

Material Participation

Technology, the Environment
and Everyday Publics

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Preface

This book is located at the intersection of different fields of research and it seems helpful to clarify this at the outset. The analysis presented here stages an encounter between the interdisciplinary field of science and technology studies (STS) and political theory, as it develops an account of the role of technologies, settings and objects in the performance of public participation, and more particularly, a form of engagement I call 'material participation'. The exchange between STS and political theory was the subject of my doctoral dissertation, and since then I have explored it further in articles, book chapters, and in discussions with a growing number of people with an interest in the connections between science, technology, politics, the environment and democracy.

This encounter between political theory and STS is considered timely by people approaching it from both sides, though arguably for different reasons. STS has taken an interest in public participation in science and technology since its very inception. But in recent years the need has arisen for a more critical interrogation of this phenomenon, to complement the arguments in support of participation which have been customary in this field. STS has long been an advocate of greater public involvement with science and technology, and, ironically, for this very reason it was quite unprepared for the rise to prominence of participatory approaches in these areas in recent decades, as signalled by catchwords like citizen science, participatory design and the democratic governance of innovation.

As an advocate of democracy, STS had relied on 'off-the-shelf' ideals of public participation, derived mainly from deliberative and post-Marxist political theory. But it is increasingly clear that the participatory turn in science, technology and the environment requires a much broader theoretical and empirical reconsideration of the phenomenon. Those of us in STS taking up this project were fortunate to find interested interlocutors in political theory, where there is increasing interest in theorizing and interrogating the role of nature, matter and non-humans in politics and democracy. As a consequence, the investigation of the connections between science, technology, nature and democracy today takes the form of, if not a shared undertaking, then at least one enlivened and strengthened by exchange.

I should also mention a second, yet more complex, encounter that informs my attempt to re-work the idea of participation in this book, which has to do with the opportunities offered in the United Kingdom to STS, and to a particular approach developed in this field to which I am especially indebted, actor-network theory. In this country, there exist strong links between STS and the disciplines of sociology and geography, and this allows for exchanges between STS and related approaches developed in these disciplines for the study of science, technology and politics. These exchanges have been especially productive, if not always without tension, with critical studies of government and governance inspired by the work of Michel Foucault. What I will call in the pages that follow a 'device-centred perspective' on participation is informed by this second exchange as well.

Different crossovers between disparate fields of research and theory, then, inform the wider project of this book: to move from the study of public participation in science and technology to the analysis of technologies, settings and objects of participation. It would have been nice to be able to make a more 'symmetrical' claim, and to suggest a move to the study of the Science and Technology of Participation, or STOP, to offer the type of acronym that was in vogue in STS in the 1980s and 1990s. But the main focus of this book is on technologies of engagement, leaving the issue of the science of participation for another time and another place, and, I hope, another set of encounters.

Participation as if Things Mattered

Introduction

What is the role of objects in political participation? This question is today being asked by researchers, theorists and practitioners of public engagement working in a range of different areas. Those concerned with environmental issues are looking for ways to account for the capacities of non-human entities – like trees and nuclear power plants – to mobilize publics, while in the world of design and innovation the crafting and handling of things are suggestive of new, inventive techniques for organizing political and ethical collectives. There is, then, a broadly shared commitment to accord to material entities the capacity to inspire, disturb, provoke and surprise in politically and morally significant ways. But, remarkably, the categories of political and social theory themselves have proven quite impervious to these effects. In these fields, the temptation has been strong to approach the inclusion of non-humans in democracy as a project of ‘extension’: engagement with the issue of non-human entities here all too often concentrates on the question of whether the *existing* machinery of politics, morality and ethics can be extended to include these entities. In this book I take a different approach, as I examine how the project of ‘letting things in’ *transforms* a specific category of social and political life, that of participation. I propose to understand material forms of engagement as a particular modality of participation, one that can be distinguished from and compared to other forms, and which brings with it particular problems, aspirations and indeed ideals.

To adopt such an approach is to tackle the above question about the role of things in participation in a particular way. It means that we do *not* take this question to be asking whether normative capacities should

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be accorded to material entities 'in themselves'. This is a fascinating question, but I do not think it is the most relevant one to ask, if we are to account for the transformation of *specific* categories of social and political life. If we make this our project, then material participation, I want to argue here, is most productively approached as a performative phenomenon. The investment of things with capacities of engagement must then be understood as an explicit 'accomplishment of the setting', as sociological parlance has put it succinctly (Garfinkel 1984 (1967)). This means that we decline to answer the general question of whether entities like trees have 'agency' and are capable of normative or political action 'in and of themselves'. Instead, we consider material participation as a specific mode of engagement, which can be distinguished by the fact that it deliberately deploys its surroundings, however widely these must be defined, and entails a particular division of roles among the entities involved – things, people, issues, settings, technologies, institutions and so on. Rather than concentrating on a secular version of the metaphysical question about causality – do non-humans have agency? – we then consider material participation as a *specific* phenomenon, in the enactment of which a range of entities all have roles to play.¹

One important reason to adopt such an approach is that it allows us to recognize that material participation is a diverse phenomenon, one that takes very different forms in different practices. This of course is true of all empirical phenomena, but it may be especially important to acknowledge this in relation to material participation. A wide range of initiatives aimed at fostering public participation are explicitly designed to locate participation in material practice, as I will discuss in what follows. And this has implications for how we understand the political and moral significance of the role of things in participation. I will argue that it now becomes crucial to note the *normative variation* among enactments of material participation, and this for two reasons. First, if material participation is *already* being performed in different ways, it is important to examine the normative differences between these enactments, rather than investing our energy in the theoretical question of whether it would be desirable, in general, for objects to play a notable role in participation. Second, I will argue that the variability and adaptability of this public form itself presents an important feature of material participation, one that can account in part for its political efficacy. *How* participation is materialized is then the critical issue, and the gamble of the book is that it may be engaged to worthwhile normative effect.

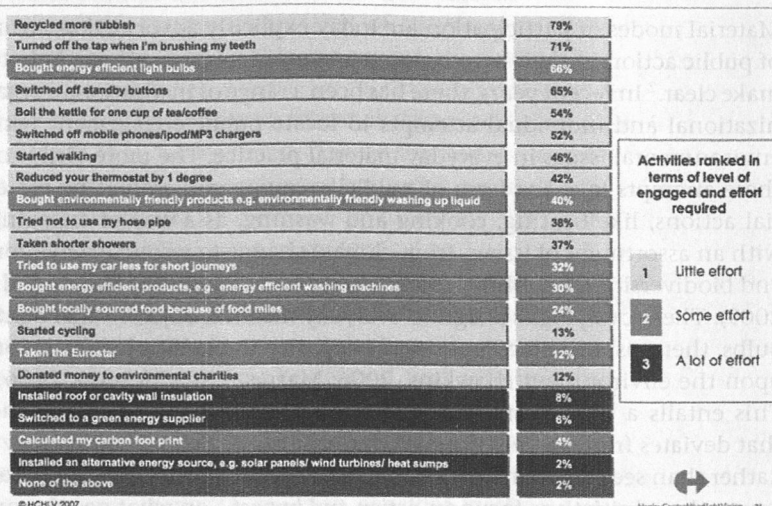
The performance of material participation

Material modes of participation are today explicitly advocated as forms of public action in their own right, as an empirical example can help to make clear.² In recent years, there has been a range of institutional, organizational and individual attempts to locate public engagement with environmental issues in everyday material practice. The more visible of these attempts take the form of publicity campaigns promoting material actions, like heating, cooking and washing, as a way of engaging with an assortment of issues, from climate change to resource depletion and biodiversity (Hinchliffe, 1996; Walker and Cass, 2007; Shove et al., 2009). These campaigns assign to everyday material objects – like light-bulbs, thermostats and compost – the capacity to mediate public action upon the environment (Hawkins, 2006; Marres, 2010; Hobson, 2006). This entails a particular framing of what participation is about, one that deviates from more customary framings of it in terms of ‘literacy’. Rather than seeking to increase people’s *knowledge* about environmental issues, these initiatives focus on *action and impact* – on what people can do about the issues in question. And the focus on everyday material action, in turn, enables a set of distinctive ideals of participation to be deployed. A report from a recent environmental awareness campaign provides a case in point.

Figure 1.1 is taken from a marketing report accompanying ‘DIY Planet Repairs’, a 2007 publicity campaign convened by the Mayor of London. It presents the results of a survey measuring different levels of environmental engagement among citizens of London, listing a number of changes in everyday habits and habitats that people may or may not be prepared to make. By ordering activities according to the amount of effort involved in them – from ‘tried not to use my hose pipe’ to ‘installed an alternative energy source’ – people’s commitment to environmental issues is measured in terms of the more or less laborious modifications of everyday routines and environments that they are willing to undertake. In this respect, the figure codifies participation in material terms: it literally overlays a range of material activities with levels of environmental engagement, turning everyday material action into an index of public participation. And in so doing, the diagram also develops a particular analysis – or perhaps even a theory – of public participation.

The ‘DIY Planet Repairs’ figure defines engagement in terms of the degree of effort that it requires from subjects (in the words of the report, ‘the level of engaged effort required’). As such, it stipulates a precondition

Q8a. Which of the following have you done in the last 12 months?



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Source: Londoners Survey Jan 2007, GLA/HCHV/LightSpeed

Henley Centre of HeadlightVision 26

Figure 1.1 Market segmentation report for 'DIY Planet Repairs', an environmental awareness campaign by the Mayor of London, HenleyCentre HeadlightVision, now The Futures Company, February 2007

for public participation to be successful: only when it is made easy for people to take 'environmental action' will they engage in it. Or to phrase this more formally, the figure proposes that the scope of public engagement is inversely proportionate to the level of practical investment this activity requires from citizens. By overlaying everyday material actions with modes of public engagement, the figure then makes the 'doability' of engagement a requirement of its success – a proposition that echoes classic arguments in liberal political theory about the minimization of effort as a condition for public participation. I will explore these resonances further, but the figure provides an indication that the framing of participation in material terms involves the deployment of distinctive techniques, methods and concepts.

To highlight the role of techniques, methods and concepts in the definition of material participation is to go against a more 'objective', and in some ways more spectacular, interpretation. Thus, it may be tempting to approach the material specification of participation as an indication that a new type of citizenship is emerging. One would then argue that the materialization of participation involves the supplanting of the familiar character of the 'informational citizen' – the one in

need of information in order to adequately perform his role of opinionated, decision-making subject – with another figure, which we could call the material public (I will examine this concept in more detail in Chapter 2). There are good grounds for such a claim. Material participation has in recent years been explicitly promoted as a way of addressing the ‘failure’ of literacy as the foundation of an effective participatory regime (Macnaghten and Urry, 1998; Macnaghten, 2003; Nordhaus and Schellenberger, 2007; also Eden et al., 2008). Locating participation in everyday material practices, it has been argued, solves a number of problems associated with informational citizenship – a form of public participation often criticized for making impossible demands on everyday subjects, insisting that they take an interest in complex issues with little or no relevance to their everyday lives. Following this argument, one would say that material participation is being configured today as the successor to informational citizenship.

However, rather than developing this kind of general claim, in this book I want to adopt a more performative approach, one that concentrates on the distinctive methods, technologies and concepts deployed in the enactment of material participation. I want to explore how the specification of participation in material terms is accomplished in practice, and accordingly I will consider material participation as an empirical phenomenon: as an *effect* that is achieved – or aspired to – in a wide range of institutional and practical initiatives, projects and campaigns aimed at fostering public participation. For this reason, I will explore the role of objects in the enactment of public participation in this book by focusing on a particular empirical area, that of sustainable living. As I mentioned above, there are several reasons for adopting such an empirical and performatist approach, but one of these is that it helps to dispel the idea that material participation must be understood in strict opposition to informational forms of citizenship.

When we consider an empirical device like the DIY Repairs survey visualization above, it becomes clear that material participation does *not* involve stripping participation of its informational, linguistic or discursive components. It rather makes a particular addition to, or modification of, the more usual codification of engagement as a state of informedness.³ Second, to consider material participation as a performative accomplishment opens up again the question of how we are to understand it as a normative project. The pervasiveness of material participation as a distinct form of public action poses a challenge to prevailing normative analyses of the role of things in social, political and cultural studies of participation. In these fields, this role has

often been characterized as a shadowy one, as something that goes largely undocumented in most official, academic and public accounts of participation (Foucault, 1975; Anderson, 1983; Akrich, 1992; Latour, 1992; Warner, 1990). This characterization does not really work for the campaigns for material participation described here, as they precisely foreground the role of things as notable components of participatory projects. To see why this difference matters, it is necessary to locate a performative approach to material participation in the context of the long-standing interest in the role of material entities in the organization of citizenship and public action in social, political and cultural studies. This work is very wide in scope, and I will therefore limit my account here to situating material perspectives on participation in relation to the 'object turn' in recent social, cultural and political research and theory.

Beyond the forgetting of materiality⁴

The inquiry into the role of things in the performance of participation has been taken up in a variety of fields in recent years, from sociology to political theory, cultural studies, anthropology, archaeology and geography.⁵ Much of this work is empirical in focus, interrogating the role of specific objects, technologies and settings in the enactment of citizenship and public action: from waste to bicycles, from freebies to packaging, opinion polls, focus groups and civic meetings, to in situ protests in road construction sites and test fields trialling genetically modified crops (Barry, 2001; Cochoy, 2007; Hawkins, 2011; Harvey, 2010; Osborne and Rose, 1999; Lezaun, 2007; Lash and Lury, 2007; Bennett, 2007; Stöckelová, 2009a; Girard and Stark, 2007). This empirical interest in the materials, technologies and settings of public engagement is closely linked to a wider 'object turn' in recent social, cultural and political theory (Knorr-Cetina, 1997; Latour, 2005b; Lash and Lury, 2007). This field of work finds its starting point in the rejection of the critique of objects that has been dominant in twentieth-century social science: the idea that things, technology and materiality render engagement impossible. This work suggests that this negative critique has lost its plausibility, and proposes what could be called an 'object turn' in social, political and cultural research: we must recognize that material entities equally make an important positive contribution to the organization of social, political and moral life in industrialized societies (Callon and Latour, 1992; Barry, 2001; Miller, 2005; Bennett, 2004; Thevenot, 2006; Thrift, 2008).⁶

In recent years, material studies of participation have started to explore the implications of this broader object turn for the understanding of democracy and public action, as they focus attention on the capacities of things to facilitate, inform and organize citizenship and engagement. In so doing, this work has raised questions about the status and intent of accounting for participation in material terms. Can all forms of engagement be described equally well in such terms? Or should material participation be understood as a distinctive type of public action to be counterposed to other types, such as that of 'public debate'? Material accounts of participation have been remarkably cautious on this point. Indeed, many of the authors associated with the object turn in social and political research and theory have long been reticent about challenging the privilege accorded in our societies to linguistic, dialogic and deliberative concepts and procedures of participation (Latour, 2004b; Callon et al., 2009; Rose and Novas, 2004).⁷ This has created the impression that to recognize the role of things in participation does not necessarily have consequences for our valuation of different forms of civic and public action.

One way to explain this reticence in studies of the materiality of citizenship and participation is to consider the deeper intellectual roots of these studies, those that lie beyond the object turn in social and political theory. Interest in the role of material entities in the organization of citizenship and public action, in social, cultural and political studies, can be traced to the philosophical traditions of phenomenology and post-structuralism. It has been informed by a normative project associated with these currents (see on this point also Bennett, 2004). This work seeks to return to citizenship, the body politic and the public what these categories had been denied in rationalist and positivist theories of democracy, which defined them primarily in abstract and linguistic terms: a sense of public engagement as an embodied activity that takes place in particular locations and involves the use of specific objects, technologies and materials. As a consequence, accounts of participation in material terms have tended to approach materiality as an under-appreciated dimension of participation, and the 'force of things' as one that is exerted surreptitiously, below the radar of official discourses about public participation (Bennett, 2004). From this vantage point, it is the task of social and political studies to recover the material dimension of participation, and to testify to its normative significance.⁸

There are specific circumstances under which the project of 'recovering' the materiality of participation makes sense, for instance where

its disavowal clearly distorts our understanding of participation. The neuromuscular disease patients studied by Callon and Rabeharisoa (2004), for instance, seem apathetic and disengaged, only so long as we ignore the myriad ways in which they are involved in the issues at hand by socio-material means, the drugs they (do not) use, the clinics they visit and so on.⁹ And projects of recovery may also be useful in order to challenge asymmetries in how different forms of participation are valued. Explicitly material practices such as in situ protests and domestic activities are frequently criticized or disqualified as improper or ineffective forms of engagement, in part because of the ways they entangle subjects in contingent, everyday, and often dirty stuff (Mol, 2008; Bennett, 2010). The understanding that all forms of participation have an irreducible material dimension is a useful first step to challenging this kind of prejudice. However, the proposal that the material dimension needs to be brought back into view, and that we need social, political and cultural studies to do this, does not really work when material participation figures as a distinctive public form.

Material entities are not forgotten at all in these cases, as in the DIY Repairs campaign above. To the contrary, the investment of material settings, objects and devices with participatory capacities here features as a *more or less deliberate effect* that is accomplished – or at least sought after – in the practices under study. When objects like light bulbs, plastic bags or compost are used as ‘poster objects’ for public campaigns, they are *explicitly* attributed the ability to mediate engagement in public affairs. This ‘coming out’ of things has consequences for how we account for the material dimensions of public participation. As long as the ‘forgetting of materiality’ (Stengers, 2010)¹⁰ could be assumed, to adopt a material perspective on participation was to engage in a form of underground inquiry. It was the role of social studies to uncover the latent roles played by material settings, devices and stuff in the organization of participation, roles which were *not* fully acknowledged in the mainstream view of participation, which tended to assume informational or deliberative conceptions of it.¹¹ And as long as the politics of things is presumed to play itself out surreptitiously, it does not really seem capable of disturbing established forms of democratic action.¹²

However, when material participation figures as a public form in its own right, materiality clearly does not refer to an under-articulated phenomenon. Here, the enactment of participation in a material dimension implies a distinctive formatting of participation: it is framed as a particular kind of practice to be pursued in a particular setting, such as recycling, changing bulbs and so on. It then becomes important to

document the particular methods, technologies and genres of publicity deployed to frame participation in material terms. The question now is: How do things *acquire* the capacities to organize publics by particular means? We must study the making of participatory objects. How could tomatoes emerge as a focal point of public campaigns against genetic modification (Kräftner and Kröll, 2003)? How were plastic bags – and particular versions of it like ‘the bag for life’ – turned into carriers of environmental awareness (Hawkins, 2006)? And how did electricity meters acquire the ability to mediate public involvement with climate change (Marres, 2009; Michael and Gaver, 2009)?

Adopting a performative perspective on material participation also has consequences for how we understand the normative project of the materialization of participation. The notion of the forgetting of materiality puts social and political studies in the position of an agency of redress. Their role was to challenge the disavowal of matter and to offer an *empiricist affirmation* of the role of things in the enactment of participation. Here, the task of social studies is to dismantle the critical understanding of objects. They must counter the deep-seated suspicion that a political or social grouping organized through things cannot possibly be a true public, but is sure to present a consumerist, domesticated parody of it. However, if we consider object-centred participation as a distinct public form, it cannot be approached uniquely in the affirmative mode. We must develop a more nuanced and ambivalent appreciation of the role of things in the enactment of public participation. Indeed, when materiality cannot be taken to refer to an under-acknowledged dimension of participatory practices, it becomes important to consider why things have been thought to cause problems for participation in the past.

Before and after the object turn: problems of participation

Material entities have long been understood as causing trouble for public engagement. Political and social theorists have deemed a preoccupation with material things to be antithetical to participation, in at least two important respects. First, classical political theory explicitly associated material entanglement with domestic life, labour and leisure, and as such located it in the private sphere. According to theorists from Aristotle to Arendt, participation in the public precisely requires actors to *extract* themselves from the absorbing material entanglements that mark these domains: only then will citizens become capable of grasping

common rather than particular interests and of making autonomous judgements (Arendt, 1958; Pateman, 1989a; Pocock, 1992 (1998); Marres and Lezaun, 2011). Modern social theory offered a second reason why material entities render public engagement impossible: here the rise of industrial type objects, that is technology and commodities, has been held responsible for the demise of community in industrial societies, an argument that has been central to the foundation of social and political science in the early twentieth century (Latour, 2005b; Wolin, 2004a). (What I referred to above as the 'coming out' of things into public life brings these two distinct conceptual tropes into contact with one another (see Chapter 4).)

The wider object turn in social and political theory is mainly concerned with this second critique of objectivity. Its principal project is to move beyond it, and to undo the modern understanding of objects as antithetical to social and political engagement. In providing positive affirmation of the role of things in contemporary forms of social and political engagement, the object turn challenges an idea that has been formative of modern social and political science, and is associated with theorists from Emile Durkheim to Theodor Adorno and Carl Schmitt (Lash and Lury, 2007; Knorr-Cetina, 1997; Latour, 2004a): the idea that the rise of industrial objects – from technology to commodities and scientific objects – should be held responsible for the demise of sociability and politics in industrial, bureaucratized, technological societies. This idea also lies behind a general diagnosis of the pathology of modern society: that it suffers from a shortage of sociability, community or engagement (Putnam, 2001). Indeed, this diagnosis has to an extent created the *need* for social and political research and theory, and thus provided an important legitimation for it.

In proposing to investigate how modern objects mediate sociability – how they enable rather than disable involvement – contemporary social theory specifically sought to undo the depiction of scientific, technological and commodity objects as anti-social and anti-political forces, as drivers of rationalization, bureaucratization, individualization, privatization and so on (Miller, 1998; Latour, 2005b; Knorr-Cetina, 1997). However, in providing a positive affirmation of the social and political capacities of objects, this work did not only undo the critical definition of modern objects. It also dismantled modern analyses of problems of engagement in technological societies: those that posit the demise of face-to-face interaction, the falling apart of communities, the forgetting of social skills and so on, and blame this on the rise of

modern objectivity (Latour, 1991; Bennett, 2010). Object-centred social and political theory thus raises the question: if we have been partly wrong to blame problems of participation on objects, *how else* should we make sense of these problems in technological societies? The affirmation of objects and their capacities for engagement, then, at least partly suspends the classic modern sociological understanding of problems of engagement. However, the question of what could replace this possibly 'outdated' problem definition follows immediately from this: surely object-centred social and political theories do not want to suggest that problems of participation in technological societies are simply figments of the sociological (and political) imagination, an artefact of outmoded habits of modern social and political thought?

The object turn in social and political theory certainly does not result in the dissolution of problems of participation. Rather, this work has undertaken an important *qualitative displacement* of this problem. From an object-centred perspective on social and political life, the idea that society suffers from a deficit of engagement does not really make sense.¹³ If we approach social and political actors as materially entangled beings, what stands out are the myriad ways in which they are *already* implicated in public affairs by material means. However, this circumstance does not necessarily mean that actors figure as participants in these affairs. As mentioned advocates of a material perspective on engagement have noted how socio-material entanglement in issues tends to remain on the level of an underground mode of engagement, one that remains unacknowledged – and is frequently at odds with or actively undermined – in institutional framings of public engagement (Wynne, 1996; Irwin and Michael, 2003; Bennett, 2005).

Thus, on the one hand, work on the object turn proposes that insofar as socio-material entanglements mediate participation, social actors are always already actively implicated in issues. Knorr-Cetina's amateur cyclists (1997), Bennett's slow fooders (2007), Wynne's sheepfarmers (1996) and Callon and Rabearisoa's neuromuscular disease patients (2004; 2008) are all involved in issues of public health, environment, trade and foreign policy and so on, as a consequence of their socio-material embodiment and entanglement. These authors challenge the assumption of a *lack* or deficit of engagement on the part of social actors – which is then to be made up for by campaigns and programmes that propose seeking to foster 'participation' where allegedly there was none.¹⁴ On the other hand, however, this certainly does not mean problems of participation are a figment of the imagination. But these problems are now understood as at least in part perpetuated by

institutional regimes: the problem of public participation here comes to refer to a *mismatch* between an institutional mode of operation which assumes that public engagement is to be created 'ex nihilo', and actors' ontological entanglements with issues which it actively disavows (Wynne, 2008; see also Marres, 2007).¹⁵

While the object turn thus certainly did not result in the dissolution of problems of engagement in technological societies, material participation itself is not really problematized in these strands of work. However, as soon as we consider material participation as a distinctive public form, it turns out that it brings with it problematics of participation of its own. Where material participation figures as a specific modality of engagement, it can no longer be understood as an under-articulated phenomenon, and in this context, attempts to organize publics by material means themselves evince a distinctive set of problems, both empirical and conceptual. And here the 'classic' critique of materiality as antithetical to public participation becomes relevant again to contemporary framings of it.

The problems of material publics

The empirical formulation of material participation may involve the attribution of particular problems to publics, as we have seen in the first section of this chapter. To mention another example, a recent report for the UK Sustainable Development Commission (Lockwood et al., 2007) proposed to measure public engagement with environmental issues in terms of the material actions people are willing to take to address them, and on this basis noted a discrepancy between what people say and what they do:

Statements of the willingness to take action to reduce emissions contrast strongly with the trends in what people actually do. Data on actual behaviour show increases in flying, holidaying abroad, driving, and consumption of household appliances (see, for example, Retallack et al. 2007). At the same time, opinion polls generally show a majority (60 per cent or more) opposed to higher taxes on driving and flying (for example, YouGov 2007). The Energy Saving Trust's Green Barometer survey shows a similar contrast between a widespread desire to be seen to be green and majority opposition to carbon rationing (EST 2007). There is thus a significant group of people in the UK who are opposed to new policies on the environment, especially on taxation.

A subsequent report by the same authors concluded that the public remains unwilling to 'make any personal sacrifice [...] thus poisoning efforts to champion the environment at the ballot box' (Lockwood and Bird, 2009).¹⁶

Concepts and methods of material participation, then, like others, can be used to problematize the public.¹⁷ They enable a *distinctive* formulation of the public's problem, one that could be called 'the dis-invested public'. Rather than by a lack of understanding of the issues, or 'literacy,' as is most common, publics are here marked by inaction or a lack of will or desire to make even small changes in their everyday lives. In a familiar turn of the plot, actually existing publics are here chastised for failing to live up to expectations generated by theories of the public: in this case, for not performing in accordance with even the most minimal expectations implied in the ideal of 'involvement made easy'. There are a number of problems with the resulting model of the public as a passive mass,¹⁸ such as the highly asymmetric way in which it distributes the cause for wider societal inaction on the environment, presenting 'the public' as a (the?) major factor in this, as I will discuss in what follows. However, it is equally important to recognize that material participation is not only a problem because predominant discourses say it is: there is a long intellectual history that suggest that material engagement presents an inherently problematic mode of involvement.

Material publics have long been considered a problematic proposition – if not a contradiction in terms – in political theory, and when we consider object-centred participation as a distinct public form, some of these problems turn out to be all too relevant to our analysis of it.¹⁹ There are then not only empirical but also good conceptual reasons to pay special attention to the problems of material publics. The classic Aristotelian idea that participation in public affairs requires social actors to disentangle themselves from their everyday material concerns continues to be evoked today to criticize attempts to locate public participation in everyday material practice.²⁰ Modern political theory has added further problematizations of material publics. As I will discuss in the next chapter, the American pragmatists John Dewey and Walter Lippmann have identified a whole range of problems with the organization of publics by material means. These publics suffer, for instance, from problems of instability: paradoxically, collectives that are organized by means of objects turn out to be especially ephemeral or fluid ones. This makes it hard to see how these publics could ever act as effective agents of change. And then there is the problem of demarcation, the fact that material publics do not map onto an exclusive

domain of public action, something which led the political theorist J.G.A. Pocock to argue that if we allow the concept of the public to pertain to material practice, this is likely to entail the dissolution of boundaries between public and private, and this 'might well mean that the category of the public loses its distinctiveness' (Pocock, 1992/1998; see also Dobson, 2003).

To consider material publics, then, is to engage with a different set of problems of social and political theory than those associated with what we could call the sociable public, thematized in early twentieth-century social and political research and theory, and connected with the notion of a participatory deficit. I will argue that the problems of material publics require a somewhat different approach and normative strategy than those of the sociable public. Instead of affirming the materiality of the public, and dismantling critiques of this type of public, I propose that we should extend an affirmative approach to the *problems* of material publics. Not just material participation, but the trouble with this form of participation requires our attention. This is not because critics are right to disqualify material action as an unviable form of public participation, but because 'problematicness' may well turn out to be an important constitutive feature of material publics. The question then is what normative register is appropriate to the analysis of material participation. Neither positive affirmation nor negative critique, taken on their own, seems quite adequate to it, and I want to suggest that a positive valuation of the problems of material publics is an important step towards getting this right. To arrive at a better appreciation of these problems, social studies of participation stand much to gain from a deeper engagement with political theory (Braun and Whatmore, 2010; Wynne, 2008; Latour, 2007).

In choosing this focus, I will quite unembarrassedly concentrate on one strand of political theory, namely that of classic American pragmatism and work informed by it. While, as mentioned, there are many political theories relevant to the analysis of material participation, I will mostly engage with the pragmatist political theory of John Dewey. This is because his work has arguably done most to bring about the type of object turn in political theory that I favour – one that is experimental and empiricist in orientation – but has not widely been recognized as such. As I will discuss in more detail in Chapter 2, Dewey had the audacity to propose that we must learn to think political and moral phenomena as unfolding 'on the plane of objects'. As he forcefully claimed in an essay titled 'Does Reality Possess Practical Character?' (1908), things like values, desires and interests are best regarded as

'aspects of objective situations:' 'Such things as lack and need, conflict and clash, desire and effort, loss and satisfaction [must be] referred to reality.' It is also to say, Dewey suggested, that there is nothing *resolved* about the politics of objects. Indeed, this is what makes Dewey's object-centred political theory so significant in my view; in proposing that we approach political phenomena such as interest, conflict and strife as 'aspects of object situations', Dewey transformed political ontology itself: the 'plane of objects' now emerges as a plane perturbed and animated by 'such things as lack and need, conflict and clash, desire and effort, loss and satisfaction'.

In this respect, Dewey's audacious proposal also opens up a set of questions in relation to contemporary political theory. I am thinking here in particular of the argument developed by Chantall Mouffe (2000) and others that conflict and strife must be placed at the heart of democracy. Distinctive about Mouffe's 'agonistic' theory of democracy has been a double commitment, a commitment to two things that have often been conceived as mutually exclusive: it aims to recognize 'clash and conflict' as a formative dynamic of politics, but, in doing so, it takes as its central question that of how 'clash and conflict' can be made productive for *democracy* (rather than assuming that democracy requires some form of consensus, as other political theorists have been prone to do). This question, I think, is equally relevant for object-centred political theory, and Dewey's political theory provides a language for posing the question in object-centred terms. (Indeed, Mouffe (1996) herself has engaged with pragmatism, though mostly with its theory of knowledge.) The question then is: if we are committed to recognizing that political conflict and strife unfold on the plane of objects, in what sense can this be understood as productive for democracy? One of the questions I then try to address in this book is whether and how agonism can be thought and studied as an 'aspect of objective situations'. But before further exploring this question, I first want to say a bit more about the broader political and intellectual context in which object-centred studies of participation intervene, as this matters, too, to how we understand their normative import.

Beyond technocracy: traffic between democracy and technology (and much else besides)

The turn to objects as foci of public participation is today occurring in a particular context, one in which calls for a 'participatory turn' regarding science, innovation and the environment are proliferating (Irwin, 2006;

Sismondo, 2007; Waterton and Ellis, 2004; Jasanoff, 2003a).²¹ The call to 'democratize' science, innovation and the governance of nature used to be the signature position of radical and progressive intellectuals, including those associated with 'Science and Society' movements of the 1970s and 1980s. But today the opening up of processes of research, technology development and environmental governance to publics may be considered the rule rather than the exception (Sismondo, 2007). This project is now actively endorsed and pursued in a variety of governmental, industrial and non-governmental settings: from the organization of public consultations on controversial techno-science (Hagendijk and Irwin, 2006; Callon et al., 2009) to the implementation of platforms for user-centred design (Wilkie, 2010; Ehn and Badham, 2002; Thrift, 2008) and the proliferation of initiatives for community-centred management of the environment (Whatmore, 1999; Agrawal, 2005; Waterton et al., 2006).²²

The idea of an object turn on participation both overlaps and differs from that of the participatory turn. In some ways, the object turn is simply *the mirror image* of the participatory turn undertaken in the 'objective' fields of science, technology and nature. The two turns may be understood as different formulations of a similar phenomenon: the attempts to approximate a crucial source of metaphors categories of objectivity and community. From this vantage point, the difference between the two turns is principally one of perspective (as with the famous rabbit of the Gestaltswitch literature): it depends on how you look at it, whether you recognize in participatory initiatives attempts to render objects more central to participation or efforts to render participation more central to object-centred practices. However, there are also some differences of emphasis between the two turns, and these differences matter insofar as they suggest a different intervention in wider debates about the democratization of science, technology and nature.

One could say that the two turns imply a different analysis of the approximation of the categories of objectivity and engagement. To speak of a participatory turn is to support, however broadly, the thesis of the 'democratization' of science, technology and the environment. It invokes the narrative according to which the previously 'closed' worlds of objectivity – science, engineering and technocratic modes of government – are today being opened up to the public (Brown, 2009; Nowotny, 2003; Irwin, 2001).²³ By contrast, the idea of an object turn on participation is *not* necessarily aligned with this narrative, and indeed complicates it in a number of ways. Most importantly, it challenges the notion that the attempt to bring science, technology and democracy closer

together constitutes a *historical exception* of some kind. Attempts to make democracy revolve around objects can be identified in different historical literatures and epochs, and contemporary efforts to do so must, as a consequence, be understood as simply 'one more object turn' after a broad range of previous ones: it presents a rather small variation on a much wider history of very similar attempts, which have gone under several names, but one of which is *scientific liberalism*.²⁴

Historians and philosophers of science have argued that science and technology, far from presenting institutions that are external to democracy, have long played a central role in the performance of the public in liberal democracies (Ezrahi, 1990; Turner, 2003; Barry, 2001). Indeed, this political form can in part be *defined* in terms of the attempt to make politics revolve around objects and to approximate the categories of objectivity and democracy, and in this respect science has served as a crucial source of its metaphors, procedures and tropes. This becomes especially clear if we consider the *formats* of public action that are associated with liberal democratic traditions. As Yaron Ezrahi (1990; 1995) has shown, a whole range of genres of public action – from procedures of accountability to dialogic conceptions of participation and objective measures of performance – bear the traces of discursive forms associated with science. The public testing of hypothesis; the critical debate among peers; the dissociation of deeds from their doers, so as to bracket subjective factors; the projection of the public in the role of a reliable witness of public experiments: these forms can all potentially be traced back to attempts to introduce a 'scientific epistemology' into modern democracy (see also Shapin and Schaffer, 1989). Liberal democracy, then, invokes an *empirical* imagination of the public and as such, it is often said to involve the attempt to make democracy more like science (Wolin, 2004b; Stengers, 2005).

Such historically informed analyses of democratic forms place contemporary calls to 'democratize' science, technology and the environment in a particular perspective. It suggests that we may be encountering a strange loop in this case: what is presented as an attempt to pry open scientific and technological institutions, *as if from the outside*, actually draws on genres of publicity that *derive* from science and technology to an extent. The historical analysis of liberal democracy, then, suggests that the call to 'open up' science, innovation and environment governance to more public scrutiny does not exactly introduce an 'alien' or 'new' element into these fields, but rather mobilizes public forms that *already* bear a scientific and technological imprint: accountability, critical debate, informational citizenship. And the merit of the notion of

an 'object turn' on participation, in this respect, is that it reminds us of this ongoing 'traffic' between democracy, science and technology (the term is Rosengarten's, 2009). It tells us that calls for public engagement with science, innovation and the environment are in some respects a continuation of all-too-familiar histories: attempts to 'objectify' democracy, as I will discuss in more detail in Chapter 2.

However, to note this is certainly *not* to accept that object turns regarding democracy necessarily involve the attempt to make it more like science. To the contrary, to speak of an object turn in relation to participation is an attempt to loosen the grip of this story that equates objectivity with science on our imagination of the public: the narrative of the threat of 'technocracy' as the principal danger to democracy in post-industrial times. As I mentioned, the wider object turn in social and political theory precisely seeks to move *beyond* the idea that scientific objects, technology, commodities are necessarily correlative of social and political life. And this also has consequences for how we conceive of the relation between technology and democracy. If we recognize that projects of democratization draw on scientific and technological forms, it is no longer so plausible to understand democracy and technocracy in strict opposition to one another (see also on this point Braun and Whatmore, 2010; Kelty, 2008; Lezaun and Soneryd, 2007; Marres, 2005a, Laurent et al., 2010).²⁵ Indeed, it may now seem problematic to let the 'threat of technocracy' guide our thinking about democracy; it distracts from all the ways in which projects of public engagement with science and technology involve the mobilization of expert knowledge, methods and technologies of public participation (Lezaun and Soneryd, 2007).

This distraction is problematic for a negative reason: it prevents us from noting how easily the democratization of science and technology may collapse into its opposite, the technicalization of publics. But the spectre of technocracy may also count as a distraction for a positive reason: it may prevent us from imagining the public as a technologically equipped entity, whose organization requires the material and technical modification of settings and practices. Indeed, this is another way of understanding why an object-centred perspective on participation is useful: it sensitizes us to the instruments deployed in the enactment of participation and directs attention to the artifice involved in processes of democratization, reminding us that science and technology are not necessarily external to democracy.²⁶ In what follows, I will argue that object-centred approaches to participation require that we extend the range of public forms to be considered relevant to the enactment

of participation: we should not only consider empirical forms like for instance the focus group, but also public forms associated with art and morality, such as experiments in living.

Finally, the 'anti-exceptionalist' perspective on the 'object turn' on participation, which I propose here, also implies that this turn does not necessarily represent a singular or unified phenomenon. Rather, the object turn must be understood as historically, conceptually and empirically multiple. There are, and have been, many object turns in relation to participation, involving the deployment of different theories, methods and techniques, and with very different normative implications. Instead of dramatically opposing an object-centred vision of participation to an 'object-less' one, we must address the question how to deal with the many different faces of the object turn – with the fact that there are many, partly continuous but also divergent versions of it. I take this to be one of the main challenges for an object-centred approach to participation, which in this book I try to address by combining theoretical and empirical ways of exploring material participation. I want to conclude this first chapter by introducing this way of thinking and working.

Dis-aggregating the object turn: theory, concepts and methods

To note the multiplicity of a phenomenon has become somewhat of an obligatory gesture (Dean, 2002), but in the case of object-centred participation it makes an important difference in at least one respect: it makes it possible to understand the object turn as a *variable* phenomenon. Variability, I will argue in this book, should be regarded as a constitutive feature of participatory objects, conceptually, empirically and normatively speaking. The same or a similar object may facilitate very different modes of engagement, and it may take on varying normative charges: participatory things must be understood as multivalent. In order to appreciate this feature, it seems important to avoid a monolithic account of the difference that things make to participation, to resist fixing or overdetermining the object turn by theoretical means (to 'know' all too well what it is). Thus, instead of suggesting that the rediscovery of things, matter and stuff is inherently enriching for democracy, I will concentrate on the question of how to distinguish between different versions of object-centred participation, and also, when it is appropriate to acknowledge the slippages between them.

Thus, in the next chapter I will differentiate a number of concepts of the material public developed in recent political theory and related

fields: in particular, liberal concepts of the community of the affected developed in political theory and notions of matters of public concern that have recently been proposed in science and technology studies and are loosely modelled on republican notions of the common good. Not only do these notions involve a different conception of the role of material entities in democracy, but they also suggest different analyses of the 'problem' with publics that are organized by material means. While in some accounts concepts of the material public are to provide politics with a new set of principles for deciding who or what is wrongfully excluded, others take it to highlight a distinctive modality of the public, a distinct mode of becoming. It seems especially important to think through the differences between these versions of the material public if we are to move beyond a simple opposition between technocracy and democracy: the significant distinctions must now be made among various forms of technological or material or ecological democracy.

If there exist many different but partly continuous versions of material publics *in theory*, this applies even more so to object-centred participation in practice, and this I will consider in chapters 3 to 5. To begin with, there is the basic fact that, when approached as an empirical phenomenon, material participation varies across settings. A public campaign against the storage of nuclear waste near the Suffolk town of Leiston is likely to draw on very different genres, concepts and methods for performing object-centred participation than the cultural movement that emerged around 'Soviet' Sausages in post-communist Lithuania (Klumbytė, 2010). This relatively basic circumstance of empirical variability may nevertheless have far-reaching consequences for our analysis of material participation. As authors in social studies of technology have emphasized, an empirical or empiricist approach should prevent us from treating our object of inquiry – material participation – as a singular object, and help us to recognize that it is differently constituted in different settings.²⁷

The inherent variability of phenomena can be understood in many different ways, and it raises the question of how variability is distributed between theory and empirical reality. We must ask a question that so many philosophers and scholars have already asked: is it the ideas that remain stable and the empirical incarnations that vary, or may stability and change also be distributed differently between practices and ideas? This question is especially pertinent in relation to participatory things, insofar as they are frequently characterized as *dynamic* objects. Social and political theorists of various stripes have argued that, to account for the role of material entities in the organization of social and political

life, we must consider them in their 'active' element: we must focus on how things come to matter (Law, 2004b; Latour, 2005b) or their inherent liveliness (Fraser et al., 2006; Bennett, 2010; Hawkins, 2011). In what follows I will also suggest that one of the important features of participatory objects is their normative instability. Insofar as engaging objects are happening or 'lively' objects, their participatory capacities fluctuate – objects may become politicized (or 'issuefied') easily, but their normative charge may be lost or transformed into something less lively just as quickly. Indeed, this seems partly what makes objects work as engagement devices.

This feature becomes all the more important, I will argue, in a context in which calls for a 'participatory turn' proliferate, and in which participation cannot be primarily identified with a singular normative agenda. In this situation, we are likely to have to consider a whole range of attempts to transform material things into vectors of participation of different kinds. I will explore this normative variability of participatory objects – their multivalency – by adopting an empiricist strategy. I will turn to a particular empirical site to explore the role of material objects, methods, techniques and concepts in the enactment of material participation: the environmental home, and its various attendant devices, such as technologies of everyday carbon accounting, the publicity genre of the experiment in sustainable living and the 'green' electricity grid.

The environmental home and related devices are especially rich sites for exploring the variability of material participation because they are being configured today as sites for material participation by a whole range of different agencies, from energy companies to environmental activists and, not least, social scientists. As such, it is also particularly well suited for the study of material participation as a performative phenomenon. Here the enactment of participation by material means can clearly be seen to involve the deployment of knowledges, methods and techniques and the equipment of the setting for this purpose. In the context of environmental living, then, the instability or 'liveliness' of participatory objects may turn out to have as much to do with this variation in the empirical equipment of the setting as with any ontological variability of political objects 'themselves'. In the last section I want to introduce this 'empirical' site in some more detail.

The 'empirical site' of the environmental home

To turn to the environmental home to study material participation is to locate it in a particular site. There are certainly less located ways

of defining the phenomenon: projects to situate participation in everyday material practice go under various labels, from 'post-environmentalism' (Nordhaus and Schellenberger, 2007) to ethical consumption and the formula of 'behavioural change'.²⁸ In contrast to these approaches, in this book I will consider material participation as a located phenomenon. Examining participation in situ enables us to understand how material participation is performatively accomplished, through the deployment of specific technologies, settings and things. In this respect, environmental homes have the merits of offering both a robust example of material participation as well as a site where it is noticeably accomplished by performative means. On the one hand, strong claims have been made about the home as a site of material participation. Domestic life in and of itself is widely understood to implicate us in wider environmental, social and ethical problems by virtue of the consumption and production of energy, waste, water and other materials that goes on here (Dobson, 2003; Hobson, 2006). On the other hand, however, the enactment of material participation in domestic settings in practice turns out to be dependent on the deployment of particular devices, from composting bins to light bulbs and smart electricity meters. The combination of these two facts makes the environmental home a good place to study material participation as a performative phenomenon.²⁹

What also stands out about the environmental home in this respect is its empirical equipment. As Michelle Murphy (2006) has shown in telling detail, environmental homes tend to be kitted out with a whole range of different empirical technologies, from sensors in walls that measure humidity levels to webcams to demonstrate how to make tea in an environmentally friendly fashion. These devices play an important role in attempts to invest everyday objects with capacities to facilitate participation with environmental issues: they help to constitute everyday material action as a mode of action upon public affairs. I will consider a range of empirical instruments of material participation, from everyday technologies of carbon accounting (Chapter 3) to the publicity format of the 'sustainable living experiment' (Chapter 4). A focus on these devices enables us to study empirically the investment of everyday objects with participatory capacities, and to consider material participation as in part an accomplishment of the material setting and attendant devices (Garfinkel, 1984 (1967)).³⁰

The environmental home, then, offers a useful site to develop a 'device-centred' perspective on material participation: one that pays special attention to the role of technologies, settings and objects in the

performance of public engagement. There are various justifications for adopting such an approach which I will discuss in Chapter 3.³¹ But one justification that I want to flag here is that it offers an empirical way of engaging with issues in social and political theory. More specifically, to attend to the role of technologies in the performance of material participation is to question a particular assumption that has informed many approaches to public participation in social and political studies, that of the primacy of procedure or the abstractability of method (Duhem, 1906 (1982); Lynch, 1991).³²

The notion that public participation can be defined in terms of an abstract procedure or general method has deep roots in the philosophy of politics and knowledge. It is related to the classical precondition for participation discussed above, the requirement that actors and action must be dis-embedded from the material entanglements of everyday life in order to qualify as publics and public participation. In this context, to focus on technologies of participation is to suggest that settings and material devices have a more important role to play in the performance of participation than these procedural understandings on participation have recognized. This is *not* to propose that conditions of dis-embedding are irrelevant and settings can take the place of method as an organizing principle of public participation. But it is to offer a sited answer to the question of how things may acquire participatory capacities, or 'powers of engagement' (Marres, 2009).³³ As I will discuss in Chapter 4, these powers may partly derive from the confusion of properties among theories, methods, settings and objects deployed in participatory settings. When things acquire the capacity to mediate public engagement, this has something to do with the fact that from *the standpoint of their effects* methods, settings and objects are relatively indistinguishable (Cussins, 1996; Latour, 1999).

A device-centred perspective, then, allows for a particular an empiricist take on the theoretical question of how things mediate publics. Such an approach also has implications for how we understand the affordances of everyday settings for engagement. Work in the social studies of science and technology (STS) has insisted on the importance of situating engagements with science, technology and nature in everyday settings (Michael, 2006; Wynne, 1996; Murphy, 2006). These sites make it obvious that people's lives are already entangled with technological, scientific and natural entities, from velcro to thermostats. A focus on everyday life provides an effective deterrent against the notion that a wide gulf separates the public from the objective world of nature, science and technology. Furthermore, in some ways, such a

focus already entails a material conception of people's engagement with science and technology, insofar as it is here understood to be mediated by everyday objects. However, something to which these studies have paid less attention so far, and which will be a central concern of this book, is that by reframing everyday sites as settings of engagement, it becomes possible to broaden the genres, styles and methods that may be deployed to enact public engagement. I will consider specific formats of publicity that help to locate public engagement in everyday practices, like carbon accounting, sustainable living experiments and ecoshow-homes. A focus on these formats also inflects the meaning of 'everyday': where these formats are deployed everydayness becomes an object of performance too.

Finally, I want to note that turning to the 'empirical' site of the environmental home has implications for how we understand the contribution of social research to public participation. In such a site, it is impossible to forget that sociologists are *not alone* in researching, and writing 'up', the capacities of mundane settings and things to facilitate participation. A host of other agencies, from building researchers to housing developers and environmental activists and independent filmmakers, is invested in adapting this site for research purposes, and thus, to enact it as an engaging location. The definition and equipment of the environmental home as a research setting is something in which social studies *participate*, and of which we cannot assume ownership. As such, it may be useful to define the setting of the environmental home as a *critical* site of research. As a whole battery of agencies are currently invested in equipping this site as a space of engagement, it provides an appropriate setting for social studies to attempt to intervene in prevailing definitions of material participation.

The appropriateness of this setting is sometimes questioned, implicitly or explicitly, as when it is argued that non-domestic settings offer better and more effective opportunities for material political action – such as power plants and oil rigs (Mitchell, 2009).³⁴ To understand the environmental home as a critical site of research is to beg to differ from this suggestion. The project of making domestic sites matter by means of research is not only an aspiration of social studies but is also something in which a whole range of political, economic, social and aesthetical agencies are currently invested. The question therefore becomes whether, by *adding* social research to the list of research agencies populating the setting, we can make a difference to the kind of site the environmental home turns out to be and what it might be capable of. As I hope to make clear in the chapters that follow, social research

has a particular contribution to make to the understanding of environmental participation, namely to insist on the 'un-boundedness of the setting'. It is not just infrastructural hubs like power plants, but everyday settings too, that have the capacity to implicate us in a host of other sites. In exploring the environmental home through this prism, my gamble is that social analysis may give us a different kind of material participation, one in which 'living' practices do not signal withdrawal, but an opening out onto wider environments.

Conclusion

The account of material participation that I develop in this book does not only grant special importance to devices but also entails a commitment to a particular setting. The following chapters each interrogate an aspect of material participation by examining devices that locate participation in domestic environments. In adopting such an approach, I follow a style of research and writing that has been championed by STS, one that is sometimes referred to as 'empirical philosophy' (Mol, 2002). Thus, famous studies in this field have addressed thorny issues of the philosophy of science – truth, legitimacy, reality – through empirical studies of specific settings, like the laboratory, or what scientist refer to as 'the field'. This book extends this method to a specific topic of social and political theory: material participation. The aim, in doing so, is to accomplish, to use a term that Steve Woolgar (pers. com.) helpfully suggested, a *re-specification* of this phenomenon. In analysing technologies of environmental living, the aim is to decompose material participation into constituent parts, and then to put it back together, so that we may offer an alternative account of what it is, how it is accomplished and why it matters.³⁵ I will end this introductory chapter by briefly summarizing how each of the different chapters contributes to this project.

The next chapter is the only one that engages exclusively with political theory. It returns to classic American pragmatism to investigate the concept of the material public developed in this tradition, suggesting that this concept offers an enrichment of contemporary conceptions. The theories of the public developed by John Dewey and Walter Lippmann, I propose, allow us to understand what is distinctive about the concepts of material democracy that have been put forward in actor-network theory and related post-instrumentalist approaches in political theory. The key contribution of the pragmatist to the analysis of material participation, I argue, was to offer a distinctive formulation

of the problem of these publics, as a problem of relevance. Furthermore, both Dewey and Lippmann defined material publics as inherently problematic, proposing to understand their formation as indicative of a particular kind of 'ontological trouble'. I propose to analyse this type of trouble further by examining the role of devices in the mediation of material participation.

Chapter 3 outlines a device-centred perspective on material participation through a case study of everyday technologies of carbon accounting. These instruments can be said to materialize participation, insofar as they locate environmental engagement in everyday practices such as cooking and heating. The chapter argues that material participation in this case involves a particular *codification* of it, in terms of the investment of effort. Material participation, then, does not just refer to its mediation by things: it involves the deployment of specific legitimacy tropes associated with liberal theories of citizenship and the domestication of technology, in particular the notion that the engagement of everyday subjects requires things to be 'made easy'. The chapter goes on to investigate the political affordances of this type of enactment of material participation. It argues that everyday technologies of carbon accounting enable a politics of 'co-articulation' (Callon, 2009): carbon accounting devices produce connections between the registers of participation, technology and economy, and different versions of this device do this in different ways.

Chapter 4 interrogates the role of experiments in the enactment of material participation. The chapter begins with an overview of different perspectives on the role of experiments as genres of public and democratic life. It then turns to a specific genre, the experiment in sustainable living, and argues that it enables a distinctively material form of publicity. As such, experiments in sustainable living pose a challenge to classic understandings of the politics of technology and the politics of objects, which suggest that things and machine exert their normative powers surreptitiously, and operate below the radars of public discourse. By contrast, experiments in sustainable living invest objects, technologies and settings with explicit powers of engagement, and as such they can be understood as exercises in the explication of the politics of things. The chapter concludes with a discussion of different conceptions of political ontology, and proposes that material participation offers opportunities to further experimentalize our understanding of it.

Chapter 5 further explores the relations between experiments, ontology and democracy through an analysis of the device of the environmental showhome. The chapter starts with a paradox that has

troubled attempts to include non-humans in democracy. This paradox says that this project of inclusion both extends the realm of public participation and at the same time limits it severely. I propose that a device-centred perspective on participation provides a way of making this paradox tractable, by offering an alternative perspective on the role of things in the enactment of participation. Sustainable showhomes allow us to expand the performative analysis of material participation. They direct attention to the crucial role played by empirical devices in the equipment of the setting for purposes of material participation and the investment of things with specific capacities of engagement. The chapter goes on to distinguish a performative politics of things from the concept of material politics put forward in the social studies of architecture. Ecoshowhomes, I argue, bring into view an experimental politics of variation, which must be distinguished from the politics of difference. This allows us to clarify the contribution of demonstrational devices to the enactment of material democracy.

In the last chapter, I return to the problems of material participation introduced in the first part of the book. I propose that a device-centred perspective allows for the 're-distribution' of these problems. Such a perspective, I propose, offers a much more symmetrical approach to problems of material participation than is customary. Rather than attributing problems of participation to features of publics themselves (their illiteracy, indifference, short-sightedness), it allows us to investigate the distribution of these problems among the whole range of actors and agencies with a stake in participatory arrangement: institutions, infrastructures, settings, technologies, and so on. Such an approach 'empiricises' problems of material participation, as it suggests that their distribution among actors and agencies is a practical accomplishment that may vary from case to case. The chapter goes on to specify further the problem of the material public in terms of relevance. It distinguishes three versions: a positional, topographic and a topological definition of the public's problem of relevance. This excursion enables us to understand the implications of adopting an empirical approach to problems of material participation for our conception of the spaces of participation. It allows us to 'devise' these spaces. Rather than conjuring up a space of democracy by projecting the metaphor of debate onto practice, we must examine how specific devices enable (or disable) the unfolding of spaces of participation.