The PFI Sustainability Evaluation Tool: A methodology for evaluating of sustainability within PFI housing projects

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Abstract

In the UK there is a need to provide more housing in order to meet increased demand. The problem is particularly acute in the social housing sector. There is also a drive to reduce CO_2 emissions from housing, whilst addressing issues of social sustainability. Accordingly governments have sought to combine the goals of sustainable development with housing policy in order to provide not just more housing, but more sustainable housing. In a time of public sector expenditure restraint the Private Finance Initiative (PFI) has been used as a means to procure social housing using private money, however sustainability within PFI housing projects has received little attention. This paper introduces a methodology for evaluating sustainability within PFI bids. Developed and tested during the procurement stage of a large PFI housing project in the North East of England, results suggest that the introduction of clear, transparent and robust evaluation criteria can enhance sustainability.

Keywords : Private Finance Initiative (PFI); sustainability; local authority, sheltered housing

Introduction

Sustainability of housing in the UK is a key issue. Energy demand from housing accounts for over a quarter of total energy consumption and carbon dioxide emissions (Palmer and Cooper 2011). Being responsible for such a large proportion of energy demand, housing also has a part to play in addressing energy security issues such as the decline of affordable fossil fuel energy resources, and the associated rise in fuel prices and subsequent increase in fuel poverty. Building and refurbishing homes to be sustainable in terms of energy and resource use is therefore a key challenge. Since 1997 emissions from the housing sector have risen by more than 5 percent, and demand is increasing due to increasing demand for electronic equipment, higher expectations of thermal comfort, changing demographics and behavioural patterns (Cockroft and Kelly 2006; Baker and Rylatt 2008).

This situation is exacerbated by the fact that the number of households in the UK is increasing as the population grows, and the average size of households shrink (Bergman et al. 2007). Single person households have grown from 18 percent of households in the UK in 1971 to 30 percent in 2001 (ODPM 2003) and are predicted to constitute 38 percent of households in 2026 (DCLG 2008), yet the number of new homes constructed year on year has not kept up with this rising demand. These pressures have resulted in the Government setting a target for 240,000 additional homes per year by 2016 (Callcutt 2007; Barker 2008).The challenges not confined to the provision of new housing. Renewal rates of existing housing are low at approximately 1 percent a year, meaning that around 75 percent of the current housing stock will still be around in 2050 (Boardman 2006).

Sustainability in the housing sector does not merely refer to energy efficiency and combating climate change, but refers more broadly to environmental, social and economic sustainability of houses, households and communities (Bergman et al. 2007; Dempsey et al. 2011). The issues surrounding sustainable housing and sustainable communities are interconnected through policy, stakeholders and processes, especially at the long-term scale. Residents care not only about their own home, but also about the community and facilities within which they live. Therefore providing affordable housing in not only about low cost, decent, sustainable housing, but also about the neighbourhoods and communities in which they are situated (Bergman et al. 2007).

The key challenge is how, in times of austerity and facing large public sector cuts, local and national governments can increase the supply of available housing whilst improving the sustainability of social housing. Many local authorities have found that the only option open to them was to engage in a partnership with a private sector organization through the Governments Private Finance Initiative (PFI). There has been much debate amongst academics and industry professionals over some of the central issues in PFI such as whether the system provides value for money, reduces risk or encourages innovation. Less attention has been given to whether the initiative can deliver sustainable building.

The Public Finance Initiative

PFI was developed in the UK in the early 1990's, initially under the guidance of the former conservative Chancellor of the Exchequer Norman Lamont (Wakeford and Valentine 2001). The main aim was to achieve closer partnerships between the public and private sectors, but with the Government of the time committed to keeping the proportion of public debt to Gross National Product (GNP) below 40 percent, PFI was also seen as a way of avoiding public expenditure controls (Wakeford and Valentine 2001). The use of PFI as a means to procure public infrastructure or services is a contentious subject and much debate has been on going over the appropriateness of the system (see for example: Hall 2009; Parker 2009; McCabe et al. 2001; Pollock and Price 2010). However the government states that the PFI model should only be used where appropriate and where it is clear that it can deliver 'value for money' benefits, such as in major and complex capital projects with on-going maintenance requirements (Hill and J. Collins 2004). In terms of the scale of use of PFI, as of 2009, there were over 400 operational projects across the UK representing a total capital value of over £55 billion, whilst PFI projects in procurement as of the same period were valued at an estimated cost of more than £11 billion (PUK 2009). The principles behind PFI have also been implemented in many other countries with (Grimsey and Lewis 2005) reporting schemes similar to PFI up and running in more than 29 countries including USA, Australia, New Zealand, India and Japan.

Introduced into housing in 1998 PFI has represented a small, but significant part of total investment in social housing (NAO 2010). Since its introduction a total of £4.3 billion has been allocated to local authority PFI housing projects through six rounds of funding (NAO 2010). As of April 2009, the programme had refurbished 12,343 homes through the Decent Homes Programme, and purchased or built 991 homes. As of June 2010, there were 50 PFI housing schemes, half of which were operational or at preferred bidder and half at various stages of procurement. The HCA estimates that the first 5 rounds of the PFI programme will deliver a total of 28,000 homes (NAO 2010).

In terms of the scope and process of PFI housing projects, whilst each programme is different and tailored to the specific need of each local authority, there are aspects which are common to all. The local authority negotiates and signs a contract with a private sector company that typically lasts 30 years and facilitates the refurbishment, re-provision or construction of new homes. During this period, and for the remainder of the contract, a private sector partner delivers the services previously undertaken by the local authority. In housing PFI, such services often include repairs and maintenance, tenancy management, facilities management and security (NAO 2010). The company is paid for the work over the course of the contract through a unitary charge which is performance based. The levels of performance required, and service standards are included in the 'output specification' that is designed by the local authority throughout the procurement of the project. If the standards contained within the specification are not met, the company will lose an element of its payment until standards are improved.

Sustainability in PFI

Since its inception PFI has drawn praise and criticism in almost equal measure, and has been the subject of numerous academic studies and industry reports. These studies investigate a range of different issues from the way in which PFI handles risk (Bing et al. 2005; Broadbent et al. 2008; Broadbent et al. 2004), whether PFI offers value for money over other, more traditional procurement routes (Akintoye et al. 2003; Asenova et al. 2002; Pitt et al. 2006); design quality and innovation (Barlow and Koberle-Gaiser 2008; CABE 2003); and more general papers concentrating on contextual factors such as barriers to PFI, success factors and project management (Li et al. 2005; Smyth and Edkins 2007; Broadbent and Laughlin 2005). An analysis of research on PFI by sector reveals that the majority of research has focussed on PFI Schools projects; PFI prisons; PFI hospitals; Ministry of Defence projects; other infrastructure projects such as roads, transport and waste. It is only relatively recently that researchers have begun to study the issues surrounding sustainability in PFI and PFI Housing in general.

The literature on sustainability and PFI spans a number of issues, including the financial implications of incorporating sustainability into PFI projects (De Lemos et al. 2003), the technical issues and how PFI may be used to promote sustainable construction techniques and unlock the associated benefits (Garwood et al. 2002), and the extent to which sustainability in general is being considered within PFI along with potential methods of improvement (Zhou et al. 2006; Wang et al. 2011; Hill and J. Collins 2004). Throughout the literature there is scepticism as to whether PFI and sustainability can in fact go together. The argument suggests that by transferring public services either fully or partially to the private sector works to exploit the capital interest of private investors, for whom profit is the overriding factor. This is backed up by evidence that in some PFI projects, both quality and cost has been compromised and sustainability not addressed (Khadaroo 2008; McCabe et al. 2001; NAO 2009). However some authors have suggested that PFI can and should be used as a mechanism to drive the construction sector towards greater sustainability (OGC 2002; BRE and Cyril Sweett 2005; Yates 2008).

Indeed, as PFI is increasingly being used to deliver new and refurbished social housing, there is an opportunity develops good practice in providing sustainable homes. For example, one of the problems inherent in attempting to utilise small scale renewable energy systems, is their high capital cost and long pay-pack periods. The long-term nature of PFI contracts, typically 25-30 years, should mean that the whole life costs of maintaining the asset should be taken into account during design and construction (Hill and J. Collins 2004). This in turn should make capital investment more attractive as the long-term costs are greatly reduced. Additionally within PFI procurement there is a period of ‘Competitive Dialogue’ used in complex contracts where there is a need for the contracting authorities to discuss all aspects of the proposed contract with candidates (O’Brien and Hope 2010). This dialogue process presents an opportunity for both parties to discuss sustainability and renewable energy objectives, and for local authorities to ensure that their long-term commitments are taken into account.

The debate as to whether PFI can deliver sustainable public infrastructure, such as social housing, raises the issue of how to measure sustainability within projects. Due to the often closed nature of PFI contractual negotiations and output specifications, there is little insight as to how, or indeed if, this issue has been tackled historically. The fact that many academics and industry insiders consider that at present PFI is not delivering on its full potential with regard to sustainability, leads to the assumption that in many cases sustainability is not being fully measured. Kumaraswamy and Anvuur

(2008) who point out that whilst frameworks exist for evaluating technical performance in PFI projects, measuring sustainability performance has been problematic.

Evaluation of Sustainability in PFI housing

Traditionally the evaluation of sustainability in PFI projects has relied heavily on the use of Environmental Assessment Methodologies (EAMs) such as BREEAM and the Code for Sustainable Homes. However the PFI procurement process differs from traditional procurement models and as such brings particular requirements unique to this style of project. With regard to sustainability these requirements will dictate the attributes required from any tool designed to evaluate sustainability.

Firstly each PFI project is different and each procurement process has different priorities. The commonly used EAMs such as BREEAM and the CfSH do not allow for these differences as they are aimed at assessing developments in general. As each PFI project is unique and has unique requirements, the inflexibility of existing tools is an issue. Projects may benefit from a degree of flexibility in being able to weight the relative importance of different issues depending on the specifics of the project. Many of these issues are dependent on the geographical location of the project. A project in the South East of England may wish to put more emphasis on water efficiency than a project in the North West of the country due to different pressures on demand.

Secondly whilst it is clear that many of the criteria evaluated by the various tools may be applicable to a specific PFI project, there still remain a number of gaps not assessed. For example, the project during which the tool was developed sought to procure sheltered housing for elderly people. In the UK, the Environmental Assessment Method that is most applicable to sheltered housing is BREEAM Multi-Residential. However the CfSH may also apply as it related to the provision of self-contained dwellings such as those contained within a multi-residential sheltered housing scheme. There are a number of issues omitted within BREEAM Multi-Residential, which would appear to be worthy of further examination. Such issues include the use of sustainable Lifts that is omitted in the BREEAM multi-residential and CfSH tools. Also measures to segregate delivery transport with resident access would arguably be applicable to these housing types.

Thirdly, there is an issue as to how to differentiate between the sustainability of competing bids. For example, a building design that achieves BREEAM ‘Excellent’ can do so in a number of different ways. Until some of the energy aspects of BREEAM were made compulsory in the 2008 update of the scheme, BREEAM Excellent could be achieved without any particular effort in energy or CO_2 reduction. There is also no incentive for developers to go beyond a particular level specified in the PFI contract. For example, if a project has to achieve a level of BREEAM Very Good, which is equal to a score of 60 percent, there is no incentive to score any higher as the next certification level is BREEAM Excellent at 75 percent.

In light of these issues a new methodology was created and tested during a PFI housing project in the North East of England.

The PFI Sustainability Evaluation Tool

The main aim of the Sustainability Evaluation Tool is to provide a methodology for evaluating and comparing the sustainability of developments procured through a Public Private Partnership such as PFI or other procurement routes which utilise some form of competitive dialogue. In fulfilling this aim, the tool offers a comprehensive and holistic assessment of the environmental, economic and social sustainability of a building. In addition to comparing the sustainability of bidders' plans at tender stage, the Tool has also been designed to be useful for directing competitive dialogue negotiations, managing information and thus, reducing the threat of legal challenge, ensuring legislative compliance and educating local authority PFI teams, and private sector bidders alike. Specifically, the tool seeks to:

- Provide an indication of the social and environmental sustainability of proposed designs.
- Improve time management by focussing dialogue in areas which need improvement
- Improve information management by cataloguing information submitted
- Educate users on the importance of sustainability issues in construction
- Assist in meeting statutory legislation such as building regulations and certification schemes such as BREEAM and the Code for Sustainable Homes.
- Enable and allow innovative solutions by not being prescriptive over measures to be taken.

The methods employed in development of the tool are illustrated in Figure 1.

Figure 1: Methods employed

The main EAMs in use were identified through a literature review that identified the issues and criteria that each EAM measured, how the criteria were measured, scoring methodologies and other relevant data. The next stage of development sought to examine best practice in each criterion identified. This was established through a thorough review of existing standards either referenced by other tools or published by academic or professional organisations. This led to the development of assessment criteria that are grouped into sections (Table 1).

Each section has a number of individual assessment criteria. It is not possible to discuss the content of each individual criterion in detail here for space reasons; however the philosophy that underpins the choice of metrics and indicators of sustainability is common to all criteria.

Scoring criteria

The scoring criteria set out for each individual question varies depending on the nature of the issue to be evaluated. There are two methods of scoring. The first sets a number of quantitative benchmark levels based on benchmark data, the second method uses an efforts based evaluation criteria, which rewards bidders for the number of efforts made to satisfy the criteria from a list of pre-determined efforts.

Table 1: Assessment Criteria used within the PFI Sustainability Evaluation Tool

Energy	
• Carbon Dioxide Emissions	• Renewable Energy
• Space Heating Energy Demand – Residential Areas	• Conventional Energy Systems
• Space Heating Energy Demand – Whole Building	• Smart Metering
• Building Fabric	• Passive Design
• Air Permeability	• Lifts
• Thermal Bridging (new Build Only)	• White Goods
• Ventilation – Residential Areas	• Plant Room
• Ventilation – Communal Areas	• Cool Room
• Internal Lighting	• Communication Room
• External Lighting	• Energy Future Proofing
Health & Wellbeing	
• Daylighting	• Lighting Levels
• View Out	• Thermal Comfort
• Sound Insulation	• Environmental Health
Socio-Economic Sustainability	
• Stakeholder Consultation	• Sourcing Locally
• Post Occupancy Evaluation	• Employing Locally
• Building User Guide	• Education
• Community Cohesion	• EMS
Water	
• Water Consumption	• Drain Water Heat Recovery
• Rain/Grey Water Re-use	• Metering
Materials & Waste	
• Construction Waste Minimisation • Household Waste Recycling • Composting • Environmental Impact of Materials	• Responsible Sourcing of Building Elements • Responsible Sourcing of Building Furnishings • Robust Design
Transport	
• Cyclist Facilities	• Pedestrian & Cyclist Safety
• Green Travel Management	• Deliveries and Manoeuvring
Ecology & Pollution	
• Appointment of Suitably Qualified Ecologist	• Minimising Light Pollution
• Enhancing Site Ecology	• Sustainable Urban Drainage Systems

Benchmark Scoring

Benchmark data has been derived from a wide range of academic and industry sources. At the lower end of the range, backstop levels are set against legislative requirements such as the national building regulations. Higher scores are awarded for solutions, which meet good, best and advanced practice levels. For example, the credit which deals with air tightness is evaluated using a range of five values which indicate the building regulations minimum, typical practice, good practice, best practice and advanced practice levels as indicated in Table 2.

Table 2: Example Benchmark Scoring Table

Air tightness $m^3/(hr.m^2)$		
Score	New Build	Refurbishment
0	≥ 10.00	≥ 15.00
1	9.99 - 7.00	14.99 – 12.00
2	6.99 - 5.00	11.99 – 9.00
3	4.99 - 3.00	8.99 - 6.00
4	2.99 – 0.00	5.99 – 0.00

Efforts to be evaluated

For several credits the score is determined using an 'efforts' based method. This method provides a list of efforts, which may be taken to satisfy a particular issue during the design stage. The assessor then evaluates whether each of the listed efforts has been made, and scores the issue according to the total number of efforts made Tables 3 and 4 demonstrate how this is communicated.

Table 3: Efforts Utilised Scoring System

Score	Efforts
0	No Efforts Utilised
1	1 Effort Utilised
2	2 Efforts Utilised
3	3 Efforts Utilised
4	4 or more Efforts Utilised

Table 4: Example of a compliant efforts table

Compliant Efforts
• Building has been orientated to maximise use of natural light and thermal gain in line with best practice (CIBSE site layout design);
• The building design has considered shape to minimise heat loss and maximise passive ventilation;
• Planning for natural ventilation where possible to reduce the use of air conditioning equipment and reduce cooling loads;
• Use of thermal mass in the building's structure to moderate temperatures;
• Use of shading devices including roof overhangs and trees to prevent unwanted solar gains;
• Spatial planning or zoning of rooms and occupant activities to maximise day-lighting benefits;
• Glazing to maximise beneficial solar gains;
• Good thermal insulation

Should the design team feel that there is an alternative effort, which may be evaluated for an effort based credit scoring, the assessment team may consider whether it is appropriate to include this and award the score. The new effort may then be incorporated into the Tool for future assessments.

Results page

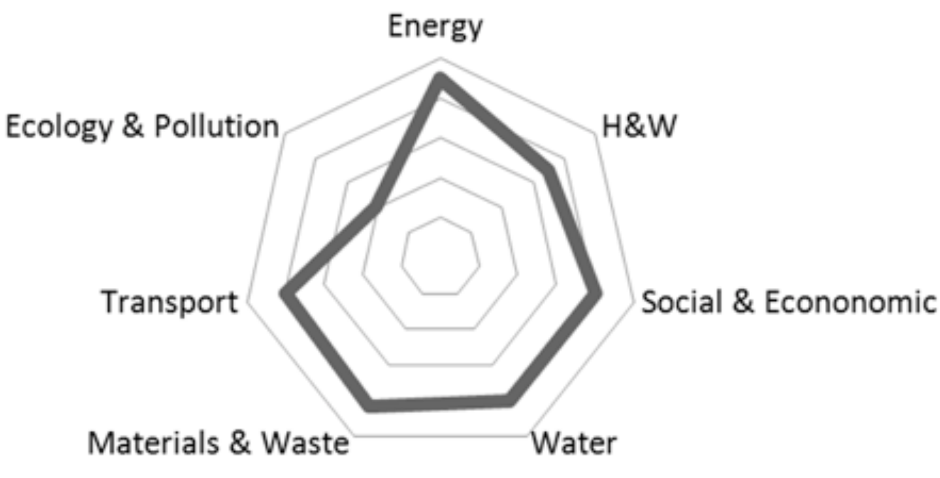
The results from the tool are designed for use both during the competitive dialogue stage of procurement in addition to the final evaluation of tenders. It is intended to give a graphical breakdown of each section to assist bidders and assessors in understanding where further work is required. The results page provides a comprehensive breakdown of all of the issues examined by the tool, as well as providing an indication of the overall score. In doing so the tool conforms with the recommendations of Cole (2005) who identifies three important demands that should be considered on presentation of the results of a comprehensive environmental assessment tool:

- It should provide a comprehensive view of building performance
- It should enable closer study of specific assessment types since different tool users may have different interests
- It should enable comparison of the building/aspects/indicators to relevant benchmarks

Each section is described in more detail below

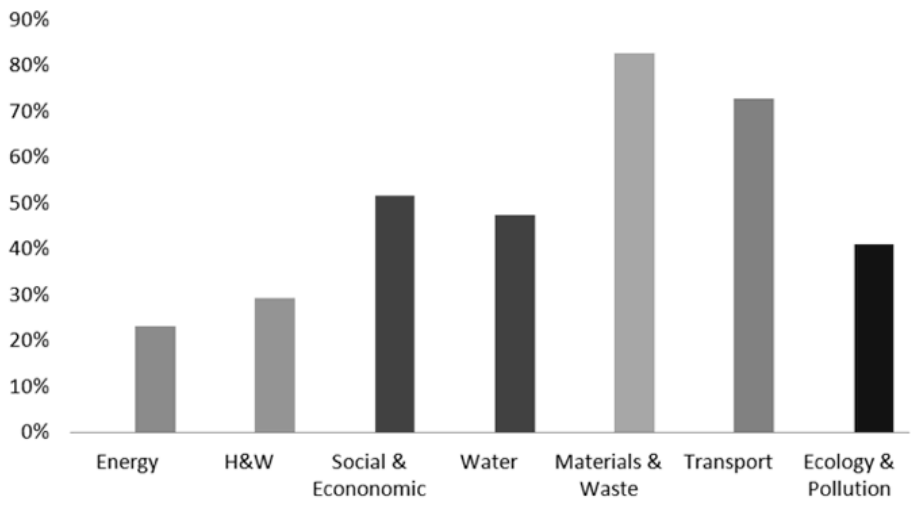
***Radar Chart*:** The aim here is to ensure that the chart is as rounded as possible demonstrating that the development makes equal attempts to satisfy each broad issue section. This is useful during dialogue as it provides a quick indication as to where bidder's resources need to be targeted. For instance, the example below indicates that the bidder has scored well on most of the issues but still has work to do on Ecology & Pollution. This information allows the procurement team to direct dialogue towards this issue, rather than concentrating on areas where bidders are strong (see Figure 3).

Figure 3: Example Radar Chart



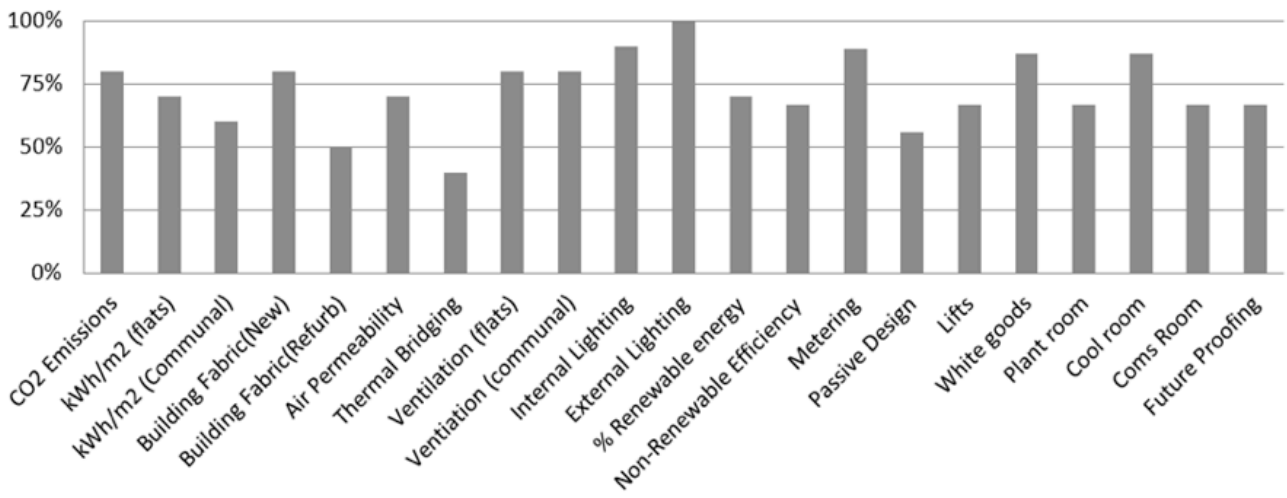
***Section Bar Chart*:** This section supplements the Radar Chart by providing another visual indication of which sections have attracted the most points, and where more effort is required (see Figure 4).

Figure 4: Example Section Bar Chart



***Section Breakdown Bar Charts*: **The section bar charts provide more detailed feedback on each individual section. They clearly display each issues percentage score enabling the procurement team or bidders to identify areas of weakness and decide where to concentrate their resources (see Figure 5).

Figure 5: Example Section Breakdown Chart



Results

The application of the tool during the case study indicated that the use of a clear framework that assessed bidders on a quantitative and qualitative set of criteria provided a baseline from which competitive dialogue could begin. Members of the PFI team who used the tool felt that it gave them an edge during the procurement process by providing them with robust, evidence-based criteria that could be used to provide consistent feedback to bidders. Private sector bidders also welcomed the use of the tool feeling that it set out clear requirements for them to meet and improved communication between the public and private sector teams

The tool represented development of guidance for integrating sustainability into PFI Housing projects. The user guide that accompanies the tool is designed to drive competitive dialogue and assist public sector PFI teams in influencing sustainability at key points in the design development process. The technical study has demonstrated that the feedback presented to bidders during the use of the tool assisted in the development of sustainability at later stages in the procurement process. Additionally including criteria to assess social, environmental, economic and technological issues as suggested throughout the literature authority PFI teams are driven to include such issues in the specification of PFI housing projects

The PFI Sustainability Evaluation Tool represented an attempt to develop a methodology with which to measure sustainability within plans for PFI projects. In this respect it has sought to address the need identified by Kumaraswamy and Anvuur (2007) for a framework to evaluate sustainability performance in PFI procurement projects. The technical study found that the tool was useful as a means to manage information and providing a consistent framework that evaluators could follow. Whilst evaluating submissions from bidders, it became apparent that there were a number of contradictions throughout different sections of the documentation. These contradictions were not picked up in the previous evaluations where the tool had not been applied, probably due to the inconstant manner of the evaluation and lack of firm criteria to evaluate against. The tool also enabled the evaluation of bidders submissions on a like for like basis.

There are a number of other findings that have arisen during the use of the PFI Sustainability Evaluation Tool. The technical and participant observation studies found that by linking many of the performance criteria contained in the tool with the contract payment mechanism, sustainability can be enhanced by ensuring that bidders' intentions are embedded within the project contract, and by including performance targets with financial penalties. Additionally, the PFI sustainability evaluation tool is designed for use by non-sustainability experts so as to build knowledge and capacity within users and reduce the reliance on external consultants.

Conclusion

The PFI Sustainability Evaluation Tool was developed throughout the course of the study as a means to assess the sustainability of bidders' submissions and plans. The tool can also be used to help direct competitive dialogue and provide bidders with feedback to enable them to improve designs

It is the intention that primarily local authority procurement teams will use the Sustainability Evaluation Tool; however it can also prove useful to clients from the public and private sectors, developers and contractors, design teams, project managers, facilities managers, local authority planning teams and environmental managers. The Tool itself does not assume any level of environmental or technical knowledge and is designed to be used by non-experts, although, people without any sustainability background may find it beneficial to use the Tool alongside experienced professionals.

There are a number of other findings that have arisen during the use of the PFI Sustainability Evaluation Tool. The technical and participant observation studies found that by linking many of the performance criteria contained in the tool with the contract payment mechanism, sustainability can be enhanced by ensuring that bidders' intentions are embedded within the project contract, and by including performance targets with financial penalties. Additionally, the PFI sustainability evaluation tool is designed for use by non-sustainability experts so as to build knowledge and capacity within users and reduce the reliance on external consultants. In doing so the tool addresses the issue highlighted by Asenova et al (2002), Akintoye et al (2003) and the National Audit Office (NAO, 2007)that the use of consultants acted as a barrier to achieving value for money.

References

Akintoye, A., Hardcastle, C., Beck, M., Chinyio, E., Asenova, D., 2003. Achieving best value in private finance initiative project procurement. Construction Management and Economics 21, 461-470.

Asenova, D., Beck, M., Akintoye, A., Hardcastle, C., Chinyio, E., 2002. Partnership, Value for Money and Best Value in PFI Projects: Obstacles and Opportunities. Public Policy and Administration 17, 5-19.

Baker, K.J., Rylatt, R.M., 2008. Improving the prediction of UK domestic energy-demand using annual consumption-data. Applied Energy 85, 475-482.

Barker, K., 2008. Planning policy, planning practice, and housing supply. Oxford Review of Economic Policy 24, 34-49.

Barlow, J., Koberle-Gaiser, M., 2008. The private finance initiative, project form and design innovation:: The UK's hospitals programme. Research Policy 37, 1392–1402.

Bergman, N., Whitmarsh, L., Köhler, J., Haxeltine, A., Schilperoord, M., 2007. Assessing transitions to sustainable housing and communities in the UK, in: International Conference on Whole Life Urban Sustainability and Its Assessment, Glasgow.

Bing, L., Akintoye, A., Edwards, P., Hardcastle, C., 2005. The allocation of risk in PPP/PFI construction projects in the UK. International Journal of Project Management 23, 25–35.

Boardman, B., 2006. 40% House.

BRE, Cyril Sweett, 2005. Putting a price on sustainability. Building Research Establishment, Watford.

Broadbent, J., Gill, J., Laughlin, R., 2004. Risk, Uncertainty and Accounting: The Case of the Private Finance Initiative in the UK'S National Health Service. Working Paper.

Broadbent, J., Gill, J., Laughlin, R., 2008. Identifying and controlling risk: The problem of uncertainty in the private finance initiative in the UK's National Health Service. Critical Perspectives on Accounting 19, 40–78.

Broadbent, J., Laughlin, R., 2005. The role of PFI in the UK Government's modernisation agenda. Financial Accountability & Management 21, 75–97.

CABE, 2003. Achieving well designed schools through PFI. Commission for Architecture in the Built Envrionment, London.

Callcutt, J., 2007. The Callcutt Review of housebuilding delivery. Department for Communities and Local Government London.

Cockroft, J., Kelly, N., 2006. A comparative assessment of future heat and power sources for the UK domestic sector. Energy Conversion and Management 47, 2349-2360.

Cole, R.J., 2005. Building environmental assessment methods: redefining intentions and roles. Building Research & Information 33, 455-467.

DCLG, 2008. Revised projections of households for the English regions to 2026. Department for Communities and Local Government.

Dempsey, N., Bramley, G., Power, S., Brown, C., 2011. The social dimension of sustainable development: Defining urban social sustainability. Sustainable Development 19, 289-300.

Garwood, R., Logan, S., Mills, K., Willoughby, N., 2002. Sustainablility Lessons from Private Fininace and similar Private Initiatives, IP 13/02. BRE.

Grimsey, D., Lewis, M.K., 2005. Are Public Private Partnerships value for money?: Evaluating alternative approaches and comparing academic and practitioner views. Accounting Forum 29, 345-378.

Hall, D., 2009. A crisis for public-private partnerships (PPPs)?

Hill, J., Collins, J., 2004. PFI: Meeting the sustainability challenge. Green Alliance.

Khadaroo, I., 2008. The actual evaluation of school PFI bids for value for money in the UK public sector. Critical Perspectives on Accounting 19, 1321-1345.

Kumaraswamy, M.M., Ling, F.Y.Y., Anvuur, A.M., Rahman, M.M., 2007. Targeting relationally integrated teams for sustainable PPPS. Engineering, Construction and Architectural Management 14, 581-596.
De Lemos, T., Almeida, L., Betts, M., Eaton, D., 2003. An examination on the sustainable competitive advantage of private finance initiative projects. Construction Innovation: Information, Process, Management 3, 249–259.
Li, B., Akintoye, A., Edwards, P.J., Hardcastle, C., 2005. Critical success factors for PPP/PFI projects in the UK construction industry. Construction Management and Economics 23, 459-471.
McCabe, B., McKendrick, J., Keenan, J., 2001. PFI in schools–pass or fail? The Journal of Finance and Management in Public Services 1, 63–74.
NAO, 2009. Performance of PFI Construction. National Audit Office.
NAO, 2010. PFI in Housing. National Audit Office.
O'Brien, G., Hope, A., 2010. Localism and energy: Negotiating approaches to embedding resilience in energy systems. Energy Policy 38, 7550-7558.
ODPM, 2003. Housing and Households: 2001 Census and Other Sources. Office of the Deputy Prime Minister.
OGC, 2002. Green Public Private Partnerships. Office of Government Commerce.
Palmer, J., Cooper, I., 2011. Great Britain's Housing Energy Fact File (No. URN: 11D/86). DECC.
Parker, D., 2009. Editorial: PPP/PFI–Solution or problem? Economic Affairs 29, 2–6.
Pitt, M., Collins, N., Walls, A., 2006. The private finance initiative and value for money. Journal of Property Investment & Finance 24, 363–373.
Pollock, A.M., Price, D., 2010. The private finance initiative: the gift that goes on taking. BMJ 341, c7175-c7175.
PUK, 2009. Projects Database : Partnerships UK - Record of all Private-Public Projects.
Smyth, H., Edkins, A., 2007. Relationship management in the management of PFI/PPP projects in the UK. International Journal of Project Management 25, 232–240.
Wakeford, J., Valentine, J., 2001. London: Learning through Partnership: Private Finance and Management in the Delivery of Services for London. Public Money & Management 21, 19-26.
Wang, N., Ding, R., Radosavljevic, M., Sun, H., 2011. Practicing sustainability in PFI project management, in: Technology Management Conference (ITMC), 2011 IEEE International. pp. 717–722.
Yates, A., 2008. Footprints and feedback. PPP Journal.
Zhou, L., Kurul, E., Keivani, R., 2006. Sustainability Evaluation in the PFI industry Analysis of a questionnaire survey. Presented at the Symposium on Sustaianbility and Value through Construction Procurement, Salford.