity supply and use, each of which included some form of local solar energy generation along with other forms of intervention in electricity supply systems and in measures to improve efficiency and reduce demand. The urban context provided the opportunity to trial suites of initiatives—from solar installations to energy efficiency, smart metering, and pricing trials—in a concentrated way in specific localities yet at sufficient density and scale to test the social and market viability of particular paths to transitioning the urban energy system. Blacktown Solar City project was one of seven successful bids for funding from the Solar City program, winning federal support of A$16 million for seven years to 2012. Aimed to trial and promote solar energy and wider deployment of demand management measures in businesses and households across Blacktown government area and beyond, the project involved a gathering of the diverse strategic interests and aspirations of local, state, and federal government agencies, solar technology providers, electricity distributors, energy efficiency specialists, mortgage financiers, and the enthusiastic residents of Blacktown, along with solar panels and hot water systems, smart meters, pool pumps, insulation materials, low energy light bulbs, discount vouchers, information

---

[6] Currently, electricity generation is Australia's single largest producer of Greenhouse Gas (GHG), accounting for nearly 35% of emissions (DCCEE 2012). Three-quarters of electricity generation is coal-fired, making Australia's electricity production system one of the world's most carbon-intensive (Commonwealth of Australia 2011).

[7] While energy demand plateaued nationally, peak demand recently reached historic highs, requiring costly upgrades to the electricity grid (Wood and Carter 2013).

[8] The average NSW household electricity bill has doubled in the past six years (Wood and Carter 2013). Of the current average bill, 51 percent is related to network charges (Australian Government 2012).

packs, and voluminous streams of data (see Table 1). Collectively, these actants constituted a wide range of initiatives and trials described by one participating actor as:

"a concentrated trial of the range of different things. Pricing trials, insulation, PV, a business program, some commercial PV, and ... a bit of behavioural change I guess, and a bit of community education" (Big Switch interview, November 2012).

Table 1: Blacktown Solar City: project components

Component	Descriptor
Department of Climate Change and Energy Efficiency	Federal department, project proponent, and key funding partner.
BP Solar	Energy company and solar technology provider, lead consortium partner.
Blacktown City Council	Local government, key conduit for community engagement.
Endeavour Energy	New South Wales (NSW)-based electricity distribution and retail corporation, key conduit for access to energy use data, meters and price trialing.
Landcom	Development arm of the New South Wales (NSW) government, lead on residential solar photovoltaic (PV) offer.
Big Switch Projects	Energy efficiency and energy management consulting firm, lead on insulation offer and business energy efficiency program.
ANZ Bank	Bank and mortgage financier, lead on discounted mortgage offer.
Cultural Perspectives	Social research consultants, lead on community engagement and social research activities.
Commercial PV	Solar electricity installed at 5 commercial locations.
Residential Retrofit	Supply and installation of BP Solar Energizer 1Kilowatt (KW) solar electricity (PV) system with solar hot water system.
Social Housing Retrofit	Replacing electric hot water systems with solar hot water systems, and installing solar electricity systems.
Residential New-build	Supply and installation of BP Solar Energizer 1KW solar electricity system in 'The Ponds' residential development.
Residential Refinance	Supply and installation of BP Solar Energizer 1.5KW solar electricity system financed through home loan refinance mechanism.
Discount Voucher Booklet	Distributed to all residents offering discounts on energy efficient products from local businesses.
Insulation Retrofit	Discounted insulation packages for residential properties.
Business Energy Efficiency	Creating energy efficiency programs to cut commercial sector energy use.
Residential Energy Consultation	Identifying and facilitating opportunities to save the residents money, energy and greenhouse emissions.
Energy Efficiency Packs	Large-scale distribution of free energy efficiency packs through Council's Information Centre.
Stand-by Power	Use of smart meters to highlight easy consumer savings by

Reporting	managing their stand-by power use.
Air-conditioning & Pool Pump Control	Remotely switching off pool pumps for short periods to reduce peak load.
Time-of-use & Critical Peak Pricing Trial	Better reflecting true cost of electricity delivery through differentiated tariffs.
Communications strategy	Communications & marketing schedule, brand identity and value proposition.

(Adapted from Blacktown City Council, Blacktown Solar City Final Report.)

Tracing the movement from the intent of the Solar City program to govern energy and climate change via reform to electricity provision and demand reduction, to the *particular* invention shaped at the Blacktown Solar City project poses the question: how and why were relations between the particular constellation of actors and elements that made up the BSC project configured and maintained?

Narrating Blacktown Solar City as solution to a complex problem
In answering this question we turn first to the process of narration, enacted through specific devices, involved in shaping BSC as a solution to the particular definition of the carbon problem as a grid problem. Several narrative threads or storylines are discernible. First, interviews with key informants involved in BSC revealed the cohering force that Blacktown—its distinctive geographies and place characteristics—had in configuring the project. Blacktown was narrated both as a place with a localized problem of growing energy demand and grid-related constricted supply, and also a place (and scale) where solutions could be emplaced that might improve the grid problem Australia-wide, via the uptake of solar and demand management practices. As such, Blacktown itself provided a valency that could gather and forge alignments between actors allowing them, in turn, to translate the project into their distinctive interests to maintain their involvement.

As one of Australia's largest local government areas, with a growing and diverse population of over 300 000 people (or one in 70 Australians), Blacktown's geographical context was mobilized as presenting the manifold challenges of inducing solar uptake and demand management across large scale, complex urban settings. Storied as a socio-demographic microcosm of urban Australia, Blacktown attracted federal government and BP Solar to the project because:

 "it is a massive diverse melting pot, so across their 47 suburbs you have every (variation) that you can get in terms of socio-economic demographic. So in terms of reflecting something that you could roll out to the rest of Australia, we touched it in Blacktown" (BP Solar Interview November 2012).

For electricity distributor Endeavour Energy, Blacktown's scale and the material diversity of the urban housing stock provided the opportunity to work on the full complexity of an electricity supply network, one in which rates of uptake of photovoltaic (PV) were high:

"Blacktown I think had the highest rate of take up of solar in New South Wales. ...it had both established areas where there were constraints on our electricity network. It also had some greenfield housing developments and there was recognition that all those paddocks are going to be houses in the next ten to twenty years and maybe we can plan things better" (Endeavour Energy interview, November 2012).

The perception of a wider enthusiasm in the Blacktown community to 'make a difference'— also cohered the project and its strong community engagement dimensions:

"there was a desire to be involved in something like this...a lot of people they said that they wanted to contribute to something bigger, not just do something in their home, but...to develop an energy efficient product or service or something" (Endeavour Energy interview, November 2012).

Indeed, 'make a difference' was adopted as BSC's marketing slogan and appeared ubiquitously on the project's web and print media material, on project advertising materials circulated through the community, at project information hubs in local community centres, and at project community events across the local government area (see Image 1). Narrating Blacktown as an arena which epitomized the complexity and multiplicity of the grid and the opportunity of mobilizing the community behind managing the grid in line with carbon objectives served, then, as a configuring force, aligning and sustaining relations between the core partnership actors around the potential for intervention through urban energy demand management as a means to improve 'the problem of the grid'.

INSERT IMAGE 1

A second narrative thread which wove the project together centred on a storyline of the grid problem and its solution as complex and manifold, beyond the governance capacity of any individual actor. For BP Solar:

"all of our partners were critical because they all had a part to play and we all had very distinct things that we were doing" (BP Solar interview, November 2012).

Yet these diverse actors and elements had to be drawn into relation in the name of 'improvement'. The multiplex nature of the project as a response to a complex problem was repeatedly rendered through inscription devices such as graphics, tables, and lists included in project reports, public presentations, media releases, and project information

circulated both by the consortium and by its constituent members (see Image 2), and its complexity was publicly managed via a toll-free call service set up to field questions from interested (or concerned) businesses and residents. The project was said to depend fundamentally on a multi-partner consortium rather than any attempt at centralized delivery:

"the usefulness of actually getting locally based consortiums to deliver the funding and manage the projects…they know what's important locally and they're the ones who can actually drive the various needs" (DCCEE interview, November 2012).

Blacktown City Council recognised its role in securing the crucial involvement of the community across the project's multiple components:

"(our involvement) gave people a lot of comfort. They thought 'oh, this is something legitimate and council's involved, then I can get involved too'" (Blacktown City Council interview, November 2012).

The utility of council's role in binding together and validating these multiple components was activated through repeated referencing of Council in print and radio media, and the inscription of Council's logo on the project website and at public promotional events, such as at a major community fair focussed on the project. The storyline of a necessarily multi-agent, complex response to realize the governance objectives helped to naturalize the project without the need for command and control regulation from government authority, making it seem a logical and inevitable consequence of recognizing the importance of addressing the grid-demand problem (see Duinveld, VanAssche, and Beunen 2013). Indeed while BSC was configured as a somewhat sprawling project—"a whole lot of discreet elements that we were doing" (Blacktown City Council interview, November 2012) that individual organisations worked on in a relatively self-contained fashion (see Table 1)—BSC actors still viewed the project as a coherent whole with "all these layers kind of working together" (BP interview, November 2013). The project was gathered, aligned, and maintained, and each element was only made possible by narrating 'the problem' as multiple, extensive in reach, and beyond the governance capacity of any individual actor.

INSERT IMAGE 2

Nonetheless, for the relationships that constituted BSC to cohere and be sustained, actors needed to be able to translate both 'the problem' and its proposed solution into their own (heterogeneous and multiple) strategic interests and ambitions (see Rose and Miller 2010). Both the problem definition of 'the grid' and the particular storying (Cameron 2012) of the BSC project as a proposed solution enabled this. For example, solar

technology provider BP Solar saw in BSC opportunities to advance future business in Australia. Connecting to BSC offered access to data (see Image 3) that would give the firm a privileged position from which to engage with federal government on policy settings around the future of the energy industry:

"It was a really good way to actually get data that would assist us in terms of programs that the government would use, moving forward, for sustainability, particularly for BP Solar around the solar industry and alternative energies…So it was a way for us to actually work with and engage at a federal level with the government to look at where we needed to go for the future for the solar industry…" (BP Solar interview, November 2012)

INSERT IMAGE 3

For Landcom, the development arm of the NSW government, the project coincided with its ambition to demonstrate leadership in sustainability. For them BSC:

"sits in well with our environmental credentials in terms of, as a developer, where we wanted to be in measuring our own targets or other activities on the ground" (Landcom interview, November 2012).

For its part, Blacktown City Council recognised the strategic advantages of building prestige and engagement with the local community providing a central role for the authority as the democratic representative body for the community. Within the wider problematique of carbon and climate change, the definition of the problem of the grid allowed BSC's configuring storylines to draw together diverse project elements through which constituent actors could recognize and pursue opportunities aligned with their diverse interests through the urban scale and material context. This recognition, mobilized discursively and through a series of material devices—from graphs representing project complexity, to tables amassing project elements, to data streams—was sufficiently persuasive to induce actors to associate and participate collaboratively across the life of the project, without the need for more directive or forceful forms of power and authority.

There was a third narrative thread through which alignments between project partners and elements were realized and maintained: that of the *collective* benefits of the project. The internal circulation of this storyline across the project provided relay points at which alignments between project partners and elements were reaffirmed. For example, representations of value reaffirmed that the project was worth doing economically, environmentally, and socially, and that this value arose from the mutual interests involved and would be shared across all parties in the project. BSC's benefits were

repeatedly represented in four main ways: as cost savings, as carbon savings, in terms of its wider legacy for the community, and because of the demonstration effect it would produce, leading to the uptake of its constituent elements. Project reports and websites were saturated with tables of project outcomes quantified in dollars shaved from electricity bills, kilowatt (kW) hours of solar energy capacity installed, and greenhouse gas reductions inferred (see image 4), and these devices circulated throughout the project such that achievements could be quantified at will by consortium members:

"we got 23 businesses on board…I did $5million worth of annual savings, 10,000 tons of Co2…" (Big Switch interview, November 2012).

Legacy components revolved around:

"big iconic pieces to …get some kind of communication and excitement around the project…these should also be legacy pieces moving forward" (BP Solar interview, November 2012).

These iconic pieces were largescale commercial PV installations on prominent public sites which could be toured by locals—28.8kWs of solar electricity installed at a local community hub, 50kWs on the council depot—or at largescale local industrial sites—100kW at the Cadbury Schweppes factory, 110kW at Coca Cola Amatil (see Image 5)—where attention could be drawn to the demonstration value of these icons.

INSERT IMAGE 4 and 5

Further strategic collective benefits were seen to accrue from the articulation the project forged between Federal government's, BP Solar's, and Endeavour Energy's common interests in reforming the electricity system. BSC could build capacity through the partnership, develop relationships with suppliers, and produce benefit from the technological elements supplied by partners:

"It was a fantastic partnership for (Endeavour) and BP Solar … it opened the doors for us to be able to communicate about the things that we were doing that impacted on an energy retailer/wholesaler/distributor. Then also what their impact was on our industry in terms of the processes, the procedures, the permissions to connect, all of the other things that move forward" (BP Solar interview, November 2012).

Narrating BSC into alignment worked through distinctive narrative threads, then, whose capacity for configuring worked discursively and through particular devices embedded in project outputs and through the installation and development of particular technologies and artefacts. Collectively the storylines, and the devices that enabled them, enacted and maintained the project's relational configuration insofar as they performed coherence and, significantly, provided an ongoing basis for authorizing the project (Bulkeley 2012).

Ordering: techniques of channelling and disciplining relations

Analysis of the workings of the BSC project suggested that, in addition to the process of narration and its attendant devices, holding the project together in an ongoing way required further explicit labors and the deployment of specific techniques to order, channel, and occasionally discipline relations (see Henry and Roche 2013). Specifically, particular devices of project management performed crucial ordering work in orchestrating and rearticulating project actors and elements, ensuring that individual partners were working to meet defined project objectives, and cohering relations between partners via standardized practices and performances.

BSC's consortium structure was determined by federal government program guidelines which included a suite of legal principles which determined that government would only deal with the lead consortium proponent. This legal principle ensured the project had a tight governance structure, a steering committee and predetermined techniques for controlling voting rights, managing decision-making and resolving conflict within a particular spectrum of visibility resulting from the legal principle, amongst additional ordering devices. These devices loomed large in actors' recollections of project relations, acting as linchpins that held the actors and project elements together, seemingly very effectively:

> "We had very good governance in place. … Make sure that it's laid out upfront, voting rights, what will happen if there's a conflict, how you would deal with it, how things will get decided, what will be documented, how often you'll meet. All of those things which sound quite mundane are absolutely critical when you're talking about - like we had a $28 million project running over seven years, with five different members sitting in a consortium and a government overseeing it, so those things actually become quite critical to making that work" (BP interview, November 2012).

A further set of devices that stabilized the performance of the project and performatively maintained its relations, involve calculation—expressed both in financial and project metrics terms. Targets were specified for each component of the intervention. These were itemized and progress against targets tabulated and reported against fixed reporting obligations for: PV sites installed; discount vouchers on energy efficient appliances circulated and cashed in; energy efficiency packs distributed; smart meters

installed for air-conditioner, pool pump, and pricing trials; insulation installations completed, contracts signed. Each element was monitored and progress in each domain made visible. Reporting on metrics and the project obligations of each partner was a routinized part of BSC and an important way of gathering and (re)configuring the layers of activities and the lead actors together (and, in so doing, maintaining their subject positions) across the life of the project:

> "the amount of reporting and inventory checks and that type of thing that we had to do. There was always something happening with the project" (Blacktown City Council interview, November 2012).

Furthermore, the project's financial calculations were predicated on a fixed in-kind:cash contribution ratio. Hence, if targets involving an in-kind dimension were not met (e.g., for smart meter installations, donated by the electricity distribution firm), the government cash contribution had to be renegotiated, effectively holding partners in ongoing relation to one another. These devices performatively made and maintained the project as actors came to understand it and recognize its agency and capacities through these calculatory terms (see Callon 1998). These devices animated the conduct of and channelled relations across and between human and non-human elements that composed the intervention.

These various calculatory techniques and devices of project management became important components of the labor necessary to smoothing out contradictions and to devising compromises that could hold intact the project's ordering as a socio-material network working towards a shared mission (see Müller, 2012). As one project actor put it:

> "Well there were certainly times when … you know there was some disagreement because of the different priorities. Yeah, so you know some might have wanted to pursue particular opportunities that were not relevant to the rest of the consortium, for example."
> Facilitator: "Okay, and that largely got managed through a governance process then?"
> "That's right" (Endeavour Energy interview, November 2012).

Opportunities that were 'off-target' could be ruled out, unable to be mapped back into the specified targets and timelines, and actors seeking to pursue ends deemed outside the project's configuring brief could be drawn back into line. Similarly as the project matured and the inevitable churning of personnel made itself felt, targets and timelines acted to draw in new personnel and align their performance with the project's existing configuration.

Yet, intriguingly, the contingencies of BSC suggest that consensus and partnership practices exceeded the cohering force of calculation and its attendant devices. BSC operated in a deeply unsettled policy landscape concerning solar rebates. Project targets shifted

repeatedly as consortium members adjusted to changing conditions external to the project, lessening the grasp of calculative targets. In addition, political exigency around the BSC launch date meant that that much was left to the process of project implementation itself:

> "due to the pressure from the…Minister to get Blacktown Solar City up and running before the 2007 election, the consortium was up and … for several years before the department worked out what data it wanted. So we really - we got going with the project before we worked out what we needed" (Big Switch interview, November 2012).

This suggests that when it comes to the politics of realizing governmental programs, practices and devices of building consensus and partnership may be just as important to ordering as more controlling, disciplinary devices of calculation. We return to this point in our treatment of the Randwick Sustainability Hub below.

Randwick Sustainability Hub: configuring community action around carbon footprints
In contrast to the scale, scope, complexity, and 'top down' nature of Blacktown Solar City, our second case, Randwick Sustainability Hub (RSH), represents a local 'bottom up' initiative resulting from the collaboration of adjacent local government authorities, and local sustainability and climate change activist groups. Rather than the grid, the domestic use of technologies reliant on carbon–for heating, cooling, cooking, provisioning–was the focus of RSH. Its various components address the opportunities for decentralizing urban infrastructures for the supply of energy, water and indeed food through urban retrofitting. Despite its differences from Blacktown Solar City, similar configuration processes of narration are to be found that serve to align the interests of the diverse actors and elements involved and forms of ordering induced through ongoing labors that channel and discipline the arrangements through which the project is enacted. This second case sheds more light on the diverse registers of power involved in configuring the relations that constitute carbon governance projects. Moreover, it foregrounds the diversity of actors—outside the domain of formal politics and beyond the range of governance actors normally considered hegemonic—that are drawn into relation in order to enact specific carbon governance projects, pointing to the polycentric nature and forms of authority emerging around the matter of governing carbon (Benson 2010).

RSH framed carbon as a problem of the overconsumption of resources. Randwick and its surrounding inner suburbs of Waverly and Woollahra are among Sydney's most affluent and high-density inner suburbs, with a population of a quarter of a million people. Inspired by a state government research report that established that the ecological footprint of these suburbs was higher than comparable suburbs nationally (Lenzen 2006) the problem of the ecological footprint became an emblematic issue behind the development of the Randwick Sustainability Hub, which in turn became visualized as a solution offering the means to

reduce local overconsumption. Despite drawing on state government finances, Randwick Sustainability Hub is a locally-initiated project[9]. It is constituted by the Randwick Community Centre, retrofitted for sustainability, closely associated with the nearby Barrett House, a home bequeathed to Randwick Council and converted as a sustainability demonstration house. The buildings have been retrofitted to include PV panels, solar heating and cooling systems, ceiling fans, solar domes, double glazing and roof insulation, light-emitting diode (LED) lighting, wind turbines, water tanks, and multifaceted permaculture gardens The two locales operate as demonstration and education sites for low cost domestic retrofit features and permaculture practices to reduce urban energy and water consumption. The character and activities of the Hub are summarised in Table 2.

Table 2: Randwick Sustainability Hub: project components

Component	Descriptor
Department of Environment and Climate Change	NSW state government department, key funding partner.
Randwick Council Woollahra Council Waverly Council	Local Governments, key conduits for initiative.
Solarch	Sustainability Architects, designed retrofit of the Hub's physical spaces.
Permaculture East	Local activist group, key drivers of permaculture initiatives in the Hub.
BIKEast	Local activist group, bicycle user group and Hub networker.
Rhubarb Food Coop	Local food cooperative and Hub networker.
Transition East	Local branch of not-for-profit Transition Towns movement, and Hub networker.
Climate-action Sydney Eastern Suburbs	Local activist group and Hub networker.
Barrett House Retrofit	Solar PV, energy saving appliances, insulation, recycled materials.
Community Centre Retrofit	Solar PV, wind turbine, water tanks, permaculture garden.
Education program	Sustainable living workshops held at both community center and Barrett House, including those for sustainability leaders/community champions.
Permaculture Interpretive Garden	Garden with signage at Barrett House, designed for school groups and public.

---

[9] While the NSW state government's Climate Change Fund resourced the Randwick Community Centre retrofit, wider funding for the 3-Council Ecological Footprint project—a partnership between Randwick, Waverley and Woolahra Councils— was obtained from the NSW Environmental Trust and Department of Environment and Climate Change (2007-2010). The three councils agreed to continue project funding after the grant period.

Non-profit/activist events	Barrett House used as 'hub' for numerous meetings etc.; National Permaculture events.

(Compiled from key informant interviews at RSH.)

Narrating the space of opportunity

Multiple local actors and a host of intervention elements were drawn to and aligned in the RSH project by narrating Barrett House and the Randwick Community Centre—the RSH—as an opportunity space through which to provide solutions to the problem of overconsumption and elevated ecological footprints. Randwick Council had been grappling with the need to find a productive use for Barrett House, a residential dwelling bequeathed to council but with strict limitations on its future use. Its materiality—in particular its location in a residential street and its heritage properties –meant that attempts to lease the house for commercial purposes had been unsuccessful. Simultaneously the council was seeking community input on how to repurpose its nearby community centre. Interview analysis suggested a cohering narrative that storied the availability of these spaces as (literal) opportunity spaces that gathered actors to the RSH project, and translated readily into the interests of the various partners and participants to align them to the project.

Narrating the opportunity to address issues of high consumption footprints relied on the mobilization of the buildings' capacity to provide affordable and available space and the valency of this in assembling a related array of community-based organizations to network, organize training, hold events, and exchange information and ideas aimed "to show people what they can do to get the footprint down" (RSH Manager interview, November 2012). RSH coordinators focused on attracting "aligned sustainability related groups" and:

> "tried to get as many community groups involved as possible and encourage them to open the house and do their own things to the public in there" (3-Council coordinator interview, June 2013).

Here, the building itself was a critical node, a device if you will, in drawing these actors and a host of related intervention activities together including the Rhubarb Food Co-op, the BIKEast bicycle user group, Permaculture Sydney East group, and Climate Action-Sydney Eastern Suburbs. For these non-profit small-scale community groups:

> "getting access to a venue without having to pay high fees is quite an important and difficult issue and that's where they helped us greatly" (Permaculture Sydney East interview, June 2013).

As a material embodiment of lower carbon, more sustainable everyday living–with natural ventilation for cooling, energy efficient appliances and sustainable materials–it became an affective drawcard to the groups involved: "It kind of imbues a nice kind of feeling for a

group like ours to be in such a place" (Climate Action-Sydney Eastern Suburbs, interview, June 2013) (see Image 6). The availability of the space and its resources proved a seductive and persuasive storyline, reproduced through the materiality of the buildings themselves, that drew these groups into relation and aligned their diverse forms of intervention through the RSH project.

INSERT IMAGE 6

A second narration that served to configure the RSH project was that which located the 'footprint problem' as one that could be addressed by working on the urban domestic sphere and the sustainability behaviors of local residents in their everyday lives. In this light, RSH was effectively storied as an opportunity to enable education and demonstration to promote everyday behaviour change. The house provided not only a space for convening but a site through which simple changes could be demonstrated, inducement enough to draw the councils together:

> "The really interesting part is it's a collaboration with two other councils…they're on board using (Barrett House) as a resource and to send residents to, to try and just (say) here's an affordable change you can make, solar tubes, [tena] windows and the cheaper version of double glazing" (RSH Manager interview, November 2012).

Indeed, the Hub's permaculture gardens became a key configuring device. Permaculture gardens were a key feature of both Barrett House and the Randwick Community Centre and they drew actors to the RSH project who were interested in permaculture, either directly or indirectly. Some actively promoted permaculture as an effective, holistic approach to lower carbon urban living and lessening resource use more generally:

> "We've been able to use it as a way of promoting permaculture … because it has a lot of great sustainability features built in to demonstrate to people (who) aren't core permaculture as such" (Permaculture Sydney East interview, June 2013);

> "In permaculture they talk about always trying to have something that fulfils three or four roles, rather than just does one. So in the built-form, that might be the way that the interface between the street and the building can adapt… Those were the things we were developing there" (RSH Architect interview, May 2013).

The storyline of the Hub's demonstration capacity both of the buildings themselves and the gardens proved particularly seductive, drawing permaculturists alongside a wider array of community actors into alignment to constitute the project.

As with Blacktown Solar City, representations of the project—for instance in the form of brochures and web-based advertisements for education programs run at the Hub, for the annual eco-living fair held there, and information posters located throughout the Hub's buildings—circulate through the enactment of RSH, re-suturing the alignment of project partners and elements and maintaining the relations between them. These include repeated representations of mutual dependence and support amongst a group of committed actors (see Image 7). These actors were argued to be connected by a set of affective qualities said to characterize the activists behind the Hub's activities: 'passion', 'drive', 'vision' and a spirit of 'crusade' that hold the RSH together and perform important binding work:

> "(RSH has) the interested people, the long term people to hold it together and drive it and to create the continuity for the group … it's very much to do with how many people are on board as to what your capacity is… you're only as big as the people you have on board and that's the capacity really" (Permaculture Sydney East interview, May 2013);

> "We've also had that support from Randwick Council and they've been involved in conversations with us about building community groups and things like this" (CASES interview, May 2013).

Wider discursive representations of the value of the RSH also focused around, first, being seen to 'do something' and, second, the Hub's value as a networking node. The continued performance of 'doing something' acted as a legitimating force, circulating through the project to (re)articulate and gel its actors and actions together:

> "the council is almost happy for us to keep trying to do programs, even (though) the one-off events or something like Ecoliving Fair[10] can be quite expensive. But they'd rather see you doing something..." (RSH manager interview, November 2012).

Crucially though, this collective act of 'doing something' produced another discourse on the RSH's value, and indeed its realisation, as a (literal) network:

> "(RSH) is really a place where lots of groups meet…all with slightly different focuses but all heading in the same directions …Knowing each other I think —and the networks that have been formed—is the real value of what's happened in and around Barrett House over the last four or five years" (Permaculture Sydney East interview, May 2013);

> "(RSH has) also been quite effective in relation to connecting people - the individuals who are all usually members of two or three other groups. We connect them and

---

[10] An elaborate annual environmental fair involving multiple events, activities, stalls, and demonstrations, hosted at the Randwick Community Centre.

promote them …So this networking has been a valuable component…it's meeting regularly with people who are concerned about the same issues, supporting of the groups, the networking and all that" (CASES interview, May 2013).

Ordering: channelling and disciplining relations

Despite the naturalizing effect of the connotation of 'hub', the RSH project is nonetheless an enacted assemblage that must be practically maintained. Given its nature and recognized value as a socio-ecological network, as opposed to a formally constituted governmental program, techniques of partnership engagement stand out above those of project management as performing the most crucial stabilizing work for RSH. In one sense, the materiality of the demonstration buildings works to engage the community members and the constituent environmental groups in the project. RSH, through its constitutive premises, performs as "a common place that we go to, so it's helped bind us together" (CASES interview May 2013). Engagement around the RSH's mission and related interaction in its physical spaces creates social capital between its diverse elements, weaving the (networking) 'ties that bind' between the diverse array of groups facilitated at the RSH. Local government support was seen as 'paramount' to enabling this. Local groups and key individuals were encouraged to work directly with local government to activate the RSH open days, annual environmental fairs, and in the training courses offered through RSH, as well as using the resources of the space for their own group activities. The combined engagements across the heterogeneous elements nurtured these networks as a deliberate strategy of local government who:

> "worked hard at creating networks of people from all different sorts of groups… with both an educational and a community networking approach" (Permaculture Sydney East interview, May 2013).

Local government's approach to coordination and the materiality of the RSH sites, that embodied the Hub as a network, combine in an ordering of relations that is non-hierarchical and wherein the boundaries between state and private capacities for governing carbon are blurred.

Finally, our analysis suggests that practices of calculation and it attendant devices have less binding or disciplining force in RSH than in BSC. In RSH the footprint acted largely through its symbolic capacity to engender action rather than its calculative character. Footprint calculation was writ small in the RSH's activities. Its valued networking and demonstration capacities were much more prevalent and, of course, are less amenable to capture in calculative forms. Yet a comparable galvanizing idea was the notion of the RSH's success in attracting repeat visits, repeat participation in various courses, and encouraging participants to adopt modeled behaviors:

"We've tried to test whether they're going back into the communities and doing what we're asking …(there's) been a couple of in-depth type evaluations of getting people back to try and see what they're doing…it's a little bit hard to quantify but the evaluations are showing that they are becoming champions in their networks" (RSH manager interview, November 2012).

The notion of multiplying the number of 'ambassadors' who could build the wider community commitment to changed climate response behaviors and capacities could help reproduce the ordering of relations that stabilize the cohort of the actors and activities that configure the RSH. Again, this points to the importance of building consensus and partnership engagement as forms of ordering worthy of attention, alongside a concern for more disciplinary techniques of calculation.

Conclusion

In this article we set out to explore the, thus far, underspecified processes of configuration through which relations between diverse actors and elements are drawn and, crucially, held together to shape governmental programs and the governance projects through which such programs are enacted. Our analysis revealed a suite of configuring processes and devices that operate across two quite distinctive projects: the top-down, large-scale Blacktown Solar City dominated by actors often thought of as hegemonic, and the bottom-up, small-scale Randwick Sustainability Hub populated by actors not often associated with the hegemonic. We specifically identified two dimensions of configuration across the two cases. The first is narration, carried via particular storylines—be they about the need for a multi-agent response to the complex grid problem or the opportunity of underutilized spaces to "show people what they can do to get their footprint down"—through which a specific project is visualized as a solution and its components assembled, composed and ordered. The storylines are circulated through the project via specific devices—graphs, tables, imagery, metrics, iconic installations, and so on—that draw project components into relation and perform the intervention as a socio-material configuration. Through circulating representations, a governance project is configured and its relations maintained, persuading project partners of the project's worth, inducing them to continue involvement by extoling project benefits in terms with which they can identify. The second dimension, ordering, is again enacted though specific devices, such as partner engagement and calculation, that (re)enrol project elements into particular roles and subject positions, operating to secure ongoing performances that cohere project relations. This excavation of the specific dimensions of configuration and the empirical texture of their devices across two cases takes us beyond the notion of translation as primarily unidirectional and discursive, to illustrate the empirical texture of the work of configuring and the detailed workings through which it forges and maintains alignments across a loose assemblage of diverse human, institutional, material, and representational actors.

We pursued this analysis of urban carbon governance interventions as a means of thinking through the implications of configuring processes for how we understand the nature and practice of urban carbon governance, particularly in relation to the operation of multiple modes of power in the practice of governance that enable the assembly of diverse elements and forms of agency into the heterogeneous configurations that are governance projects. Configuration's relational conceptualization of governance projects leaves no room for the idea of a pre-established or stable hegemonic system of power (Rose 2002) that might straightforwardly direct the imagination and enactment of governing intentions.[11] Rather the prism of configuration reveals power as working (discursively and materially) in a wide register of modes, whereby powers of persuasion, inducement and negotiation—that is, associational/relational modes of power (Allen 2003)—appear to be as central to configuring project relations as more authoritative or disciplinary modes. Relatedly the analytical prism of configuration suggests that while calculative practices are present and exert power through disciplinary means as technologies of performance (Dean 1999), they are not always necessary to reproducing a project's ordering and maintaining its relations. In BSC, for instance, we witness project actors being enrolled to work towards and report against performance metrics through forms of discipline manipulation that reinscribe relational dependencies. Likewise the calculative logics embedded in project's financial structuring and used to account for performance in calculative terms may have similar cohering, disciplinary effect. By comparison in RSH, as a socio-ecological network as opposed to a formally constituted governmental program, practices of partnership engagement stand out above project management as performing the most crucial work for maintaining the project's constituent relations. The absence of disciplinary calculative practices in RSH indicates that ordering can be achieved through associational/relations forms of power. Disciplinary practices are one element in the diverse registers of power expressed in the techniques that configure governance projects that far exceed those of authority or domination. This insight opens out the notion of governing from a focus on the 'will to improve' on identified problems to embrace the opportunities for intervention towards generative ends.

In sum, conceiving of governing projects as relational socio-material configurations, and recognizing the multiple modes of power at work in the specific processes, devices, and techniques of configuring that our analysis draws out, recalibrates understandings of the nature and practice of urban carbon governance. When understood in in these terms the outcomes of urban carbon governance projects, and by extension the governmental programs to which they contribute, can never be entirely predictable as if they enacted straightforwardly the implementation of programmatic designs (see Cupples 2011; Duinveld, VanAssche, and Beunen 2013, 23). The processual, socio-material, and ongoing

---

[11] Nor does it abandon the idea of hegemony, however; accepting that hegemony is always in the making (see McGuirk, Bulkeley, and Dowling 2014a).

nature of configuring means that there can be little fixity: challenges to the consistency with which relational configurations hold are always present. And, as Duinveld, VanAssche, and Beunen (2013) point out, configuring occurs through multiple sites, often simultaneously, continually, and through complex pathways and devices. Thus, the coherent figuring of a governance project is confronted by the challenges of its actualization both in the face of diverse interests and logics they attempt to articulate, and in light of the socio-materiality of the time-space contexts in which they are enacted. The realities of actualizing governance projects require the investment of energies in ongoing configuring and reveals the vulnerability of these attempts. Realizing projects must be recognized as freighted with uncertainty: prone to being set on shifting trajectories as the terms of relating, mobilized through individuals, institutions, representations and material devices, are rendered persuasive to diversely-motivated actors, their frictions are negotiated and they encounter the socio-materiality of the urban. With respect to our focus in this article on urban carbon governance, there is the always-present possibility that the context and socio-materiality of the urban will disrupt the project, de-align its components and disassemble its configuration. The project configuration is, then, always liable to be re-worked to be made otherwise (see Anderson et al. 2012). Notwithstanding this relational conception of governing, and the spectre of uncertainty and instability that inheres in it, the on-going questions for analysts concerned with the politics of urban carbon governance are: how and why some forms of projects might be more readily configurable than others, and how might projects be configured in ways that enable a progressive politics of responding to climate change to take place in the city.

Image 1
BSC promotional flyer
Source: The Blacktown Solar City Story, 2013

Image 2

Devices circulating project complexity

Source: Endeavour Energy community information webpage
http://www.endeavourenergy.com.au/wps/wcm/connect/EE/NSW/NSW+Homepage/communityNa
v/Supporting+the+community/Blacktown+Solar+City/; Housing NSW conference presentation
http://www.nhc.edu.au/past-conferences/sydney2008/slide; and excerpt from Wyld Group (2011)

Blacktown City snapshot

Figure 5-11 shows the Blacktown Solar City data. This consisted of HEA, insulation, critical peak pricing, DLC, PV, SHW and IHD interventions. Sites primarily had NEM12 data, after moving from NEM13 early in the program. Similarly, control sites began with NEM13 data, but most had NEM12 energy data available from 2007 onwards.
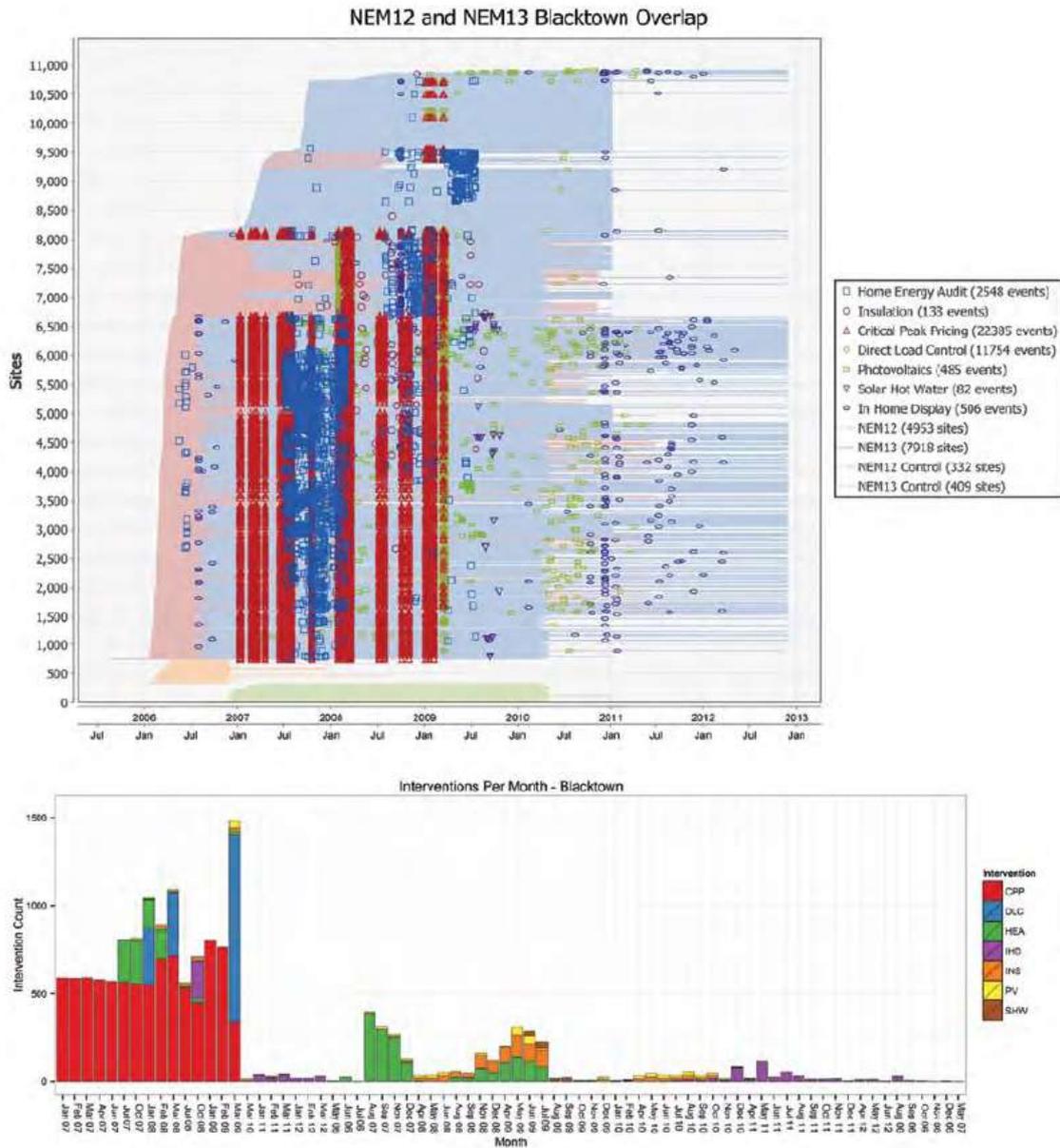

Image 3
The configuring pull of data
Source: Sayeef et al (2013)

BLACKTOWN

Community of diverse cultural and socioeconomic backgrounds. The population of roughly 300,000 includes more than 120 different nationalities and ethnic groups.

Savings of over 1.3 gigawatt-hours of electricity annually

Greenhouse gas emissions reduced by more than 1300 tonnes each year

Annual savings of $200k in electricity bills

490 households installed a BP Solar Energizer electricity system

340 kilowatts of solar electricity has been installed on commercial buildings

Over 3,500 energy efficiency consultations for households

13,000 energy efficiency packs distributed

76,500 compact fluorescent bulbs distributed

1800 customers participated in the Energy Saver Trials

139 households participated in the discounted ceiling insulation offer

Over 184,000 energy efficient discount voucher booklets distributed

Educational information distributed to over 92,000 households

Reducing energy usage

Ethnic community engagement program

School student engagement

Engaging with the community

Meeting the challenges of cultural diversity and facilitating community engagement within a multicultural environment

Table 5.1 – Impact on energy demand

Element no.	Element name	Total estimated energy generated from PV only kWh per year	Total estimated energy usage savings per year kWh per year	Total estimated savings on energy bills from PV only $ per year	Total estimated savings on energy bills $ per year
1	Commercial PV	384,887	384,887	dependent on retailer contracts	dependent on retailer contracts
2	Residential retrofit	553,134	706,534*	$319,880	$355,988*
3	Department of Housing retrofit	259,623	599,623*	$155,773	$226,572*
4	Residential New-build	16,418	56,718*	$9,851	$18,243*
5	Residential refinance	24,254	24,254	$14,552	$14,552
6	Discount voucher booklet	N/A	**	N/A	**
7	Residential insulation retrofit	N/A	181,395	N/A	$37,772
8	Business energy efficiency	N/A	10,102,914***	N/A	$1,299,449***
9	Residential energy consultation	N/A	****	N/A	****
10	Energy efficiency packs	N/A	****	N/A	****
11	Standby power reporting	N/A	****	N/A	****
12	Air-conditioning cycling	N/A	****	N/A	****
13	Pool pump control	N/A	****	N/A	****
14	Time-of-use pricing trial	N/A	****	N/A	****
15	Critical peak pricing trial	N/A	****	N/A	****
	TOTAL	1,238,316	1,963,411	$500,056	$653,127

* including solar hot water

** not measured

*** if all projects identified are implemented – not included in the total.

**** information was not available at the time of publication of this report. Data analysis commissioned by federal government will identify actual figures.

Image 4

Itemising BSC's collective benefits

Source: Solar City Program reporting documents; The Blacktown Solar City Story, 2013

Above: Paul Waterman, President BP Solar Australasia,
Ed Husic, Member for Chiefly and Hon Greg Combet,
Minister for Climate Change and Energy Efficiency.

Image 5
Federal Minister of Environment Greg Combet attends the opening of the iconic solar PV installation at Blacktown Council Depot: 275 panels, 346 sqm of rooftop, 60 MWhs of electricity p.a.
Source: Solarise Issue 8,   June 2011, Australian Government

Image 6
Image 6 Materialising the narrative of lower carbon, sustainable urban living: Randwick Community Centre (permaculture garden; wind turbine, water tank demonstration unit and demonstration kitchen).
Source: Authors' photographs and School Excursion program, RSH Website
(http://www.randwick.nsw.gov.au/environment-and-sustainability/get-involved/sustainability-education-hub)

Image 7

Representing mutual benefit at the RSH

Source: authors' photographs , RSH School Excursion program, RSH Website (http://www.randwick.nsw.gov.au/environment-and-sustainability/get-involved/sustainability-education-hub) and http://www.randwick.nsw.gov.au/about-council/history/historic-places, and Russ Grayson

References

Allen, J. 2003, *Lost Geographies of Power*. Oxford: Blackwell.

Anderson, B., Kearnes, M., McFarlane, C., and Swanton, D. 2012. On assemblages and geography. *Dialogues in Human Geography* 2: 171-189.

Australian Government. 2012. *Electricity Prices Fact Sheet*. Canberra: Department of Resources, Energy, and Tourism.

Barnett, C. 2005. The consolations of 'neoliberalism'. *Geoforum* 36: 7–12.

Bamberg, M. 2011. Narrative practices. In *Varieties of Narrative Analysis,* ed. J.A. Holstein and J.F. Gubrium, 99-124. London: Sage.

Bennett, J. 2005. The agency of assemblages and the North American blackout. *Public Culture* 17: 445–65.

Benson, M. 2010. Regional initiatives: scaling the climate response and responding to conceptions of scale. *Annals of the Association of American Geographers* 100: 1025-35.

Bingham, N. 2009. Assemblage. In*The Dictionary of Human Geography*, ed. D. Gregory, R. Johnston, G. Pratt, M. Watts, and S. Whatmore, 38. Oxford: Wiley-Blackwell.

Blok, A. 2014. Experimenting on climate governmentality with Actor-Network Theory. In Governing the Climate: New Approaches to Rationality, Power and Politics, ed. J. Stripple and H. Bulkeley, 42-58. Cambridge: Cambridge University Press.

Bulkeley, H. Forthcoming. *Accomplishing Climate Governance: new politics, new geographies*. Cambridge University Press.

Bulkeley, H., Paterson, M., and Stripple. J. Forthcoming. Introduction. In *Towards a Cultural Politics of Climate Change: Devices, Desires and Dissent, ed. H. Bulkeley, M. Paterson., and J. Stripple.* London: Routledge..

Bulkeley, H. 2012. Governance and the geography of authority: modalities of authorisation and the transnational governing of climate change, *Environment and Planning A* 44: 2428-2444.

Bulkeley, H., Castan-Broto, V., and Edwards, G. (2015) *An Urban Politics of Climate Change: Experimentation and the Governing of Socio-Technical Transitions*, London: Routledge.

Callon, M. 1998. Introduction: the embeddedness of economic markets in economics. In *The Laws of the Markets*, ed. M. Callon, 1-57. Oxford: Blackwell.

Cameron, E. 2012. New geographies of story and storytelling. *Progress in Human Geography* 36: 573-592.

Commonwealth of Australia. 2011. *Securing a Clean Energy Future: The Australian Government's Climate Change Plan*. Canberra: Australian Government.

Cupples, J. 2010. Shifting networks of power in Nicaragua: relational materialisms in the consumption of privatized electricity. *Annals of the Association of American Geographers* 101: 939-948.

Dean, M. 1999. *Governmentality, Power and Rule in Modern Society*. London: Sage.

DeLanda, M. 2006. *A New Philosophy of Society: Assemblage Theory and Social Complexity.* New York: Continuum.

Department of Climate Change and Energy Efficiency. 2012. *Australian National Greenhouse Accounts: Quarterly Update of Australia's National Greenhouse Gas Inventory, March.* http://www.environment.gov.au/climate-change/greenhouse-gas-measurement/publications/quarterly-update-australias-national-greenhouse-gas-inventory-march-2014 (last accessed 14 July 2015).

Duinveld, M., VanAssche, K., and Beunen, R. 2013. Making things irreversible. Object stabilization in urban planning and design. *Geoforum* 46: 16-24.

Ekers, M., and Loftus, A. 2008. The power of water: developing dialogues between Foucault and Gramsci. *Environment and Planning D* 26: 698-718.

Featherstone, D. 2011. On assemblage and articulation. *Area* 43: 139–142.

Foucault, M. 2009. S*ecurity, Territory, Population: Lectures at the College de France 1977-1978*. ed. M. Senellart, trans. G. Burchelle. Basingstoke: Palgrave Macmillan.

Gidwani, V. 2008. *Capital Interrupted: Agrarian Development and the Politics of Work in India.* Minneapolis MN: University of Minnesota Press.

Hajer, M. 1995. *The Politics of Environmental Discourse: Ecological Modernisation and the Policy Process*. Oxford: Clarendon Press.

Hall, S., and Massey, D. 2010. Interpreting the crisis. *Soundings: A Journal of Politics and Culture* 44: 57–71.

Harrison, C., and Popke, J. 2011. "Because you got to have heat": the networked assemblage of energy poverty in Eastern North Carolina. *Annals of the Association of American Geographers* 101: 949-61.

Henry, M., and Roche, M. 2013. Valuing lively materialities: bio-economic assembling in the making of new meat futures. *New Zealand Geographer* 69: 197-207.

Jonas, A., and Gibbs, D. 2011. The new urban politics as a politics of carbon control. *Urban Studies* 14: 2537-2554

Laclau, E., and Mouffe, C. 1985. *Hegemony and Socialist Strategy.* London: Verso.

Larner, W. 2011. C-change? Geographies of crises. *Dialogues in Human Geography* 1: 319-335.

Latour, B. 2005. *Reassembling the Social. An Introduction to Actor Network Theory*. Oxford: Oxford University Press.

Law, J. 2004. *After Method: Mess in Social Science Research*. London: Routledge.

Lenzen, M. 2006. *An Ecological Footprint Study of New South Wales and Sydney.* http://www.environment.nsw.gov.au/resources/research/08215ecofootprintnswsyd.pdf (last accessed 14 July 2015).

Li, T. 2007. Practices of assemblage and community forest management. *Economy and Society* 36: 263-293.

Marcus, G.E., and Saka, E. 2006. Assemblage theory. *Culture & Society* 23: 101–9.

McFarlane, C. 2009. Translocal assemblages: space, power and social movement. *Geoforum* 40: 561–567.

Meehan, K., Shaw, I., and Marston, S. 2013. Political geographies of the object. *Political Geography* 33: 1-10.

Mitchell, T. 2011. *Carbon Democracy: Political Power in the Age of Oil*. London: Verso.

Moloney, S., Horne, R., and Fien, J. 2010. Transitioning to low carbon communities—from behaviour change to systemic change: lessons from Australia. *Energy Policy* 38: 7614–7623.

Müller, M. 2012. Opening the black box of the organisation: socio-material practices of geopolitical ordering. *Political Geography* 31:379-88.

Müller, M. 2015a. Assemblages and actor-networks: rethinking socio-material power, politics and space. *Geography Compass* 9: 27-41.

Müller, M. 2015b. A half-hearted romance? A diagnosis and agenda for the relationship between economic geography and actor-network theory (ANT). *Progress in Human Geography* 39: 65-86.

McGuirk, P.M. 2004. State, strategy and scale in the competitive city: a neo-Gramscian analysis of the governance of 'global Sydney'. *Environment and Planning A* 36: 1019-1043.

McGuirk, P.M. Bulkeley, H., and Dowling, R. 2014a. Practices, programs and projects of urban carbon governance: perspectives from the Australian city. *Geoforum* 52: 137-47.

McGuirk, P.M. Dowling, R., and Bulkeley, H. 2014b. Repositioning urban governments? Energy efficiency and Australia's changing climate and energy governance regimes. *Urban Studies* 51: 2717-2734.

Paterson, M., and Stripple, J. 2010. My Space: governing individual's carbon emissions. *Environment and Planning D* 28: 342-362.

Rice, J. 2010. Climate, carbon territory: greenhouse gas mitigation in Seattle, Washington. *Annals of the Association of American Geographers* 110: 929-937.

Robbins P., and Marks, B. 2010. Assemblage geographies. In *The Sage Handbook of Social Geographies*, ed. A. Smith, R. Pain, S. Marston, and J.P. Jones, III, 176-194. . London: Sage.

Rose, M. 2002. The seductions of resistance: power, politics, and a performative style of systems. *Environment and Planning D* 20: 383–400.

Rose, N., and Miller, P. 1990. Governing economic life. *Economy and Society* 19: 1-31.

Rose, N., and Miller, P. 2010. Political power beyond the state: problematics of government. *British Journal of Sociology* 43:173-205.

Rutland, T., and Aylett, A. 2008. The work of policy: actor networks, governmentality and local action on climate change in Portland, Oregon. *Environment and Planning A* 26:627-46.

Shaw, I., and Meehan, K. 2013. Force-full: power, politics and object-oriented philosophy. *Area* 45: 216-22

Suchman, L. 2012. Configuration. In *Inventive Methods: the Happening of the Social*, ed. C. Lury, and N. Wakeford, 48-60. Hoboken: Taylor and Francis.

Swanton, D. 2013. The steel plant as assemblage. *Geoforum* 44: 282–291.

Wise, J.M. 2005. Assemblage. In *Gilles Deleuze: Key Concepts*, ed. C. J. Stivale, 77-86. Chesham: Acumen.

Wood, T., and Carter, L. 2013. Shock To the System: Dealing with Falling Electricity Demand. *Grattan Institute.*://grattan.edu.au/wp-content/uploads/2014/03/804-shock-to-the-system.pdf (last accessed 14 July 2015).