Working Paper 17: The Dynamics of Demand: methods and concepts for thinking about change

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This paper captures some thoughts and ideas that have been swirling around within DEMAND (and beyond) on understandings of change: what it is, where it 'comes from' and how to study it. The aim is to provide some context, and hopefully inspiration, for the presentations and discussion at the conference stream on change and steering.

Our focus is on how and why energy demand changes and is connected to thinking about whether and how changes might be 'steered' (see the Steering discussion paper). Our starting premise is that people do not use energy for its own sake, and that by implication changing demand relates to changing practices in one form or another. So how do practices change? What is it that stimulates the growth, persistence and decline in social practices and in the energy they use? More fundamentally, how are such changes to be defined, conceptualised and investigated?

The intention is not to repeat existing arguments about the dynamics of practice (e.g. Shove et al, 2012) but to bring them into the discussion along with other debates and ideas that relate to the challenges of researching change in energy demand.

Processes of Change: Causality and Explanation

Change is generally defined as difference over time. In this sense accounts of change can refer to a state of affairs (that is, of what it is that is different) and/or to processes of change (the becoming-ness of change). Methods of interpreting difference and time are inherently 'theory laden'. That said the methodological strategies of starting either from states or from processes represent two different ways of proceeding. Abbott writes:

> "There are two ways of seeing … historical processes more generally. One focuses on stochastic realizations and aims to find causes; the other focuses on narratives and aims to find typical patterns" (Abbott, 2001: 164).

These different ways of seeing underpin what have been characterised as variance and process approaches (Mohr 1982; Poole 2000). The former examines the relationship between observed inputs (independent variables) and outputs (dependent variables) and evaluates the strength of causal influence of one upon the other, assuming immediate causation. It asks *if* there is a change following from an action or other change, without necessarily observing *how*. Such approaches suppose a model of social life in which certain identifiable aspects have causal impact on others. From this point of view explanation is a matter of identifying which bits (factors or variables) affect which others, in what direction and to what degree. In the energy world, correlation between the increasing supply and consumption of energy and GDP is often presented with little further explanation, the assumption being that there is some causal link between the two.

In contrast, process approaches focus on temporally ordered sequence of events through which change unfolds, thus developing an historical narrative of where the 'action' is. The entities that constitute events may themselves change over time and more 'distant' forms of causation are assumed (Poole et al., 2000). Theories concerned with process are diverse. Van den Ven and Poole

(1995) distinguish four ideal types, each of which represents change as occurring through different 'motors':

- Life-Cycle Theory – based on a metaphor of organic growth which follows an immanent or internal programme in a linear / unitary sequence regulated by logic or nature (e.g. Rogers (1983) stages of innovation.
- Teleological Theory – whereby the goal or purpose of a changing, adaptable entity is the 'motor' of change
- Dialectical Theory – based on the Hegelian idea that change occurs through conflict, at times struggles maintain the status quo, producing stability; at other times the balance of power changes and the dominant thesis is challenged, resulting a new synthesis.
- Evolutionary Theory – drawing on biological principles of variation, selection and retention; maybe gradual or punctuated equilibrium; often Larmarckian wherein traits are acquired.

Accounts of change may integrate several of these types. For example, Geels (2005) describes the multi-level perspective as a 'multi-motor' model, arguing that transitions are driven from different points, and in different ways at different moments in time.

Verbong and others (2012) use similar ideas to describe and characterise radical upheavals in energy systems. These multi-dimensional accounts seek to explain transitions between one socio/technological regime of energy provision and another – hence discussions of shifts from systems organised around horses to those that depend on cars, or from coal to gas. Since these are at heart accounts of technological innovation, questions about changing *demand* remain in the background. In so far as they figure at all, they do so not as dimensions of change in their own right, but as evidence of 'the market' or of the 'users' impact on the (technological) transition in question. Demand is consequently treated as a 'factor' that explains change in the energy system as a whole. Because of this focus there is no attempt to enquire further into the dynamics of practice on which the widespread adoption of new fuels or technologies depend.

This is, nonetheless, a literature in which there is repeated talk of 'co-evolution', of multiple forms of feedback (and feed forward), and of complex system dynamics. Rather than dealing with one factor at a time, 'process' models of change often work with concepts of co-evolution, emergence, complexity and chains of actions. The challenge is to grasp what is changing, and beyond that to explain the dynamics involved and their wider consequences. As such, there is an emphasis on how social arrangements hang together, and how entire systems evolve. The relationships at stake may still be causal, but the difference is that these more emergent, complex and distant forms have no inherent direction or sequence. This calls for methodological strategies of describing and accounting that involve and that foreground processes of judgement, summarising, overviewing and understanding.

These few notes hopefully catch key features of variance and process oriented accounts of change. There is clearly more to say about this topic, and we invite contributors to reflect and comment on where they stand in terms of the positions and ideas sketched above.

Conceptualising Stability and Change

Despite their differences variant and process approaches are alike in that they describe an entity or social phenomenon that is provisionally stable and which then changes. Not all theories conceptualise the relationship between change and stability in this way.

Heraclitus' famous metaphor of never being able to step into the same river twice, suggests that nature and human beings are be in a state of constant flux. Deleuze developed, in this same vein, a metaphysics of difference that inverts everyday understandings of contained identities that become different. Within the social sciences, authors such as Crang, Massey and Lefebvre follow this line of thought, arguing that social life is constantly becoming different. From this ontological perspective, identities and entities only ever appear stable: change is in fact ongoing. As such it is the qualities, movements and directions of change that require description and explanation, not the variables or motors which cause things to change.

Others argue that such accounts overstate the obvious (of course change is endemic) and are of limited value in distinguishing between more and less significant forms of change in social life. Schatzki writes:

> "Theorists such as Massey and Crang carry the dynamization of the social too far. A human life, for instance, embraces continuous happenings. It is not, however, constant movement or transition. Nor, pace Deleuze, is it constantly becoming different (except in trivial regards, for example a person's objective past continuously expanding) … *An event is not ipso facto a becoming or a change:* only some events are occasions of change or becoming. Indeed human lives and the timespaces that characterize them usually contain more continuity and sameness over time than they do difference, change and becoming." (Schatzki 2010: 200)

In Schatzki's account, change is considered to be a particular type of event, amongst other events and happenings, defined by "an empirical observation of difference in form, quality, or state over time" (Van de Ven and Poole 1995). Change happens in contrast to existing periods of stability or stasis. Even though Schatzki is largely sympathetic to a concept of becoming in which happenings and doings are always ongoing he emphasises the importance of differentiating between continuous action and continuous *change*:

> "Constant doing must not be equated with change. Many human and non-human doings alike maintain the practice-order mesh as part of which they occur. Maintenance accordingly, is not the absence of activity, but instead the occurrence of activity that perpetuates practices and reorders arrangements minimally. Change, by contrast, comes about with activity that alters practices and orders more robustly." (Schatzki 2002: 234)

In Schatzki's terms the definition of *a* change that "alters practices and orders more robustly" is ultimately a matter of judgement. Such judgements vary depending on the scale over which difference is assessed. For example, change can be discerned on the scale of seconds or hours, weeks and months or years and decades.[1] Methodological strategies of zooming in and zooming out involve shifting frames of time, scale and aggregation. Meanwhile, interpretations of rapid or slow change depend on the time scale (rapid change in the moment may look like incremental change over a century), along with the commentator's also changing point of view.

From this perspective, stability, obduracy and very very slow change are also relative concepts. Hommels (2005) work is interesting in this regard. She took on the challenge of conceptualizing obduracy in cities, here defined as complex technological configurations that clearly change over time but that also appear to be highly resistant to intentional efforts to change. She argues that "one of the main challenges for STS scholars has become to achieve a balanced understanding of

[1] Note that longer timescales always contain (and are made of) shorter ones, but typically the data deployed at different scales smoothes out or obscures this nesting.

both obduracy and change in sociotechnical developments" (Hommels 2005: 330). In this conceptual scheme, obduracy is framed as longevity, and more specifically a[2]s resistance to 'making change'.

Assessments of similarity and difference underpin accounts of relative change and stability and the terms in which dynamic processes are explained. For Bourdieu, understanding change doesn't depend on conceptualisations of change itself. Instead, it depends on a broader understanding of what a stable structure is like in the first place. When we pin down and define social phenomena, when we draw lines around what we understand to be relevant properties and connections, we are already positioning the ways in which we might think about how that phenomena changes

The following quotation exemplifies this idea:

> "If I do not know that perturbations on Uranus are determined by Neptune, I will believe that I understand what happens on Uranus, while in reality I will only understand the effects of Neptune. The object of the story here is the history of these transformations of the structure, which can be understood only by knowing what the structure was at a given point in time. (This means that the opposition between structure and change, between statics and dynamics, is completely fictitious, and one cannot understand change except on the basis of knowledge of the structure.)" (Bourdieu 1990: 159)

These observations generate a number of fundamental questions for theories of practice. For example, how does defining the boundaries of a practice on one way (and not another) matter for further accounts and explanations of how that practice changes? Put another way, does working with the notion of a practice-as-entity already define a particular way of thinking about change? Similar questions arise applies when thinking about connections between practices and when defining and characterising changing complexes of practices.

These are questions to reflect on when developing and accounting for the dynamics of energy-demanding practices, and when distinguishing between instances and processes of stability and change.

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[2] Since experiences of change develop over the life course the positions from which change is judged are themselves dynamic.

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