

## An Evolutionary Perspective on the Economics of Energy Consumption: The Crucial Role of Habits

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**Abstract:** The climate change issue imposes us not only to change the way we produce and convert energy but also to modify current energy consumption patterns. A substantial body of literature has shown that our behavior is often guided by habits. The existence of habits – not fully conscious forms of behavior – is important as it contradicts rational choice theory. Their presence thus calls for the setting of new instruments as it is difficult to expect consumers to be capable of exercising control over their consumption of energy in reaction to given incentives. This is further increased in our perspective where the current carbon-based *Socio-Technical System* constrains and shapes consumers' choices through structural, cultural, social and institutional forces. Habits being potentially “counterintentional,” can be considered as a form of behavioral lock-in that may explain continued increase of energy consumption. Policies should thus specifically address the performance context of habits.

**Keywords:** habits, evolutionary economics, energy consumption, lock-in

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More than a century ago, Thorstein Veblen wrote “[a]t the same time men’s present habits of thought which tend to persist indefinitely, except as circumstances enforce a change. These institutions which have so been handed down, these habits of thought, point of view, mental attitudes and aptitudes, or what not, are therefore themselves a conservative factor. This is the factor of social inertia, psychological inertia, conservatism” (Veblen [1899] 1994 190-191).

The least we can say is that the work of Thorstein Veblen is very enlightening for any one who is interested in economic analyses of the climate change problem (which is often seen as one of the most challenging issues that our civilization will have to face during the twenty-first century<sup>1</sup>). Two different elements allow us to make that statement on Veblen’s contribution. First, through highlighting the importance of

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historicity and its embeddedness in a wider institutional and social environment, Veblen can be considered as a precursor of the “path dependence” approach pioneered by David (1985) and Arthur (1988).<sup>2</sup> This approach and its related concept of technological lock-in shed a very insightful light on the economics of climate change (Maréchal 2007).

Second, as illustrated by the introductory quote, Veblen’s analysis raised the idea that individuals have certain habits and behaviors that are conditioned by experience (see also Veblen [1919] 1990, 79). This notion of habits provides an interesting starting point in building an analytical framework that departs from the rational choice model that has clearly been misleading in providing guidance for climate and energy-related policy-making.

In line with this context, the goal of this paper is to further explore the role played by habits in the field of energy consumption while also integrating those insights on habits into a broader evolutionary view of the economics of energy. The idea is to show how the two aforementioned insights from the work of Veblen are interrelated in that they reinforce each other. Accordingly, the objective is to provide a clear picture of habit development while also showing how habits serve to maintain the incumbent “locked-in” socio-technical system that relies on the use of fossil fuel energy.

The next section provides a brief overview of the issues at play in mainstream economic analyses of energy consumption building on the illustrative example of what has been termed the “efficiency paradox.” The third section then describes the broader evolutionary framework within which the analysis of the habit concept is performed. In the fourth section we show why habits are important to take into account in the field of energy consumption and how they fit into our broader framework. In section five, we try to provide a functional definition of habits. The final section then concludes by looking at ways to break unsustainable habits in the field of energy consumption.

### ***Mainstream Economic Analyses of Energy Consumption and the Efficiency “Paradox”***

The unequivocal link between climate change and anthropogenic activities that has recently been reaffirmed in the IPCC Report (2007) requires an urgent, world-wide shift toward a low carbon economy (Stern 2006, iv). Considering that energy-related emissions amount to a substantial part of global greenhouse gas emissions,<sup>3</sup> this shift inevitably implies changing not only the way we produce and convert energy but also current energy consumption patterns.

Insisting that energy consumption does matter *per se* is crucial as, for the past 25 years, the focus of energy policies have clearly been on energy efficiency rather than on energy conservation (Wilhite et al. 2000; Harris et al. 2007). Even though energy efficiency might be one way to reduce energy use, focusing solely on “bringing in” more efficient technologies could turn out to be counterproductive if it serves to sustain unsustainable patterns of consumption. The well-known “rebound effect”<sup>4</sup> is an example of such a counterproductive effect.

The focus on energy efficiency as a way to tackle energy-related environmental issues such as global warming is obviously linked to the prevalence of “technology optimism” where future technologies will solve the problem by providing consumers with more efficient ways of using energy (Wilhite 2007, 23). This view has consecrated energy efficiency as an *end* in itself rather than as a *mean* (i.e., toward a reduction of energy use).

But there is another equally important causal factor: the dominance of the “rational choice” model in economics. First, as argued in Maréchal (2007), the notion of efficiency itself is the inherent focus of mainstream economics which reduces human beings to their mechanical properties (Hodgson 1993b; Foster 1997). Indeed, the mainstream economic paradigm – known as *Homo oeconomicus* – rests on the Cartesian idea that the left hemisphere of the neo-cortex (specialized in analytical abilities and computational operations) is dominant. This explains why efficiency is “at the centre stage of neoclassical economics” to the detriment of efficacy, a “fundamental economic problem – one that cannot be found at all in the neoclassical research agenda” (Dopfer 2005, 25). Furthermore, the simple aggregation rule based on the concept of the “representative agent” contained in the theoretical framework of mainstream economics implies that macroeconomics “has shifted steadily from questions of distribution and institutions to an almost exclusive concern with market efficiency” (van den Bergh and Gowdy 2003, 65).

Secondly, the perfect rationality principle has rendered any question on energy demand trivial as it could be taken for granted. Based on this kind of framework, the goal then is to provide economic agents with the correct information to persuade them to invest in energy-efficient measures. In other words, the rational choice model has paved the way for the current state of policy-making where decision-makers “obsessively invoke ‘incentives’ as the panacea for any given social problem” (Hayes 2007).

Energy policy is no exception as can be illustrated by the debate on the “no regret” emission reduction potential also known as the “efficiency paradox.”<sup>5</sup> For instance, after having strongly argued against the existence of such an untapped potential of profitable energy-efficient investments at the beginning, mainstream economists then resorted to the traditional view of “market failures” that lead to erroneous market signals.<sup>6</sup> Accordingly, policy-makers were told to correct those failures by providing judicious incentives among which “getting the price right,” “providing accurate information,” and “facilitating access to capital” are the most common measures.

Empirical studies have shown that the picture is not as simple as thought by economists and that there are different obstacles to profitable energy-efficient investments than economic market failures.<sup>7</sup> Non-economic barriers – which have mostly been neglected by energy economists – are thus an important part of the explanation and require a wider range of policies to be implemented if decision-makers wish to tap the “no regret” potential.

Given that the focus on efficiency and the “incentives obsession” have failed in delivering energy reductions, it suggests that turning to an alternative framework of

analysis could provide an insightful alternative. This is all the more so since the mainstream economic model of rational choice — on which the “efficiency-incentives” view is clearly founded — is being strongly questioned by scholars from different academic disciplines (see Gowdy and Erickson 2005 for a brief overview of recent sources of criticism). As shown in the thorough review on sustainable consumption undertaken in Jackson (2005), all three key assumptions contained in the rational choice model — namely rationality, individuality and self-interest — have been challenged.

For instance, there is a substantial empirical literature demonstrating that the self-interested and rational *Homo oeconomicus* does not quite exist in reality (see the abundant empirical literature dealing with actual economic behavior of economic agents in Fehr and Gächter 2000; Henrich et al. 2001). More particularly, experimental studies in the realm of “neuroeconomics” have shown that economic decisions are partly guided by feelings and thus emotionally colored (Camerer and Lowenstein 2004).

Needless to say, this empirical evidence should be fully acknowledged in analyzing the behavior of economic agents as in the field of energy consumption (where such “anomalies” are observed).

### ***Description of Our Evolutionary Framework of Analysis***

Given that economics developed “along some paradigmatic lines determined by the cultural crucible in which the stuff of our mind is initially mixed” (Perlman and McCann 1998, 2), it was thus strongly influenced by the climate of Newtonian mechanistic science that was reigning at that time. As claimed in Foster (1997, 432), this Newtonian/Cartesian legacy leaves us with a linear and a-historical paradigm in economics insofar as it does not “depict a process unfolding in history.” All together, the Newtonian/Cartesian influence on Economics has led to a model that could be called “mechanistic reductionism” (Maréchal et al. 2008).

Having acknowledged this and bearing in mind the fact that the core assumptions of mainstream economics about the behavior of economic agents are at odds with empirical evidence (Dopfer 2004, 186), the choice of an evolutionary-inspired line of thought is rather straightforward. On the one hand, this is due to the fact that evolutionary economics can be said to have developed partly with the aim of correcting the “scientific failure” of mainstream theory in explaining why economic agents do not always act as optimizing machines. Following Herbert Simon’s “bounded rationality,” agents are viewed as adopting decision “routines” to simplify their decision process and ensure satisfactory results (Nelson and Winter 1982). On the other hand, the other cornerstone of the evolutionary framework in economics is a radically different interpretation of economic change. More specifically, what is exogenous in mainstream economics “comprises the endogenous core of evolutionary economics” as claimed in Dopfer (2004, 178). Given that it focuses on economic dynamics resulting from innovation, selection and accumulation, evolutionary economics may offer new insights in the framing of environmental policies (van den

Bergh et al. 2006). It will be shown in the analysis that together with its departure from the perfect rationality hypothesis this shift of focus toward a better understanding of economic dynamics renders evolutionary economics an inevitable theoretical ground in setting up policies for sustainable energy consumption.

In line with Veblen's above-mentioned concept of cumulative causation and with Hodgson's recent work on economics becoming "progressively more reductionist and formalistic" (Hodgson 1993a, 251), our approach emphasizes that contrary to the deterministic and linear view that prevails in mainstream economics, economic change is better conceptualized as a process of cumulative, double (downward and upward) and interactive causation (van den Bergh and Gowdy 2003; Corning 1997; Hodgson 1997).

The group-level approach<sup>8</sup> is very insightful for analyzing energy consumption, which as we will show, can be better understood through a framework allowing for circular and self-reinforcing interactions between economic agents. In other words, through this framework, consumption dynamics involve processes of individuals interacting with an emergent population in a self-reinforcing manner.

In this context, the added value of the evolutionary perspective of economic change is emphasizing its historically-contingent nature (because causation is cumulative) and highlighting the role played by systemic interdependencies (because causation is double and interactive). As illustrated in Veblen ([1915] 2003) with the example of British small wagons, systemic interdependencies imply that technologies are not isolated but rather belong to technological systems. Such systems are defined as "interrelated components connected in a network or infrastructure that includes physical, social and informational elements" (Unruh 2000, 819). Since technologies depend upon and connect with the wider range of cultural, organizational and institutional aspects of their environment enabling them to work together, we end up with what Geels and Kemp (2007) call *Socio-Technical Systems* (STS) or what Unruh (2000) calls *Techno-Institutional Complexes* (TIC).<sup>9</sup> This is illustrated by the expansion of the automobile, which required parallel developments in supporting industries (steel, glass, etc.), infrastructures (service station, roads, etc.) and academic research and lobbies (Flink 1970; 1988).

This intertwining of different elements that characterize STS sheds light on the potential inertia of such systems. Indeed, once historical conditions have led to the emergence of a STS, its multiple components are as many factors that can contribute to stabilize the system in a self-reinforcing manner. The nature and type of a STS is thus dependent upon the path followed and is further perpetuated through the interactions of its multiple elements.<sup>10</sup> Positive feedbacks act as a snowball that results in the locking-in of the incumbent STS following a path-dependent co-evolutionary process. Following the definition given in Puffert (2002, 282), a path-dependent process is "one in which specific contingent events – and not just fundamental determinative factors like technology preferences, factor endowments and institutions – have a persistent effect on the subsequent course of allocation."

This view is important for energy-related issues for at least three different reasons. First, as Grubler (1998) has argued, the last two centuries could be viewed as

the succession of mainly three STS, each based on a source of energy. From 1800 to 1870, the dominant STS was composed of steam, iron and canals; then over the 1850-1940 period it was progressively replaced with coal, railways, steel and industrial electrification; and this last cluster has in turn been shifted to a STS made of oil, roads, plastics and mass electrification between 1920 and 2000.

Second, as noticed by Shove (2004), given that technologies are embedded in a strongly influential social context of institutions, consumption is shaped by (whilst also shaping) technological constraints.

Third, since the emergence of a given STS (such as the current carbon-based one) is considered to be historically contingent,<sup>11</sup> it is no longer viewed as being governed only by optimality. As first claimed in the pioneering work of Paul David on the QWERTY case (David, 1985), a given STS might be based on an inferior (design of) technology. There has been an extensive debate on that hypothesis of inferior design among experts mainly because of the difficulty of proving counterfactual superiority. However, the empirical evidence suggests that this hypothesis should not be overlooked (see the evidence gathered in Cowan (1990) on light water reactors and in Scott (2001) on the lock-in of the British railway system into a small wagon system). Yet, in our case, we are “fortunately” faced with enough scientific evidence that climate change is caused by the accumulation of greenhouse gas (GHG) emissions to find ways to unlock out of the current carbon-based STS without having to discuss its potential technological inferiority.

### ***An Evolutionary View of Energy Consumption: The Importance of “Habits”***

As shown in more detail in Maréchal (2007), looking at energy-related issues through evolutionary lenses sheds a clearly different light and thus calls for a broadening of current policy-making in the field. For instance, the notion of “bounded rationality” is important in explaining the efficiency paradox in energy we mentioned previously. In line with authors that see energy consumption as “the routine accomplishment of what people take to be “normal” ways of life” (Shove 2004, 117), a study has shown that consumers’ intrinsic (i.e., not determined by market signals) habits and preferences were important determinants of energy-inefficient choices in motor technologies (de Almeida 1998, 650). Accordingly, we assume that consumers are “locked in” their emotionally-based consumption routines as illustrated by Simon’s concept of docility as the “human propensity for accepting information and advice that comes through appropriate social channels” (Simon 2005, 95).

Starting from the idea that social learning is the most important form of learning of human beings (Tomasello et al. 2005) and that it is impossible to verify every piece of information we consider legitimate since rationality is bounded, there is some form of “path-dependence” of the information that we use to make our decisions.

Following this line of research, a substantial body of literature has shown that — more often than not — our behavior is guided by habits (i.e. it takes the form of repetitive actions performed with minimum thinking) and thus without the type of

cognitive deliberation assumed in the rational choice model.<sup>12</sup> The obvious advantage of these “habits” in decision-making is to free up resources that can be devoted to solving non routine-like problems and, as such, it can be said to be a highly rational way of allocating our limited cognitive abilities (Jager 2003). It liberates the individuals from “the burden of all decisions” (Berger and Luckmann 1966, quoted in Lindbladh and Lyttkens 2002).

As it has convincingly been shown in Tversky and Kahnemann (1974), people use a variety of cognitive and emotional heuristics to deal with the impossibility of amassing all possible information and thus tend to make immediate and sometimes unconscious choices of behavior. This idea that people are not always fully conscious when they are performing routine-like behaviors is important not only because it contradicts rational choice theory but also because it suggests that the conspicuous part of consumption might have been overemphasized. As shown in the work of Elisabeth Shove and other sociologists, a non-negligible part of our consumption is inconspicuous. Much of our every day consumption is almost invisible to our peers and even to ourselves (Jackson 2005). And this is especially so when it comes to energy consumption.

In such a context, it is difficult to expect consumers to be capable of exercising control over their energy consumption in reaction to given incentives (whether economic or informative). This is exemplified in the current carbon-based *Socio-Technical Systems* (STS) constraints and shapes consumers’ choices through structural, cultural, social and institutional forces such as norms, media, etc. More than “willing” consumers should rather be viewed as partly “locked-in” (Sanne 2002). Consumers are thus neither fully rational (in the sense of mainstream economics) nor omnipotent.

In addition, as underlined by the notion of “circular causation” highlighted in our perspective, while choices in energy consumption are strongly influenced by the existing STS, they, in turn, reinforce and maintain the incumbent STS. Indeed, if the use of highly automatized behaviors such as habits is undoubtedly “procedurally rational” in stable contexts, it quickly turns into a change-resisting factor when conditions and circumstances vary such that alternative behaviors would yield better outcomes. In line with Carrillo-Hermosilla and Unruh (2006, 708) who resort to “original institutionalism” to explain the “apparent paradox in the increasing returns and lock-in conceptualization,” we thus consider habits as an additional explanatory factor of long-term technological stability.

Paul David, who together with Brian Arthur pioneered the research on “lock-in” processes, asserted in the mid-80s that path dependencies may arise “in the presence of strong technical interrelatedness, scale economies and irreversibilities due to learning and *habituation*” (David 1985, 336 – emphasis added). As mentioned in Barnes, Gartland and Stack (2004, 372), only the first two arguments were used in the literature on “technological lock-in”<sup>13</sup> that has followed from the work of David and Arthur to the detriment of the “behavioral” part of the lock-in process. In fact, there is a sort of mutual (i.e., or circular) form of reinforcement that arises from the influences of the STS in shaping behavior that makes individuals form habits in specific ways that are consistent with the STS operating constraints (Hodgson 2004,

656). As mentioned in Hodgson (2007, 107), “habits are the constitutive material of institutions” while the presence of institutions make that “accordant habits are further developed and reinforced among the population.” This is in line with the view that “consumers can only ask for what is available; they cannot demand what is deemed “technically” impossible to produce. These real constraints eventually feed back on mental habits” (Ramazotti 2007, 774).

It is important to note that such a view contradicts “mechanistic reductionism” since it relies on the idea that individuals and institutions (i.e., here under the form of the STS) “mutually constitute and condition each other” (Hodgson 1997, 404). The idea is that the current carbon-based STS both constrains and enables habit formation. This corroborates recent empirical analysis of energy consumption in Denmark and illustrates that there are both “similarity and collectivity” as well as “variety and individuality” in behaviors (Gram-Hanssen 2008, 14) as well as with Veblen’s acknowledgement of the “varying degrees of ease with which different habits are formed by different persons, as well as the varying degrees of reluctance with which different habits are given up” (Veblen 1899, 108). Assessing individual habits is thus relevant in our framework.

Behavioral lock-in under the form of “habits” is important to understand the continued increase of energy consumption in spite of existing environmental awareness and concern among the population. Indeed, even in cases where people intend to perform a given behavior (e.g., eat more healthily), they sometimes do not implement it because it contradicts existing habits (e.g., stop by the fast-food restaurant around the corner). Verplanken and Faes (1999) coined the term “counter intentional habits,” referring to the stronger they are, the more they affect behavior relative to intentions. Habits thus “become a better predictor of behavior than behavioral intentions” as suggested in Triandis (1977, 205). The failure of intentions to predict behavior for people with strong habits has been shown to be the case for car use (Verplanken et al. 1998) as well as for food purchases, watching TV news and riding the bus (Ji Song and Wood 2007).

This may be explained by the automatic nature of habits (i.e., directly cued by environmental stimuli). Given the minimal cognitive effort they require, habits “assume precedence over more thoughtful actions” (Verplanken and Wood 2006, 93). This is important as today’s society is characterized by a feeling of generalized time pressure, people will tend to use simple heuristics such as habits (Betsch et al. 2004). In fact, the trend toward individualization and the parallel rapid technological and institutional changes that characterize contemporary society engenders a feeling of information overload that renders habits an element enhancing security and comfort (Lindbladh and Lyttkens 2002). For mainly risk-adverse people, habits can also be considered less risky as outcomes and probabilities are allegedly known with greater certainty.

Another reason for the potential persistence of habits lies in the presence of strong short-term rewards that override long term benefits as illustrated by the case of “bad habits” such as smoking where people cannot give up the pleasure of a cigarette (i.e. short term reward) even though they formulate strong intentions to quit given the



potential health damage it could help avoid (i.e., long-term benefits). This temporal asymmetry can also serve to illustrate the above-mentioned influence of STS and institutions on individual decision-processes like, for instance, in the case of financial markets that make managers develop habits of focusing “on short-term profitability rather than long-term growth and firm survival” (Barnes, Gartland and Stack 2004, 373).

Finally, the pervasiveness of habits is even enhanced through self-reinforcing processes acting both on the general propensity to rely on habits and on the existing habits themselves. On the one hand, the above-mentioned path-dependence of information as well as the tendency to disregard contradictory information<sup>14</sup> makes existing habits even more deeply ingrained. On the other hand, at a broader level, people relying on habits adjust their cognitive perceptions, matters of appreciation and normative judgments in coherent structures (Lindbladh and Lyttkens 2002), which strengthen the idea that the reliance on habits is dependent upon past experience and conditions. In addition, Veblen ([1899] 1994, 108) asserts that habits are stronger if they are “largely and profoundly concerned in the life process” or “intimately bound up with the life history.” In other words, not only do existing habits get more entrenched through time but so does the general disposition to rely on habits. This is what Jager (2003) calls a “contingent reinforcement.” This also was already acknowledged in Veblen ([1899] 1994, 107-108) where it is said that “the longer the habituation (. . .) the more persistently will the given habit assert itself.” There is thus clearly a form of lock-in process of habits.

Thus, policies promoting sustainable energy consumption would need to both shift the incumbent STS to shape decisions toward the desired direction and also deconstruct habits that this STS has forged with time (as increased environmental awareness and intentions formulated accordingly are not sufficient in the presence of strong habits).

### ***Defining “Habits” and Assessing the Strength of their Influence on Behavior***

At this stage, it is important to provide a “tentative” definition of the concept of habits. Following Verplanken and Aarts (1999, 104), habits are defined as “learned sequences of acts that have become automatic responses to specific cues and are functional in obtaining certain goals or end states.” Note that this definition clearly focuses on habits that intervene at the level of actions and not on the influence of habits on intention themselves. The latter is the focus of interest of “old institutional” economists like Hodgson who sees established habits as “a potential basis for new intention or beliefs” (Hodgson 2004, 656). According to this view, the word “habit” can also include habit of thoughts and is thus a generative ground of both reflective and non-reflective behavior. Hodgson’s view of habits as a propensity is interesting as it is “both interactionist and evolutionary” (Hodgson 2004, 658) since humans are considered as socially constructed beings but with different predisposition and aspirations. Again, this shows the adequacy of those habits with our framework centered on the concept of circularity between individuals and population and with the aforementioned approach adopted in Gram-Hanssen (2008).

This “propensity” concept inspired by Thorstein Veblen is insightful for energy consumption. If it can be convincingly argued that every individual has habits, the attitude toward habits as a general strategy of decision-making can be different among individuals as it is clearly shown in the qualitative analysis performed in Gram-Hanssen (2008).

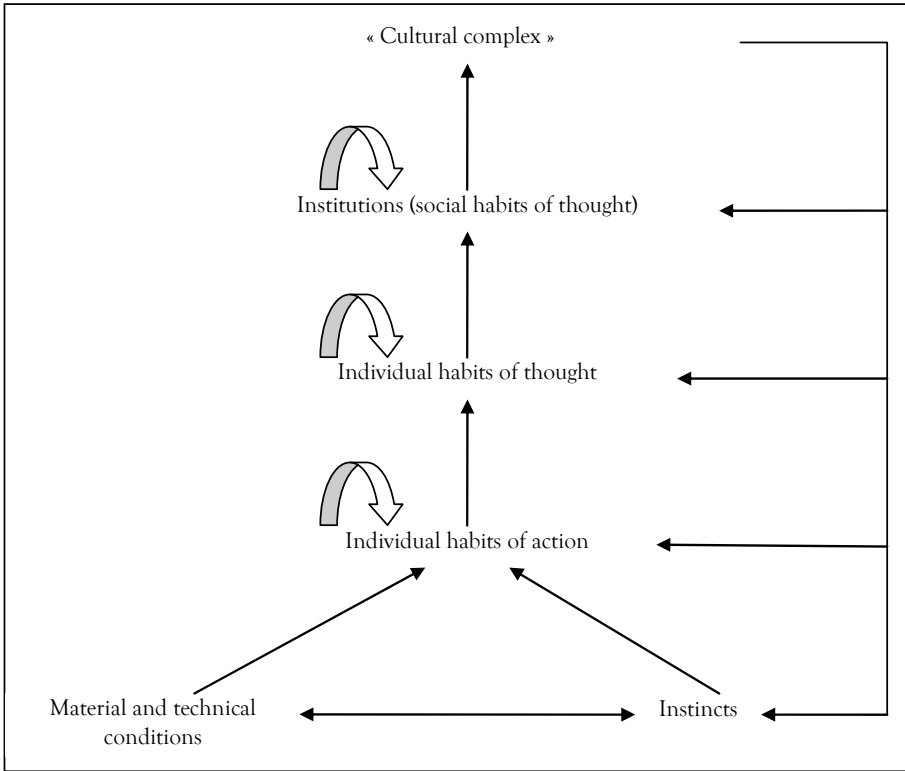
Nonetheless, in the following sections, we will deal solely with “habits” in the sense of Verplanken and Aarts (1999). Accordingly, within the view of habits as expressed in Hodgson (2004), we thus only consider the non-reflective behaviors that are generated by the concept of “habits of thought” that act as “filters of experience.” In other words, Hodgson’s view of habits refers to learning “sequences of acts” that are performed in a habitual manner. We are thus closer to “habituation” as a “social mechanism” (Hodgson 2004, 652) than to habitual acts.

This dichotomy between actions and thought is essential to better understand how the somewhat ambiguous and multi-dimensional term of “habits” shed an insightful light on energy consumption dynamics. The clarification is not new as Veblen himself clearly distinguished “habits of thought” from “habits of life.” The latter are considered as equivalent to the “habits of actions” defined by C. S. Peirce as “a rule of action” allowing to address “familiar circumstances in an effective way” (Brette 2004, 247-248). As summarized in Waller (1988, 114), “Veblen, in contrast to Peirce, focused on the social dimensions of habit, rather than on its individual manifestations.” However, this does not prevent us from integrating habits into a broader evolutionary framework since “(h)abits of thoughts are an outcome of habits of life” which are themselves “the indirect product of the technological scheme” (Veblen quoted in Brette (2004, 253)). As mentioned above, social learning being an essential form of learning, both forms of habits can be handed on and thus may serve to explain the above-mentioned fact that people develop habits that are “compatible with a given material and technical environment although they may not be directly confronted with it” (Brette 2004, 259).<sup>15</sup> If we add to that picture the notion of circular causality we referred to earlier, we end up with a process with positive feedbacks between habits (i.e. “habits of actions” which will be further explored below), institutions (i.e., “habits of thoughts”) and the broader “cultural complex,” a notion similar to the aforementioned STS or TIC as shown in Figure 1.

Highlighting the role that habits play in mediating behavior does not leave room for controlled or deliberate processes in the causal factors of behaviors. Nor, does it imply that there exists a clear division between automatic and controlled processes. Consistent with the work of Damasio (1995; 2000) that shows the presence of cortical interconnectivity in the human brain, it is clear that mental processes generally involve a mix of automatic and controlled attributes (Bargh 1996; Betsch et al. 2004; Jackson 2005). In fact, consciousness and deliberation accompany the process of automatization.

Besides, since habits are acquired and learned, they originally require deliberation as free will is essential to memorization.<sup>16</sup> The often quoted “driving metaphor” indeed perfectly illustrates that even though experienced drivers are able to change gears without having to think about it, this cognitive automatism was

Figure 1: Veblenian Process of Institutional Self-Reinforcement



Source: adapted from Brette (2003; 2004)

“acquired through a long learning process in which motivation plays a far from negligible role” (Lazarcic 2007, 3). Thus, if “consumer behavior is often mediated by processes that occur outside of conscious awareness” (Chartrand 2005, 209), it could also sometimes be qualified as unconsciously resorting to previously consciously determined evaluation. Echoing the sentence on emotions mentioned in Dopfer (2005, 25), we have “intelligent habits” while the general disposition to rely on habits could be considered as a form of “habitual intelligence.”

This corroborates the process of habit formation in three stages as described in Jager (2003) where it is acknowledged that the first performance of a certain behavior was intended – whether through deliberation, learning or imitation. Then, the first stage is the cognitive processing of the information gathered during the initial

performance. It is followed by the second stage during which the processed information is converted in procedural forms by practices (i.e., the required effort is diminished). Finally, the third stage refers to the behavior acquiring the status of a habit, which as mentioned above, will then be reinforced through time.

Nonetheless, on the spectrum from control to automaticity, habits clearly lie closer to automaticity (Jager 2003). Even though we may be aware that we rely on habits and are capable of changing them, we still do it without little cognitive resources involved. This clearly distinguishes habits from purely automatic behaviors that are more emotionally-based and reflex-type of behaviors,<sup>17</sup> It is thus important to insist that the strength of a habit depends on the “degree to which the behaviour has been automated and is being performed without cognitive elaboration” (Jager 2003, 2-3). Therefore, habits should not be simply equated with frequency of past behavior. As claimed in Verplanken (2006, 639), “whereas repetition is a necessary condition for a habit to develop ( . . . ) it is not repetition *per se* that matters.”

Beyond their necessary “history of repetition,” the crucial feature that characterizes habits<sup>18</sup> is their automaticity or more precisely “the automatic elicitation of behavior upon encountering specific cues” (Verplanken and Orbell 2003, 1317). In other words, provided that a habit has been formed through the satisfactory repetition of a given behavior and that the goal associated with that habit is activated,<sup>19</sup> the presence of the specific cue automatically triggers the habitual behavior. Veblen ([1899] 1994, 106) also mentions the fact that habits are “a method of responding to given stimuli.”

Following the work of John Bargh (1994), automaticity can be considered as displaying four distinct features sometimes referred to as the “four horsemen of automaticity”: lack of control, lack of awareness, efficiency (i.e., saving up cognitive resources that can be used for other purposes) and lack of intention. Verplanken and Orbell (2003) provide evidence that habits tend to display the first three features of automaticity, at least to a certain extent, which can serve to distinguish the strength of different habits. For instance, even though habits are controllable in principle, it is often quite difficult to override strong habits such as smoking cigarettes (Verplanken and Faes 1999). Dijksterhuis et al. (2005), as well as Chartrand (2005), provide ample and well documented evidence regarding the minimal awareness that is involved in performing consumer behavior. Regarding the unintentional feature of habits the picture must be somewhat qualified: if habits can turn to be “counter intentional” (Verplanken and Faes 1999), the fact that they are functional make them intentional to some degree (Polites 2005). All together, this again shows that, as mentioned earlier, habits are not purely automatic as reflex-types of behaviors could be deemed to be.

### ***Conclusion: The Need to Break Unsustainable Energy “Habits”***

In our perspective, the important question is to assess whether and in what proportion energy consumption is generated by habitual behavior. This is obviously an empirical question but based on the three conditions identified in Jackson (2005)

– degree of involvement, perceived complexity and degree of constrain – we may suspect this part to be high as claimed by Shove (2004). Indeed, the decisions taken in everyday energy consumption are likely to be considered as having less important consequences than other decisions. According to Amos Tversky, people are more likely to use simple heuristics (such as habits) in such situations. Needless to say, the low complexity of decision tasks related to everyday energy consumption does not require a lot of cognitive effort either. Finally, as we mentioned above, the constraints of today's society (i.e., the feeling of time pressure as well as the information overload) tend to favor the use of habits. This suggests that everyday energy-related behaviors do not require much intentional effort to be set in motion such as it has been shown to be the case of, for example, food consumption of adolescents in Kremers, van der Horst and Brug (2007). For Schäfer and Bamberg (2008, 213), energy use along with nutrition and mobility are “forms of behaviour that are hardly reflected upon in everyday life.” This is corroborated by a review of studies on household energy consumption where one of the lessons learned is the importance of habits that can “prevent that (pro-environmental) behaviour from happening” and make a person “act opposite to his or her intentions without even realising it” (Martiskainen 2008, 87)

One other important element that characterizes domestic energy consumption is that, as mentioned in the fourth section, it is not visible (Jackson 2005; Abrahamse et al. 2005). This implies that people do not consider the remote environmental impacts of their actions when performing energy-related behaviors. This obviously facilitates having unsustainable habits in this field (Martiskainen 2008, 77).

The existence of habits in domestic energy consumption will most likely limit the effectiveness of incentives as these traditional measures do not specifically address the performance context and the social and structural influences that shape and maintain these habits. For instance, the efficiency of information campaigns will be reduced by the presence of the above-mentioned “confirmatory bias” displayed by people with strong habits. Efficient energy policies should thus be designed with the aim of disrupting unsustainable habits. Starting from the very definition of habits, it seems straightforward that breaking existing habits will require change in environmental cues and/or induced deliberation while time and repetition will be needed to promote alternative habitual behavior.

Since habits can be seen as the automatic cuing of behavior induced by stable features of performance context (Dijksterhuis et al. 2005; Chartrand 2005; Wood, Tam and Guerrero Witt 2005), analyzing the habit-triggering cues in the field of energy consumption is a first step toward disrupting existing habits. Indeed, as noted in Verplanken and Wood (2006, 9), “the dependence of habits on environmental cues represents an important point of vulnerability.” Following Ji Song and Wood (2007), the main context cues include physical surroundings, social surroundings, temporal perspective, task definition, and antecedent states.

As far as household energy consumption is concerned, physical location is obviously an important environmental cue. Accordingly, economic incentives aimed at improving energy efficiency would probably be more effective if supporting

information was specifically targeted toward new residents (whose previously-determined habits have been perturbed with the change of physical location) than they would be among the population of incumbent residents. This is supported by the evidence contained in Wood, Tam and Guerrero Witt (2005) that shows how a change of location would induce decisions to be more in line with intentions than with habits.

Beyond the importance of cues, we also saw that the persistence of habits could be partly explained by the presence of short-term rewards coupled with what we called the problem of “temporal asymmetry.” Besides disrupting the performance context of habits,<sup>20</sup> another policy measure that could also turn out to be effective would be to reduce the direct rewards experienced when performing the habitual behavior. Jager (2003) provides some interesting examples of such rewards-reducing strategies like, for instance, applying nasty substances on fingernails to avoid biting them or the use of anti-alcohol pills.

Whereas there does not seem to be any obvious similar strategies in the field of domestic energy consumption, policy-makers could turn to their counterparts, which aim at increasing the rewards attached to the alternative behavior. An example of such a strategy is also provided in Jager (2003) who mentions the Dutch policy of placing waste nets along the roads in order to turn correct waste disposal into a rewarding game. Making the alternative behavior more rewarding seems to provide an interesting point on which to found sustainable energy measures. This is confirmed by the answers provided by respondents that have taken part – on a voluntary basis – in the Brussels Energy Challenge as it is the very notion of “challenge” that is considered to be the most “interesting” aspect of the proposed policy.<sup>21</sup> The participants also considered the idea of challenge as a facilitating factor in implementing their behavioral change on a daily basis. In fact, as mentioned in Matthies, Klöckner and Preiber (2006, 94), commitment strategies (i.e., as the Brussels Energy Challenge) enhance “self-satisfaction as a result of acting in accordance with personal values” and therefore increase “the cost of not acting.”

Another strategy that builds on predictions from social identity theory and social comparison theory is the use of comparative feedback. This has been shown to increase performance through raising motivation in a study of two units of a metallurgical company (Siero et al. 1996). In one unit, employees received information about energy conservation, had to set goals and received feedback on their own conservation behavior. In the second unit the only difference was that they also received information about the performance of the other unit. As expected, employees who received comparative information saved more energy. Interestingly, the authors note that it is “remarkable that behavioral change took place with hardly any changes in attitudes” (Siero et al. 1996, 245).

Finally, it is important to recall the context within which habits develop. Bearing this in mind, it is obvious that disrupting an unsustainable habit of energy consumption is only a first step as policy-makers must also ensure the new (more sustainable) behavior is tested, adopted and maintained. As mentioned in Matthies, Klöckner and Preibner (2006, 104), “a temporary situational change as a defrosting of

habits can only lead to a long-term change to new behavior if the evaluation of the new behavior is positive, which require that the internal and external determinants are in favor of the new behavior.” Within our framework, this clearly means that external aspects (i.e., wider societal, cultural, institutional and technological aspects) must be taken into account. Policies should be aimed at helping consumers “to escape the restrictions imposed on their knowledge by the mental habits they have acquired” (Ramazzotti 2007, 776).

### **Notes**

1. For instance, the U.S. Union of Concerned Scientists introduces one of his position paper on climate change by recalling that “[g]lobal warming poses a profound threat to humanity and the natural world and is one of the most serious challenges humanity has ever faced” (Union of Concerned Scientists (UCS) 2007, 1).
2. Veblen’s contribution is acknowledged in the conclusions of David’s article (see David 1985, 336).
3. Energy-related GHG emissions make up 80% of total GHG emissions in EU-27 (European Environment Agency (EEA) 2007).
4. The rebound effect comes from the fact energy-saving technologies trigger behavioral response by the economic agents, that may prevent the benefits from energy conservation to be entirely tapped (e.g., you buy a more energy-efficient car but you drive more). For a good definition and overview of the rebound effect, see Berkhout, Muskens and Velthuisen (2000).
5. An emission reduction potential is said to be “no regret” when the costs of implementing a measure are more than offset by the direct or indirect benefits (not including climate-related benefits) it generates based on traditional financial criteria. The most obvious non-climate benefits are those arising from reduced energy bills. For a brief overview of the debate, see Maréchal (2007).
6. The reason for this initial opposition lies in the theoretical incompatibility between the Homo oeconomicus paradigm and the existence of profitable investments not being spontaneously undertaken. “Locked” in their theoretical background, economists were thus quite skeptical about the evidence coming from engineer-type bottom-up studies (see DeCanio 1998).
7. See the limits of market forces in de Almeida 1998; of energy labels in Gram-Hanssen et al. 2007; of price signals in Meier and Eide, 2007.
8. It refers to the idea that the sole selection operating at the individual level cannot serve to explain what exists and happens today. It has extensively been shown that socially-acquired characteristics of human beings are better explained by group level analysis (Henrich 2004).
9. Here again, it is interesting to note how Veblen’s work is insightful as he already touched upon similar ideas. In fact, its notion of “cultural complex” coupled with the materialist determinism his work is imprinted with leads to a view that is very close to Unruh’s TIC.
10. In line with the concept of “path-dependence” which refers to the fact that technological systems follow specific trajectories that it is difficult and costly to change (Arthur 1983; David 1985). As shown in Arthur (1989), these trajectories depend on historical circumstances, timing and strategy as much as optimality (i.e., the main focus of mainstream economics).
11. That means that a completely different STS could emerge from a similar context depending on how things happen in early stages. For instance, railway gauges would probably be of a different width, were Stephenson born in another mining district (Puffert 2002).
12. In fact, in the original work of Nelson and Winter (1982), “routines” are organizational (i.e., relate to firms). It is now standard practice in evolutionary economics to use the term “routine” for collective behavior and the term “habit” for individual behavior (Dosi, Nelson and Winter 2000).
13. See Maréchal (2007) for an overview of the important insights from this literature for energy analyses.
14. Discarding information is a way to solve cognitive dissonance that is produced by receiving conflicting information. There is even the presence of what is termed a “confirmatory bias” as people favor and seek out information that confirms their views, beliefs and behaviors (see Faiers et al. 2007, 4385). This is in addition to a reduced capacity to detect environmental change in the presence of strong habits (Verplanken and Wood 2006, 92).

15. Translation from French is my own.
16. As shown by Bargh (1997). It is also important to note that social processes like imitation and conformism are involved in habit forming (Hodgson 2004, 652).
17. As noted in Limayem, Hirt and Chin (2001), 277, habits are, unlike reflexes, “based in part on the ability of the individual to learn or acquire/absorb the particular behavior into a cognitive schemata or script.”
18. From now on, habits are to be understood in the sense of Verplanken and Aarts (1999) (unless specified otherwise).
19. The functionality (or the goal-directed nature) of habits is important as shown in Ouellette and Wood (1998).
20. A good example of a perturbed habit context is the 8-day closure of a freeway that led to the development of a new script-based travel mode choice (Fujii and Gärling 2003).
21. It has a 9.06 on a scale ranging from 1 to 10 anchored by “not at all interesting” to “very interesting.” For instance, “the feeling of acting individually to fight against a global issue” has a score of 8.30 whereas the score of “individual follow-up” is only 5.60. The complete results can be found in the June 2007 Report (in French) on [www.defi-energie.be](http://www.defi-energie.be).

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