A Critical Review of the Interplay between Policy Instruments and Business Models: Greening the Built Environment a Case in Point

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2014/36/IIP
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Acknowledgements: This paper was developed using funds made available through the Abu Dhabi Education Council, whose support is gratefully acknowledged. The authors would also like to thank Mr. Tomoo Machiba (UAE Ministry of Environment and Water) and Dr. Georgeta Vidican (German Development Institute) for their constructive feedback on an earlier version of this manuscript.

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This working paper was developed using funds made available through the Abu Dhabi Education Council, whose support is gratefully acknowledged.

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Abstract

Policy instruments introduced with the aim of promoting environmental sustainability are often designed and evaluated in terms of their impact in facilitating technological change. The bulk of ‘green’ policy instruments that have emerged in recent decades have had as their target the facilitation of the development and adoption of greener processes, goods and services. Concurrent business models have sought to create and capture value arising from this policy-induced transition to more environmentally sustainable practices. However, both such policy instruments and the business models are often evaluated more in terms of their impact on the development and adoption of innovations, and less in terms of their impact on behavioural change. This paper provides a critical review of interplay between green policy instruments and green business models from a behavioural perspective. Thus, instead of looking at policy instruments from a technology-push and demand-pull perspective, this paper samples them in terms of sticks, carrots and sermons and then provides a critical review of the emergent business models that have emerged in response to stick-, carrot-, and sermon-types of policy regimes. The paper finds that most green business models that emerged, in the built environment, in response to sticks may be characterised as buck-passing, i.e. passing costs to others and skirting around the stick of regulations; those that emerged in response to carrots as opportunistic carpet-bagging aimed at capturing temporary gains; while those that emerged in response to sermon-orientated awareness campaigns, show a tendency to diffuse even in the absence of supportive fiscal conditions.

Keywords: green business models; environmental policy; sustainable built environment; green entrepreneurship
1. Introduction

There is widespread agreement that the cost of mitigating climate change is a significant fiscal issue across the globe (IEA, 2013; UN, 2013). As governments have limited financial capacity, a large proportion of the required green investment to address this issue is expected to come from the private sector. Given the high upfront investment usually associated with green energy technologies, a range of innovative policy instruments and business models have emerged to create potentially lucrative green markets (WEF, 2013). However, a review of the literature pertaining to sustainability transitions, reveals that – with a few exceptions – the interplay between business models and policy has not been well addressed in previous research (Doranova, 2012; Kivimaa and Virkamaki, 2013; Provance et al., 2011; Truffer et al. 2012). This is despite intense pressure on politicians and managers alike to create and capture value from eco-investments (Desyllas and Sako, 2013; Kiron et al., 2013; Nidumolu et al., 2009; OECD, 2013; Orsato, 2009). Contrary to the conventional wisdom of most business leaders and mainstream economists, Porter (1991) floated the idea that environmental regulations could actually enhance the productivity and competitiveness of firms. Whilst many economists remain sceptical of such ‘win-win theorising’, Porter and van der Linde (1995) offer several case studies of companies that appear to have benefited (i.e. through value capture) from developing or adopting green technologies in response to market-based environmental regulations. However, whilst there is a growing awareness that new business opportunities may be created through green business model innovation, empirical data regarding their sustainability are limited (Huijben and Verbong, 2013).

The built environment is a case in point\(^1\). A review of the literature indicates that the topic of green business models in the built environment sector has not been subject to much academic scrutiny (IEA-RETD, 2013). Not only is the built environment highly affected by climate change, but it is also a major consumer of energy and contributor to climate change. Given recent massive growth in new construction within developing economies and the issue of inefficient building stocks that exist worldwide, the current business-as-usual scenario envisaged by the United Nations Environment Programme (2009) is that greenhouse contributions from the built environment sector will more than double over the next twenty years. This forecast even takes

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\(^1\) The built environment refers to surroundings that provide the setting for human activity. It can range in scale from individual buildings through to public spaces and communities and cities and typically includes their supporting infrastructure, e.g. transport, energy and water networks.
into consideration the entry of new technologies into the market that have the potential to significantly reduce greenhouse gas emissions (IPCC, 2007; Mahroum and Al-Saleh, 2012).

The ‘greening’ of the built environment is often associated with the implementation of energy efficiency measures and/or renewable energy technologies. Their uptake, despite the availability of cost-effective technologies, has however been slow (Gillingham et al., 2009) with the dominant policy paradigm focused on designing and introducing policy instruments with twofold aims of: (i) generating new energy-efficient and cleaner technologies; (ii) accelerating the adoption of these technologies by consumers (e.g. see OECD, 2012). In other words, the innovation literature has been dominated by the so-called ‘technology-push’ and ‘demand-pull’ perspective; where success and failure is measured in terms of technology development and diffusion. There are, however, concerns about the sustainability of temporary gains made in this regard given that much of the ‘push’ and ‘pull’ dynamics are the result of heavy subsidies (Taylor, 2008). This applies both to the costs of technology development and technology adoption, which has the probable effect of slowing down the emergence of sustainable business models that are not underpinned by the presence of government subsidies (Gan et al., 2007). While behavioural implications of policy interventions may have significant potential in addressing such concerns; they are often seen as precursors for technological developments rather than ultimate policy objectives.

So, what happens if or when the subsidies go away? How sustainable are the gains made through utilising these green policy instruments? How do the business community behave in response to various types of green policy interventions? This paper does not claim to provide a definitive answer to these questions but instead proposes an approach for examining the sustainability of such gains and the behavioural changes that emanate from the interplay between green policy instruments and the business models. It takes the built environment as a case in point.

Our review is based on over a dozen semi-structured interviews and in-depth discussions with green business professionals and policy-makers. This field research was augmented by a review of green business models that have recently emerged in relation to the built environment. The review also draws upon a range of international examples of successful and unsuccessful experiences in greening the built environment. The remainder of the paper is structured as
follows. The proceeding section establishes a basic understanding of the various rationales behind green policy interventions. This will be followed by an overview of the types of green policy instruments (Section 3). The paper then provides a synthesis of a range of green business models in terms of the policy instruments that have emerged in the built environment (Section 4). Section 5 examines the voluntary emergence of green business models in the form of entrepreneurship with the aim of distilling further the interplay between the fields of environmental policy and entrepreneurship studies. In Section 6, we propose a behavioural framework for examining the sustainability of the gains that result from the interplay between policy and business models. Section 7 concludes with a discussion that summarises the findings of the paper and reinforces the importance of further consideration of behavioural aspects in mainstream environmental policy debates.

2. Rationales for Green Policy Intervention

In spite of the apparent abundance of clean and profitable energy-saving opportunities, green technologies often fail to be diffused widely within markets (Gillingham et al., 2009; Jaffe, 1994). Reasons provided by neoclassical economists to explain the limited adoption of such cost-effective technologies generally boil down to so-called ‘market failures’, which in turn provide a justification for policy intervention as suggested by Arrow (1962). Market failures can be a result of several factors, including misplaced incentives; negative externalities (i.e. unpriced costs such as air pollution); imperfect competition; free riding; distortionary fiscal and regulatory policies; and insufficient or incorrect information (Cornes and Sandler, 1996; Jaffe and Stavins, 1994; Weber and Rohracher, 2012). Misplaced incentives are of particular relevance to the built environment sector. These are the result of the so-called ‘the principal-agent problem’ in economics literature – where an agent has the authority to act on behalf of a customer, yet does not fully reflect the consumer’s best interests (Brown, 2001). For example, consider the moral hazard that may arise in the landlord-tenant relationship; the former is not usually incentivised to invest in energy-efficient equipment as the latter is the party that will usually end up paying the energy bills and hence benefiting from any savings. If the landlord is not able to recover the cost of energy efficiency investment through the purchase price or rent charged for the property, then the tenant would be encouraged to under-invest in energy efficiency relative to the social optimum, thereby creating a market failure (Gillingham et al., 2009).
Figure 1 shows a matrix of three possible avenues for split incentives in the landlord-tenant relationship (the agent making the hidden action in the landlord-tenant problem is indicated in parentheses).

<table>
<thead>
<tr>
<th>Landlord occupies the property</th>
<th>Tenant occupies the property</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Occupant pays for energy use</strong></td>
<td><strong>No Split Incentives</strong></td>
</tr>
<tr>
<td></td>
<td>(Landlord) Under-insulation &amp; less-efficient appliances; optimal effort to reduce energy use</td>
</tr>
<tr>
<td><strong>Occupant does not pay for energy use</strong></td>
<td><strong>(Both)</strong> Lower effort to reduce energy use; under-insulation &amp; less-efficient appliances</td>
</tr>
<tr>
<td></td>
<td>(Tenant) Low effort to reduce energy use; ambiguous effect on insulation &amp; appliances</td>
</tr>
</tbody>
</table>

**Figure 1: Possible Avenues for Split Incentives in the Landlord-tenant Relationship (Adapted from Gillingham et al., 2012)**

Another typical example of market failures is a power plant that does not have an economic incentive to minimise the external costs of pollution. In this case, governments might attempt to serve the public good of clean air through creating new mechanisms such as carbon trading schemes (Jaffe et al., 2005). Additionally, a government may intervene to preserve commonly-shared resources such as water and non-renewable energy sources. Without government involvement, such resources could be overused or depleted (Agrawal, 2002). According to neoclassical welfare economics, the existence of such market failures impedes the attainment of socially-optimal levels of investment in energy efficiency, and therefore provides justification for public policy interventions. However, whilst economic analysis of environmental policy is mainly based on the idea of correcting market failures with the aim of achieving economic efficiency, economists have long disputed the extent to which policy interventions are needed to foster the development and diffusion of low-carbon technologies and practices (e.g. see Kneese and Schultze, 1975). In an attempt to advance this debate, Jaffe et al. (2005) articulated the idea of ‘double market failure’, i.e. market failures associated with environmental pollution interact with those associated with the innovation and diffusion of new technologies. The interplay between these two analytically distinct, yet linked, sets of market imperfections decreases the likelihood that the rate of investment in the development and diffusion could occur at a socially-optimal level.
Along similar lines, Gillingham and Sweeney (2012) argued that although the high cost of renewable energy technologies constitutes a major barrier to their market penetration, it does not necessarily present a rationale for policy intervention on economic efficiency grounds (i.e. the possibility to improve welfare for at least some people, whilst at the same time making no one worse off). Through raising questions about the fundamental theorem of welfare economics, they suggested that economists should be hesitant about justifying a subsidy to stimulate the diffusion of such low-carbon technologies unless there is clear evidence suggesting a sizable R&D spill-over. A valid analytical basis for considering such policies might be that the social benefits associated with a speedy diffusion of green technologies are unlikely to be fully captured by private innovators (Jaffe et al., 2005). Nevertheless, some scholars caution that subsidising green technologies, on the ground of positive spill-over effects, can sometimes be welfare-worsening as it may delay the introduction of new technologies (Kverndokk et al., 2004). For example, subsidies of ethanol production may hamper the creation of new firms that look for alternative green fuels (York and Venkataraman, 2010). Thus, although the existence of multiple market failures and policy targets may justify employing several policy instruments, the disproportionate use of pricing interventions can prejudice the introduction of potentially better products and services as has been the case in the Brazilian ‘Pro Alcohol/Ethanol Programme’ (Mahroum et al., 2011).

3. A Closer Look at Green Policy Instruments

Contemporary discussion in environmental policy circles have moved on from justifying whether government intervention is needed to support green innovation, to how this ought to be designed for optimal effect (Veugelers, 2012). An extensive toolkit of policy instruments has emerged to facilitate protection of the environment and to support the generation and diffusion of green innovation. These instruments can be mapped into two broad categories; (i) technology vs. market dynamics; (ii) deterrents vs. rewards. The first analytical category deals with policy instruments that aim to foster technological change using either technology-push (i.e. supply) instruments, or market-pull (i.e. demand) mechanisms (Mowery and Rosenberg, 1979). Table 1 shows some recent examples of both types.

<table>
<thead>
<tr>
<th>Technology-Push Green Instruments</th>
<th>Demand-Pull Green Instruments</th>
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</table>
| Table 1: Examples of Technology-push and Demand-pull Green Policy Instruments
Despite its inclusion in some contemporary debate, the technology-push/demand-pull typology reflects an arguably outdated thread in the economics of innovation literature, i.e. a linear progression from basic science to applied research to product development to commercialisation (e.g. see Horbach et al., 2012; Miles, 2010). In classical innovation literature, there exists a tendency to view innovation as a ‘black box’ – into which R&D inputs flow and out of which commercial technologies diffuse into the marketplace (Jaffe et al., 2002). Just as the economics of innovation literature moved beyond the narrow technology vs. market dichotomy, we suggest that it is time for environmental policy researchers and analysts to transcend this as well.

An alternative and underexplored analytical category of policy instrument is the ‘deterrent vs. reward’ formulation, more commonly known by its ‘stick’ versus ‘carrot’ idiom in reference to the use of rewards and punishments to induce certain behaviours. Some environmental economists have further suggested public influence (i.e. sermon) as a third type of policy instruments (Vedung and van der Doelen, 2010). Table 2 illustrates examples of how various policy instruments may be mapped along the deterrent-reward axis.

Table 2: Examples of Stick, Carrot, Sermon-type Green Policy Instruments

<table>
<thead>
<tr>
<th>‘Sticks’ as Green Policy Instruments</th>
<th>‘Carrots’ as Green Policy Instruments</th>
<th>‘Sermons’ as Green Policy Instruments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Saving Obligations</td>
<td>Feed-in Tariffs</td>
<td>Provision of Information</td>
</tr>
<tr>
<td>Mandatory Green Building Codes</td>
<td>Net Metering</td>
<td>Eco-Labelling</td>
</tr>
</tbody>
</table>

2 Thaler and Sunstein (2008) popularised the term ‘nudges’ to refer to the shaping of behaviour. This paper adopts instead the term of ‘sermon’ as opposed to ‘nudges’ because we believe that both sticks and carrots have a nudging effect. In other words, all types of policy actions send signals to investors that motivate them to behave in certain ways.
Thus, we propose a mapping framework that links policy instruments to both business model design and economic agent behaviour. Adopting a stick, carrot and sermon perspective as opposed to technology-push vs. demand-pull approach allows the linking of various policy instruments to their expected behavioural responses. This helps not only in terms of designing, but also in evaluating policy interventions. According to Taylor (2008), a lack of systemic policy evaluation has often been identified as a reason behind a weak empirical basis for green policy design recommendations.

Regarding carrots and sticks, there seems to be an overwhelming consensus – in the literature – that carrots should be used for correcting positive externalities and sticks for addressing negative externalities (Wittman, 1984). Hence, for addressing environmental pollution, internalising the environmental costs or imposing a limit on the level of pollution makes more sense than subsidising pollution-reduction measures, which could inject money into the industry and thus attract more polluters in the long run. But both carrots and sticks come with their own cost burdens. Carrots generate transaction costs relating to compliance, whilst sticks do likewise but in relation to violation. Following this logic, theft should be penalised rather than non-theft subsidised because the former occurs less frequently (Geest and Dari-Mattiacci, 2013). Nevertheless, after examining the theoretical and empirical evidence pertaining to environmental policy, several scholars – including Fisher and Rothkopf (1989) and Jaffe et al. (2003) – accept that economists and policy analysts are far from having a well-established theoretical or empirical basis for when and what kind of green policy instruments (e.g. sticks, carrots or sermons) are preferable in any given market conditions. That said, there seems to be unanimity of opinion that voluntary and incentive-orientated policy approaches are more likely to foster diffusion and compliance paths than rigid regulatory approaches (Sioshansi, 1994). However, there are still the questions of how much penalty/reward is necessary and how it should be administered to induce certain behavioural change?
Having briefly discussed the potential connection between types of policy instrument and expected behaviour in terms of responses to sticks, carrots and sermons, we now turn our attention to the behaviour of the business community, particularly in terms of generation and adoption of green business models. Again, we take the built environment as a case in point.

4. How Green Business Models have Emerged in Response to Policy Actions?

The Built Environment as a Case in Point
What do we mean by ‘business models’? The field of business model research has gathered momentum since the mid-1990s. However, its literature seems to be developing largely in silos with various scholars yet to agree on what constitutes a basic business model (Klang et al., 2010; Zott et al., 2011). In broad terms, a business model defines a business logic or a value proposition for the way that a company creates value and how it captures some of this value as profit (Teece, 2010). Green business models could be broadly defined as business plans which support the diffusion of products and services that offer economically-viable environmental benefit (FORA, 2010). In the context of the built environment, building owners emerge as an important stakeholder because they often have the final say on whether or not to install renewable energy technology or an energy-efficient measure. Several business models exist that present building owners with attractive opportunities to help address high up-front costs and other non-financial barriers, such as the hassle associated with buying, installing or maintaining green energy equipment (Huijben and Verbong, 2013; IEA-RETD, 2013). The following sub-sections evaluate the experience of some green business models, which have emerged within a stick, carrot or sermon-orientated policy environment.

4.1 Stick-induced Green Business Models
Our research suggests that businesses respond to stick-type policy instruments by ‘passing the buck’ – a metaphor that refers to evading responsibility by passing it on to someone else. Stick-induced green business models thus tend toward buck-passing behaviour that offloads additional costs to other parties (see Figure 2).
The fragmented nature of the built environment and a green business industry – characterised by greed, vested interests and ‘vicious circles of blame’ – hinders parties from working together to achieve high levels of environmental sustainability but rather to apportion blame on one another for failures (The Voluntary Environmental Governance Project, 2013). As a result, Davis (2005) finds that energy-efficient appliances are less likely to be installed in rented dwellings; whilst Gillingham et al. (2012) show that owner-occupied houses are more likely to be well-insulated. Nevertheless, there is a growing understanding that building owners who do not occupy their buildings can profit from additional revenue opportunities if they are allowed to charge higher rents after undertaking energy-saving upgrade renovation. This business model aims to address the aforementioned problem of ‘split incentives’, which is commonly referred to in the energy efficiency debate as the ‘landlord/tenant dilemma’. However, it only seems applicable for rented buildings in countries where rents are regulated; for example, the social housing sector in the EU.

Quite often, there is a need for a change in legislation in order to allow landlords to pass on all or part of the cost of the investment to the tenant, mainly through a rent increase. A number of such regulatory changes have been introduced across the EU over the past few years. France, for example, adopted a tenants’ law in 2009 in order to enable owners to realise energy improvements and share energy-saving benefits with their tenants. In France and the Netherlands, not only is the landlord required to obtain the consent of the tenant to undertake renovation, but also the economic gains of the landlord cannot exceed half of the energy cost.
savings. Additionally, rents are allowed to rise only when the effect of the energy conservation measure has been proven. The results are usually monitored, allowing for rents to be adjusted if the expected results are not achieved. A potential risk of adopting this business model is that a change in regulations can be a time-consuming process. For instance, the change of the rental price evaluation in the Netherlands was only realised after a tense political process that took three years (CEPI and UIPI, 2010; IEA-RETD, 2013). In the United States (US), it was noted that the need for change in existing legislations has slowed down the emergence of third-party business models – i.e. where commercial companies own and operate customer-sited solar systems and lease the equipment or sell electricity to the building occupant (Drury et al., 2012). Since the companies assume the risks associated with owning and operating the green technologies, the occupant is likely to adopt positive and collaborative attitudes towards installing such equipment in the property.

Energy Saving Obligation (ESO) schemes, sometimes referred to as ‘White Certificates’, are an example of a stick-type policy instrument that forces energy companies to realise energy savings at the level of the end-user. They represent documented – and often tradable – obligations that certain reduction of energy consumption has to be attained. Such policy schemes have motivated energy companies to develop business models that realise mandated energy savings (IEA-RETD, 2013). In France, this was carried out through partnership with electricians and installers in order to offer new energy-saving services to customers. In Italy, a large part of the obligation was outsourced to Energy Service Companies (ESCOs). In other words, ESO schemes played a role in stimulating the demand for, and growth of, the ESCO market (Boot, 2009). Indeed, if energy companies are allowed to pass on the costs of efficiency measures to customers, through charging higher energy tariffs, such obligations could be considered as a potential financing mechanism for greening the built environment without having to use direct government funds. One successful ESO scheme has been enforced in the UK by a policy

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3 Energy Service Companies (ESCOs) emerged in the US and the EU following the energy crises of the 1970s. Quite often, ESCOs target existing buildings in order to achieve significant energy and cost reductions with no cost to the building owner (Peretz, 2009; Wargert, 2011). This business model – usually referred to as energy contracting – is one of the most established green business models in the built environment. However, whilst it has been endorsed for its business and environmental credentials, it has attracted relatively little academic scrutiny, with most of the existing literature originating from industry and government sources. For this reason, many economists and policy scholars maintain that because the nature and long-term potential of the ESCO markets are poorly understood, it is difficult to adequately appreciate their potential contribution to sustaining a green economy (Hannon, 2012; Sorrell, 2005; Vine, 2005).
programme named the ‘Carbon Emission Reduction Target (CERT)’. Through targeting low-income households, it has reduced the incidence of ‘free riding’, as this target group was less likely to adopt the efficiency measures.

Mandatory green building codes are another example of a stick-type green policy instrument. A number of green building codes and certifications have been introduced around the world in order to assess and rate the environmental credentials of buildings. Many property developers have thus voluntarily engaged in constructing buildings according to green certification schemes, with the expectation of realising a price premium when green codes become mandatory. This business model is based on the assumption that such a premium will compensate the additional costs associated with greening a building and obtaining certification, in addition to a greater profit. It should be noted here that it is difficult to assess the sustainability of this business model. The relatively short history of green certifications and codes means there is little evidence regarding the impact of green building certificates on decisions related to purchasing, renting or renovating a property. It has been noted, however, that speculation of a possible price premium accompanied the launch of the Estidama scheme by the Government of Abu Dhabi as the Middle East region’s first – and voluntary – green rating system (Nelson, 2011). This should not underplay the role of Estidama in raising awareness (i.e. sermons) with regard to sustainability in a place that has the unenviable tag of being the world’s largest per capita emitters of carbon emissions (Ghazal-Aswad et al., 2012). In other words, depending on the context in which a policy instrument is applied, it may result in dissimilar behavioural change.

Governments too engage in buck-passing to manage risks and this is likely to be one of the motivations behind government initiatives involving Public-Private Partnerships (PPPs), e.g. when governments are incapable of either adequately funding or running a construction project. Design, Build, Finance and Operate (DBFO) is a form of PPPs that has been used for building a number of climate-resilient infrastructural projects across the EU such as roads and hospitals. Innovative features of this model include the use of private finance in addition to merging the design/construction phases with the operation/maintenance phases. A private sector developer takes charge of the design, construction, finance and operation/maintenance of an infrastructural asset. Since the risks are passed on to the developers, they have an
incentive to adopt a long-term view, i.e. to design and build the project so that it can be operated and maintained in an efficient manner for a typical period of 30-35 years. Despite the increasing interest in green PPPs around the world, however, a stronger backing from public authorities – either through lending, guarantees or supportive regulatory frameworks – could encourage the private sector to invest in green projects (IEA, 2012; IRENA, 2013; Lmaye and Zhu, 2012). Examples of green business models that have emerged due to such carrot-type policy schemes are discussed next.

4.2 Carrot-induced Green Business Models

A critical evaluation of international experiences confirms that whilst stick-induced business models tend to create buck-passing behaviour, uncontrolled offering of carrots often leads to opportunistic behaviour aimed at capturing temporary gains (see Figure 3). In essence, this finding is in line with the utility maximisation hypothesis assumed in most economic analyses of firm behaviour – i.e. a firm acts so as to maximise its profits\(^4\).

\begin{center}
\includegraphics[width=0.5\textwidth]{carrot-induced-policy-business-behaviour-cycle.png}
\end{center}

\textbf{Figure 3: Carrot-induced Policy-Business Behaviour Cycle}

\(^4\) Some economists have raised criticisms about the neoclassical hypothesis of utility maximisation. For example, van den Bergh et al. (2000) suggested that such deterministic models are based on a flawed assumption that choices are easily predictable because individuals behave consistently across different situations and periods (c.f. bounded rationality). Other economists further argue that this hypothesis is but a metaphysical assumption, and not subject to empirical scrutiny. For instance, experimental economics has provided evidence to show that individuals are less free-riding than predicted by neoclassical theory. Broader explanations include ‘other-regarding’ and ‘reciprocal fairness’ where people reward and penalise the behaviour of others instead of acting strategically in their own self-interest alone (Gintis, 1998).
The Netherlands is an instructive example of a built environment shaped by a carrot-orientated policy regime. It has the largest share of social housing in the EU, accounting for around 32% of total houses and approximately 75% of the rental stock in the country. The success of the aforementioned model of increasing rents after implementing energy saving measures in the Netherlands is partly attributed to the existence of a favourable environment, characterised by loan guarantees in addition to rent-price regulation. Registered social housing organisations are eligible to benefit from an innovative three-level security structure. The first security instrument is the Central Fund of Social Housing, which is an independent public entity that acts as a supervisor empowered to financially support such organisations when in difficulty. The second instrument is the Guarantee Fund for Social Housing; a private organisation created by housing organisations themselves to act as a solidarity-based mutual fund. In cases where these two instruments are unable to provide favourable conditions and interest rates, financially troubled social housing organisations may resort to a third option, i.e. the state and local authorities (CECODHAS Housing Europe, 2013). However, although there exists a favourable policy context in the Netherlands that has stimulated the rise of energy efficiency-based business models, the policy conditions have not been as rosy for its local solar energy market. Whilst Verhees et al. (2013) have applauded the advent of a few innovative business models for solar technologies in the Netherlands, other scholars (e.g. Huijben and Verbong, 2013) argue that the financial viability of these green business models was found to be highly dependent on the existence of net metering regulations (i.e. carrots). Quite often, providing carrots for efficiency (through end-user subsidies) tends to create distorted price signals and may also encourage increased energy use and reduced incentives to use energy efficiently (i.e. the rebound effect). Evidence of such behavioural patterns among occupants of energy-efficient buildings have been documented in the Netherlands (Santin, 2013) and other European countries (e.g. Haas et al., 1998; Hens et al., 2010).

One of the most popular incentivising policy structures for renewables in general, and rooftop solar panels in particular, is the Feed-in Tariff (FiT). Designed to address the barrier of high capital costs associated with most renewable energy technologies, the FiT scheme obliges utilities to purchase electricity from renewable energy producers/users at a rate per kWh that is higher than market electricity rates. Since a FiT scheme guarantees access to a predictable and long-term revenue stream from a usually reputable counterpart (i.e. government or network
operator), it can serve as an incentivising basis for a green business model (Gifford et al., 2011; IEA-RETD, 2013; Mande, 2011). In addition, the FiT scheme has the potential for driving the deployment of renewable energy technologies in ESCO models; as the building owner can outsource the installation and operation to the ESCO, as well as claiming FiT support. Evidently, the introduction of the FIT by the UK Government in April 2010, with the aim of helping the UK meet legally-binding targets under the EU Renewable Energy Directive, has stimulated the growth of roof-mounted solar panels in the country. A large number of installation and consultancy firms have been set up to enable customers to gain from this scheme. The FiT has enabled landlords to either provide electricity for free – as a rental incentive – or impose higher rents based on the kind of benefit the tenant will receive (Owenergy, 2013; UK Energy Partners, 2013). Nevertheless, some building owners favour direct investment subsidies as opposed to FiT schemes, which sometimes have a payback period of around twenty years. Additionally, investment risks arise from inconsistent policy regimes that result in unpredictable changes in the tariffs. Therefore, some EU countries have implemented ‘stepped FiT’ schemes, where the tariffs are decreased over time in accordance with expected technological learning and economies of scale. For instance, according to the German Renewable Energy Act, the FiT for new renewable energy installations is decreased annually in order to both avoid overcompensation and provide a continuous incentive for cost reductions of new plants (Klein et al., 2010).

4.3 Sermon-induced Green Business Models

Sermon-induced business models emerge in response to demand sparked by a change in value systems. This is akin to the emergence of business models that foster fair trade, organic food and/or ethical businesses. Certain segments of society are willing to pay a premium for consuming goods and services that are produced in line with their value systems. The Halal and Kosher businesses for Muslims and Jews are two examples of such values-based markets that have recently attracted scholarly interest (e.g. see Campbell et al., 2011; Verbeke et al., 2013). For example, Ibrahim (2011) reported that willingness to pay a premium for the halal goat meat in Atlanta equates to 50 US-cents per pound. Hill and Lynchehaun (2002) argued that due to the high prices associated with organic food, consumers in the UK tend to perceive organic food to be of higher quality and tastier than conventionally-grown food. Likewise, over the last two decades, there has been a growing awareness about environmental degradation among the population resulting in the emergence of a green value-based market segment.
Consequently, there is considerable evidence to show that an increasing number of customers are willing to pay more for green products and services (Manget et al., 2009; Margolis et al., 2007; Orsato, 2009). A survey of more than 1,000 companies, by Haanaes et al. (2013), revealed a growing number of green companies whose emergence had been driven by internal motivations as opposed to government regulations or market competition. A growing number of studies further recognise the importance of social acceptance and behavioural patterns in shaping environmental technologies and markets (e.g. see Keirstead, 2007; Rohracher, 2003; Wolsink, 2012). A review of the business management literature indicates a long-standing debate on how corporate environmentalism may improve financial performance for businesses. A company portraying itself as a ‘green firm’ sends a signal that supports a perception that it is a well-managed business, which can help in terms of both attracting good employees and low-cost capital from potential investors (e.g. see GIIRS, 2012; Odell, 2007).

At a theoretical level, a number of scholars (including Gillingham and Sweeney, 2012; Shu and Bazerman, 2010; van den Bergh et al., 2000; Venkatachalam, 2008) have challenged welfare economics principles citing behavioural and ideological anomalies, which infer that insights from behavioural economics are arguably more instructive in designing effective green policy instruments. For instance, that decisions by consumers are swayed by their ethical values or a lack of information. Thus, uncertainties regarding the detailed usage of electricity, or even the cost-effectiveness of energy efficiency measures, could lead to building owners under-evaluating potential future economic savings (Girotra and Netessine, 2013). In fact, not only does the provision of information with regard to electricity consumption influence the conservation behaviour of occupants, but also heuristic-based social norm have a nudging effect as well. Schultz et al. (2007) demonstrated that providing households with information on how their electricity consumption compared to their neighbourhood averages has significantly encouraged them to rationalise their consumption. The use of a smiley face 😊 or a frowny one 😞 (conveying social approval for under-average or disapproval for above-average) has also eliminated the undesirable boomerang effect.

Persuading the public to ‘go green’ could be achieved through the provision of information, education, eco-labelling or sustainability awareness campaigns. Public campaigns have been
carried out extensively using different means around the world to discourage habitual behaviours such as smoking, alcohol and other drug consumption. Empirical evidence shows that the outcomes of these campaigns yield mixed results in different domains and jurisdictions (Momin et al., 2014; Wakefield et al., 2010). In the context of the built environment, one could argue that raising the awareness of the value of sustainability among the public may be used to create a social value-based market for green buildings – i.e. a lower-cost policy option when compared to the use of sticks or carrots. However, increasing awareness of sustainability does not necessarily guarantee that ‘greener’ actions will follow. Thus, unlike the case with sticks and carrots, it might prove difficult to establish a clear and direct correlation between the use of sermons and the emergence of green business models. However, it would be reasonable to assume that the magnitude of green business undertakings might be partly rather than wholly influenced by sermon-orientated policy regimes (see Figure 4).

![Figure 4: Sermon-induced Policy-Business Behaviour Cycle](image)

5. The Voluntary Emergence of Green Entrepreneurs beyond Carrots and Sticks: An Example from Dubai

Approaching green business models from the angle of policy instruments does not mean that green business models could be triggered only by policy intervention. In this respect, Dubai in the Middle East provides a good example given the near absence of policy carrots and sticks in
the region as a whole. Estimates provided by Frost & Sullivan (2011) show that the energy performance contracting market in the Middle East earned revenues of around US$79 million, and is expected to grow at an annual rate of 4.1%. To shed some light on the emergence of such a market in the absence of carrots and sticks, we look at an example from Dubai, in the United Arab Emirates (UAE). An instructive case to consider there is of a green company named Taka Solutions. Based in the hydrocarbon-rich UAE, Taka Solutions is considered to be one of the few pioneering ESCOs to have adopted an energy performance contracting business model in the Middle East region. The near absence of green-oriented carrots and sticks in this region makes the emergence of such a green company noteworthy because it provides proof that given market opportunity, green business models can emerge without direct government support. Further scrutiny reveals that the UAE leads the broader region in terms of the extent of green building certification (i.e. Estidama), government-led sustainability awareness building campaigns and levels of environmental consciousness (Ghazal-Aswad et al., 2012)\(^5\). Thus, Taka Solutions represents a case for the voluntary emergence of green entrepreneurship without the aid of sticks or carrots.

The company was established in 2012 with the aim of providing building owners with risk-free energy-efficiency upgrades that have the potential to enhance the durability and value of their buildings, and without the need for capital investment from the owners. When interviewed, Charles Blaschke IV – Founder and General Manager of Taka Solutions – indicated that “The establishment of this company was motivated by a desire to address a host of neglected problems currently facing the adoption of energy upgrades to existing buildings in the UAE”. There exist many organisations with old and inefficient building assets that would like to implement energy conservation measures, but have neither the technical expertise nor the capital to do so. This situation is a historical function of low utility rates, harsh weather conditions, occasionally inefficient planning, inferior quality of construction and amenities and conflicts of interest between owners, tenants and real estate investors, as well as a lack of transparency with regard to energy usage.

\(^5\)Interestingly, our research indicates that the high level of sustainability awareness has not been the case in the UAE a few years ago. For instance, interviewing an official from the Dubai Municipality has revealed that due to intense opposition from the public, they once had to abolish a law that mandated the installation of green roofs for every house in Dubai (i.e. a stick-type regulation). Green roofing is an energy conservation measure that was identified as a cost-effective mean to reduce the carbon footprint of the UAE’s residential sector. In October 2009, the government decided to make green roofing optional, whilst at the same time launch intensive awareness campaigns that educate the public about the benefits of green roofs (i.e. sermons).
Taka Solutions expect contract lengths of seven years or fewer to satisfy the project costs required to reduce energy by up to 30%, and sometimes more. The company arose in anticipation of things yet to come. For example, the Regulatory and Supervisory Bureau of the Dubai Government has started work on a framework to nurture the ESCO market in Dubai. Elements of this framework include launching an accreditation scheme for ESCOs and standardising energy performance contracts; this is in addition to setting up mechanisms for measurement, verification and dispute resolution (Sims, 2014). Such carrot-based legal frameworks that uses ‘reputation-enhancing’ tools could help in terms of maintaining competitive market conditions given that the private sector – in its pursuit of value appropriation – may try to maximise profits beyond what many would agree is socially acceptable. Taka Solutions could be seen as a green entrepreneurial initiative that has decided to address a neglected societal problem (i.e. inefficient building stock) by challenging conventional wisdom through the innovative green business model of energy performance contracting. Through targeting the low-hanging fruit of the UAE buildings, it has demonstrated the viability of a green business avenue that has subsequently enticed the appetite of government-owned utilities to fund a super ESCO, named ‘Etihad Energy Service Company’, which started operations in June 2013. This is a counter-intuitive development in a country that is characterised by artificially cheap energy, hence energy conservation is not a high priority by necessity.

Recent years have witnessed a growing awareness of the conditions in which entrepreneurs may surpass, or at least supplement, the efforts of governments, established firms and NGOs (York and Venkataraman, 2010). In this respect, Santos (2012) suggests that social entrepreneurship – which voluntarily green entrepreneurship could be seen as a subset of – is the pursuit of sustainable solutions to problems of neglected positive externalities. When substantial positive externalities exist, goods and/or services may be under consumed or under provided because self-interested actors do not perceive there to be a potential for value appropriation (Rangan et al., 2006). Since governments have multiple roles and often scarce resources, not to mention that self-interested behaviour is not usually effective in the presence of positive externalities, these sustainability-orientated entrepreneurs are usually the economic agents that end up trying to address these neglected externalities.
Accordingly, one could argue that Taka Solutions represents an example of a green entrepreneurial company which has emerged under an extant policy regime and market conditions that favour the incumbent energy system. The fact that its emergence did not require direct policy support suggests that market-tested business models have a chance of diffusing voluntarily, even without the presence of supportive regulatory conditions. In essence, such entrepreneurs could be viewed as being continually enticed by the promise of competitive advantage and the possible enhancement in market power that ‘going green’ could offer. To remain sustainable, however, the importance of continuous innovation at the level of business model cannot be overemphasised. The next section provides a synthesis of the various interactions between green policy and business models, with a particular focus on the prospects for such sustainability.

6. **On the Sustainability of Green Business Model Innovation**

For a green business model innovation to be sustainable, it needs to allow for both value creation and value appropriation. Indeed, the importance of connecting value creation and value appropriation in the pursuit of a sustainable business model is well-established in the field of strategic management (see for example Girotra and Netessine, 2013; Lavie, 2007; Mizik and Jacobson, 2003). Whilst the value creation/value capture dichotomy is centuries old, the main purpose of firms is usually assumed by the business community to be value capture; hence the buck-passing and carpet-bagging behaviour that result from stick and carrot-type policy regimes. Figure 5 illustrates a framework for examining the sustainability of gains and behavioural change emanating from the interplay between green policy instruments and business models.
Figure 5: The interplay between Green Business Models, Behaviour and Various Types of Green Policy Instruments

Extending the arguments of Santos (2012) in his search for a plausible theory of social entrepreneurship, one could suggest that whilst it falls upon traditional commercially-orientated entrepreneurs to pursue new opportunities for value appropriation (through stick or carrot-induced green business models), green entrepreneurs focus on value creation opportunities (through ideology-driven green business models). Although the stick method forces the market to behave in certain ways using the ‘visible stick of regulations’, the carrot approach offers financial rewards to energy users to modify their energy consumption behaviour – and to investors to take their investment decisions – using the ‘invisible hand’ of economic theory (Sioshansi, 1994). Green entrepreneurship, on the other hand, could be seen as what Santos (2012) calls the “2nd invisible hand of Adam Smith”, which is driven by others-regard as opposed to self-interested and profit-maximising entrepreneurial behaviour. This activity is driven by a view of environmental degradation not only as an opportunity, but also an ethical issue (York, 2009). Adopting such ethical considerations in the work of green entrepreneurs has implications for the business world.

What sometimes tends to be overlooked in the business community is that without value being created, there is nothing to capture. In other words, it would be possible for a business to make
more money through either maximising value capture or increasing the value it creates. Indeed, an over-emphasis on monetising value may undermine the long-term sustainability of a business. Conversely, too much focus on value creation may deteriorate the ability of the organisation to compete and thus keep creating value (Pitelis, 2009). Moving away from such a narrow trade-off mentality, we argue that sustainable business model innovation should be based on creating ‘shared value’ – an approach that links business success with social progress (Porter and Kramer, 2011). The central thesis of ‘shared value’ notion is that since the competitiveness of a company and the health of its community are mutually dependent, the company should focus on creating economic value in a way that also creates societal benefits by addressing its needs and challenges. In effect, creating shared value should goes beyond traditional CSR (Corporate Social Responsibility) programmes which tends to focus on boosting reputation with a limited connection to business (Porter and Kramer, 2011). This represents another contemporary endeavour to broaden both the conception of Adam Smith’s invisible hand and the construct of value, which has been overly simplified to focus narrowly on purely economic returns (Harrison and Wicks, 2013; Satz, 2010). Adopting such an approach is important because solving social problems can no longer be the sole responsibility of governments. Figure 6 reflects these ideas on the so-called ‘Value/Business Behaviour Quadrant’.

![Figure 6: The Value/Business Behaviour Quadrant](image-url)
• **Low Value Creation – Low Value Capture**: A state of affairs in which a business strives neither to create value nor to capture it. In essence, this is a case of a stagnant business model with a limited value proposition.

• **Low Value Creation – High Value Capture**: This is where a company behaves in an opportunistic fashion to maximise short-term profits, often in response to policies which it seeks to exploit. This attitude resonates with the utility maximisation hypothesis, a basic assumption of most economic analysis of firm behaviour.

• **High Value Creation – Low Value Capture**: The business model of green entrepreneurs who adopt an others-regard as opposed to self-interested mind-set.

• **High Value Creation – High Value Capture**: For a green business model innovation to be sustainable, it needs to allow for a balance of value creation and value capture (i.e. a shared value perspective).

7. **Conclusions**

In this paper, we have provided a critical review of the interplay between various policy instruments and emergent business models in the green built environment. The critical review has allowed for a number of observations to be made upon which some normative prescriptions can be proposed. To start with, governments’ rationale for policy intervention to support the transition into a more environmentally sustainable economy cannot be based on the premise of a market-failure in the eco-technology market alone. A technology policy approach to sustainable energy solutions assumes that once a green technology is found, market pull becomes the next immediate area for government interventions since on its own the new technology will not be able to survive. This has led to a situation where green business models have developed to a point of being unsustainable without government support. The observations made in this paper suggest that while there is truth in the premise that many green technologies would not have survived without government support, the interventions used (i.e. the policy instruments) have generated significant negative externalities that have rendered them ineffective. The bulk of policy instruments deployed by environmentally-conscious governments have sought to stimulate demand for greener technological solutions by
either bribing users to adopt a greener solution, or using a subsidised substitute to fuel a binging behaviour. In other words, the adopted policy instruments do not target behavioural change, but rather support a sense of entitlement to established wasteful behaviour. As a result, many government-supported programmes and initiatives have led only to temporary gains. These often quickly disappear as a result of negative externalities in the form of tactful behaviour (e.g. buck-passing and carpet-bagging behaviour). Stick-induced business models tend to engender a buck-passing attitude in the business community, whereas uncontrolled offering of carrots often leads to opportunistic carpet-bagging aimed at capturing short-term gains (i.e. value appropriation). Consequently, the emergent green business models are primarily aimed at capturing and distributing value rather than creating new sustainable value.

However, when externalities are overlooked by governments and established businesses, green entrepreneurs may hope to exploit what they see as potential opportunities for value creation from identified positive externalities. These tend to be business opportunities characterised by high-value creation and capture. This was observed in the emergence of companies with green-based business models in the Middle East, where neither carrots nor sticks are available on any substantial scale. The emergence of such models lends support to the proposition that governments can achieve positive results by targeting behavioural change that lead to the creation of new markets, rather than targeting the formation of an artificial demand for an alternative technology. While sticks and carrots can indeed be used effectively to cause such a change – for example as evident in the experience of some countries in reducing smoking habits – sermon-type interventions in the form of awareness and information campaigns have the ability to expand the opportunities for positive externalities to arise.
References


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