



University of  
**Salford**  
MANCHESTER

# Change management in public agencies to attain low carbon efficiencies

Ibbottson, K, Farrell, P and Whittleston, GS

<b>Title</b>	Change management in public agencies to attain low carbon efficiencies
<b>Authors</b>	Ibbottson, K, Farrell, P and Whittleston, GS
<b>Type</b>	Article
<b>URL</b>	This version is available at: <a href="http://usir.salford.ac.uk/id/eprint/51069/">http://usir.salford.ac.uk/id/eprint/51069/</a>
<b>Published Date</b>	2015

USIR is a digital collection of the research output of the University of Salford. Where copyright permits, full text material held in the repository is made freely available online and can be read, downloaded and copied for non-commercial private study or research purposes. Please check the manuscript for any further copyright restrictions.

For more information, including our policy and submission procedure, please contact the Repository Team at: [usir@salford.ac.uk](mailto:usir@salford.ac.uk).

**ID 042**

## **Change management in public agencies to attain low carbon efficiencies**

K. Ibbotson<sup>1</sup>, P. Farrell<sup>2</sup> and G. Whittleston<sup>3</sup>

*<sup>1,2,3</sup>University of Bolton, UK,*

Email: 1KM9bee@bolton.ac.uk; P.Farrell@bolton.ac.uk; G.Whittleston@bolton.ac.uk

### **Abstract:**

There is great impetus to implement change in all areas of the UK economy. Key aims are to reduce costs and CO<sub>2</sub> emissions, and increase efficiency and growth. There are often difficulties in putting change into practice, evidenced by the perceived lack of progress on 1990s recommendations by Latham and Egan. Change can be most difficult in the public sector, whereby long established ways of working are culturally ingrained. The basis of this research is a comprehensive literature review. It forms the foundation for an electronic survey of practising professionals in a leading government agency that procures major construction projects; findings from this survey will be reported in subsequent work. The survey embraces the whole supply chain of the agency, since many authoritative sources call for integration, and for change to be implemented in partner organisations. The research will also be supported by interviews, both at early stages in the development of the main research instrument, and in later stages during interpretations of findings. The main analytical approach will be quantitative. There is a focus upon the role of leadership in implementing change and judgements are made about whether the knowledge level of practitioners is sufficient to allow them to drive new initiatives. Conclusions and recommendations are made regarding training, knowledge management and Building Information Modelling.

### **Keywords:**

BIM, change, CO<sub>2</sub>, leadership, procurement

## **1. Introduction**

There is great impetus to implement change in the UK economy but with the distraction of an economy that has been in recession, public sector staff subject to pay restrictions and at risk of redundancy, trying to put change into practice becomes a challenging task. The difficulties of implementing change however, are not specific to the here and now. The UK construction industry has had many attempts to move to a more 'Lean' and innovative industry with recommendations by Latham, (1994) and Egan, (1998) highlighting the need for the industry as a whole to improve. These previous attempts have been limited with Egan stating that "Since 1998 we could have had a revolution and what we've achieved so far is a bit of improvement" (Wolstenholme, 2009). The question then is why have previous attempts at implementing change been received with enthusiasm but the results have been limited in their effect? According to Wolstenholme "the construction industry has been sheltered by a strong economy. This has enabled construction to prosper without having to strive for innovation".

"Today's economic climate is different and offers an opportunity to think again" (Wolstenholme, *ibid*; GLA Economics 2008 cited in Sundar, 2013). In order to address the underlying issue of whether the construction industry and the public sector will be successful in implementing current Government initiatives for change, further understanding of

organisational culture and change is required. The public sector has a long established way of working and the culturally ingrained practices appear to be a barrier to implementing change, whereby the democratic leadership approach results in discussions with unions or employees before organisational change occurs, slowing down the timescale for its implementation and reducing the sense of urgency needed to gain support for change initiatives. Employees in both public and private sectors of construction need to be bought-in to the process for change, in order for this to be successful; the process for change needs to be linked to organisational culture. Understanding whether public sector construction is (or is not) different from private sector construction, is dependent on the individual organisations and the “complex interrelations between organisational culture and organisational climate” (Mehmet, 2006).

A literature review has been undertaken focusing on the implementation of these Government initiatives within the construction industry; the effect of organisational culture on change implementation and the need for clear leadership in organisations to implement and sustain change within the industry through knowledge management and training.

## **2. Public Sector Construction**

The challenge for public sector organisations and their supply chain is to ensure that Government priorities for a low carbon economy, increased efficiency and the introduction of Building Information Modelling (BIM) are fully understood, embedded and prioritised on public sector construction schemes. This is in addition to the demand for construction schemes to be built on time, to the required engineering and environmental quality and cost, and meeting the needs of partnership funding bodies and stakeholders. All of these requirements do not cohesively work together but often result in conflicting priorities, relying on public sector agencies and their supply chains collectively working towards targets set by Government.

The construction industry has been affected by many Government initiatives focused on improvement. The Latham report (1994) highlighted the need for driving productivity and improvements, offering leadership, coordinating the production of Codes, guidance and advice, and setting specific targets for progress. The Egan report (1998) outlined the need for committed leadership, focus on the customer, integrated processes, quality driven agendas and commitment to people, all of which still apply to the ‘here and now’. However a review in 2009 evidenced the lack of progress in both the Latham and Egan recommendations. The ‘Never Waste a Good Crisis’ report (Wolstenholme, 2009) suggests that changes have not been wide ranging or self-evident due to the lack of incentives created by a buoyant economy, and it is only since the recent recession within the UK that organisations are having to make cutbacks and demonstrate that they are not only adding value to the work they do, but leading the way with green technology and low carbon initiatives. Moving to a low carbon economy is the right thing to do, for our economy, our society and for future generations (HM Government, 2011). This is supported by the UK Low Carbon Transition Plan, which clearly outlines the implications of a low carbon economy and its effect on the construction industry; however all of this is dependent on the construction industry operating at its best (Innovation and Growth Team, 2010).

The demonstration of how the construction industry is pursuing a low carbon industry to date, is arguably somewhat lack lustre, despite Government setting clear targets. This view is supported by Thornley-Walker (2010) who states that engineers have been given clear advice on their duty through (i) The Institution of Civil Engineers in its 2009 State of the Nation report (ICE, 2009) that recommended that carbon should become a ‘key aspect’ of all design, and (ii) The Engineering Council (UK) in 2009, which issued its document ‘Guidance on Sustainability’ (Engineering Council, 2009), stating that engineers should: (a) undertake a

comprehensive risk assessment before a project begins, (b) ensure that the risk assessment includes the potential environmental, economic and social impacts, beyond the lifetime of the engineering project or product, (c) recognise the potential long-term aspects of risk, and (d) give sustainability the benefit of the doubt, adopting a precautionary approach where scientific knowledge is not conclusive.

Under the Construction, Design and Management Regulations (CDM) (HSE, 2007 cited in Thornley-Walker, *ibid*), all those involved in construction have “a duty either to design-out dangers, or to reduce risks to acceptable levels“; this view is supported by the Department of Business Innovation and Skills (BIS, 2010) who state that design can make an impact of reducing CO2 through in-use emissions. However, very few members of construction design teams feel compelled, or justified, to cut down or design-out and replace the high-carbon materials on the above advice or to meet government advice (HM Government, 2005; cited in Thornley-Walker, *ibid*). The Innovation and Growth Group recognise that Government needs to drive change and innovation amongst the construction community and has stated that “this will involve both push (e.g. legislation) and pull (e.g. incentives to create a market). It will require a definite long-term plan allowing business to adapt and plan ahead to deliver the infrastructure and buildings required for the UK to meet its low carbon targets in the long-term. Without their backing and support there will not be impetus to move forward and work towards a low carbon society. This in turn will aid in trying to change the perception of the general populous” (Bryne, et al., 2010).

### **3. Implementing new initiatives**

For public sector organisations undertaking construction schemes it is not just the organisation itself but the supply chain that needs to be influenced. Implementing change in commercial construction organisations should focus on the need to stand out from their competitors making them more commercially attractive. Understanding the drivers and vision of private organisations and the climate that they operate in, highlights the type of influencing and incentivisation requirements needed by public sector agencies to implement change within their supply chains. As many public organisations operate under specific framework agreements, a set criteria is outlined at framework tender stage with a clear outline of the vision and aspirations of what the public sector organisation wishes to achieve with the support and influence of the private sector supply chain. Such vision and aspiration however needs to lead to economic competitiveness, and is defined as the ability to maintain or expand market position based on cost structure; the loss or gain of competitiveness can be caused by a relative increase or decrease in cost compared with competitors (Sathre and Gustavasson, 2007). However, due to the current culture of the construction industry after initial and basic requirements are met, the cheapest construction materials are usually utilised. This highlights “the importance of the public sector client driving and providing incentives for the use of low carbon dioxide materials in the construction industry” (Ng, et al, 2012).

Similarly the requirement to include carbon emissions in risk assessments has not been emphasised and climate change has been specifically excluded from the UK National Risk Register (HM Government, 2010) on the grounds that it would not affect the safety and security of the UK within a five-year time scale (Thornley-Walker, *ibid*).

The use of Carbon Calculators within public sector construction schemes enables project teams to demonstrate that they have achieved savings on the carbon output from appraisal, through to detailed design and at construction end. This information is monitored within the public sector and contributes to the carbon target for each agency. Although monitored to ensure that set targets are not exceeded, it falls short in both (i) recording the full carbon figure, as operational

carbon is not taken into account, and (ii) failing to actively motivate project teams to prioritise low carbon within their schemes. With no clear project level targets set or the ability to accurately and routinely challenge the cost of low carbon solutions, construction professionals who are frequently in a position to reduce GHG emissions, for example by specifying granular material instead of concrete in many locations, are not adequately incentivised to do so. Utilising the correct incentives or pressures, effort in the design and the procurement processes, could affect changes each week that most members of society would hardly achieve in years (Thornley-Walker *ibid*). However the current likely outcome is that cheaper cost solutions are prioritised over low carbon solutions, resulting in low carbon targets being missed by the promotion of efficiency targets. This is likely to be due to the level of understanding and ability to see tangible results and cost savings from pursuing low carbon solutions.

The Government's efficiency initiative has tasked public sector organisations to provide a year-on-year efficiency savings on their construction schemes. "An efficiency saving is a monetary saving which has been incurred by undertaking works in a different way or with a different resource, but still achieving either the same output or a greater standard" (Agency *ibid*). Baselined in 2010, the Government's 20% efficiency target resulted in many quick wins with project teams recording reduced travel and the increased use of teleconference and videoconferencing as an efficiency saving.

Going forward the efficiency target has become more challenging with project teams having to innovate to find alternative solutions to demonstrate actual savings. No longer are these only reviewed at detailed design or construction stage but project teams are being encouraged to identify potential efficiency savings at project start, with contract targets and project budgets being set on the basis of project efficiency savings being achieved. This early reporting and identification of savings to Government, acts as a driver to motivate teams to achieve the savings identified (Agency, 2011). However, for some, the basic identification of savings requires a change in mindset and motivation, to ensure that the innovative use of alternative technology and approach to construction solutions is progressed.

The utilisation of Building Information Modelling has the potential to offer both efficiency savings and cost improvement to public sector construction work. Although BIM has been available to the construction industry for a number of years, it has only recently become a priority for Government whereby clear targets have been set for its use by 2016 (Cabinet Office, 2012). Although for some public sector agencies this may be viewed as a tough target to achieve, it is not so much the achievement of the target, but the suitability of implementing BIM into their organisation and the requirement to identify and define the data requirements required. According to Arayici, et al. (2011) there are several challenges in implementing BIM into the UK construction industry, including "overcoming the resistance to change, and getting people to understand the potential and the value of BIM over 2D drafting;. . . adapting existing workflows to lean oriented processes; training people in BIM, or finding employees who understand BIM; the understanding of the required high-end hardware resources and networking facilities to run BIM applications and tools efficiently; the required collaboration, integration and interoperability between the structural and the MEP designers/ engineers; and clear understanding of the responsibilities of different stakeholders in the new process".

As with the progression of low carbon construction solutions and efficiency savings, BIM requires the construction industry to change the way it works at all levels. For BIM specifically it requires training in new software applications, the reinvention of workflow, how to train staff and assign responsibilities, and changing the way of modelling the construction (Bernstien, 2004; Eastman, et al., 2008; Aryaici et al., *ibid*).

The lean principles and elimination of waste raised by Egan and Latham form the implementation strategy and focus for BIM (Construction, 2010; Arayici et al, *ibid*). The confusion for some is that BIM is not just about technology and knowing “what every object is, where it is, how big it is and what it is made of” (Construction, *ibid*) but about people and process. Ensuring people are engaged in the process and receive the right level of training that allows the organisation and businesses to build their capability, is a core requirement for successful BIM implementation (Arayici et al, *ibid*). Tekla UKs’ Managing Director Andy Bellerby commented in the *New Civil Engineer* (2012) “the Government’s decision to make the use of BIM on all public projects mandatory is a positive step towards prompting this behaviour change”. Bellerby also comments that “Specifying level 2 BIM isn't really taking it much beyond where most people are already. Only when you get to level 3 and beyond are you really changing cultures. At the moment the biggest outcome of the mandate is that the industry is now much more aware of BIM”. Bellerby fears that it does not go far enough to change a great deal or force a cultural shift. This view is supported by Ayaici et al. (*ibid*).

The implementation of Low Carbon, Efficiency and BIM can collectively offer mutual benefits with BIM offering greater efficiency and the ability to link Low Carbon to the data held in BIM (Ng, et al, 2012). This collective implementation requires the support of public sector agencies and their supply chains in the construction industry, all focusing on the prioritisation and organisational leadership of these initiatives, and the knowledge sharing and training requirements to make them successful. In order to test the level of success of these initiatives and whether they are fully embedded into the organisation and proactively pursued, an understanding of employee’s knowledge is required alongside their view on their organisational culture and ability to implement these initiatives.

#### **4. Organisational culture**

Culture is viewed as the foundation that establishes the trust that impacts on the degree at which employees buy-in to change, and highlights the commitment to drive and sustain change. In addition to this, it focuses on employees’ willingness to share information and collaborate, which ultimately determines organisation ability to survive disruptions, thus effecting ability to advance (Alavi et al., 2005; Barney, 1986; Janz et al., 2003; Taylor, 2013). According to Gaplin (*ibid*) there is no single component to describe organisational culture as each element is individual to the organisation, and relies on how each element interacts on a day-to-day basis. Understanding and diagnosing organisational culture can assist in implementing the type of change needed and establishing organisational readiness for change (Burnes, 1996; Sundar, *ibid*). This view is also supported by Gaplin (*ibid*) who states that “the primary motive for managing culture during change is to implement and sustain changes. Too often, executives and managers struggle when implementing changes because they don't understand how to make them important to employees”.

Gaplin does state that there are ten components that contribute to organisational culture description that can be used to establish which items can be managed to help implement and sustain change: (1) rules and policies, (2) goals and measurement, (3) customs and norms, (4) training, (5) ceremonies and events, (6) management behaviours, (7) rewards and recognition, (8) communications, (9) physical environment, and (10) organisational structure.

Including change initiatives into as many of the ten components as possible will assist in embedding them into the culture of the organisation. Bascal, (2009, cited in Ibbotson, 2009) emphasises that the success of organisational change “requires the understanding of how individuals change, associating this understanding with the specific phases such as Preparation, Acceptance and Commitment whereby an individual gains more of an understanding of the

changes and therefore automatically has a positive acceptance of these stages". In contrast Kubler-Ross, (2009) and Fisher, (1999) focus on the psychological changes associated with individual positive and negative feelings and reactions. As each individual and their reaction are different, this poses a risk that can form into negative attitudes towards work. This will in turn make them risk adverse and afraid to innovate (Scott, 1989; cited in Ibbotson, *ibid*).

The ability for individuals to cope with change varies; for some not enough pressure leads to boredom and low self-esteem, the correct amount of pressure can be a challenge improving performance and innovation, whilst for others too much pressure can lead to feeling out of control and poor quality of work, leading to stress and a loss of confidence in ability (Willis, 2008; Ibbotson, *ibid*).

Kotter and Schlesinger's (1979) methods for overcoming opposition, although for some mirror Galpin's (1996) organisational culture components, take a step further into how methods for change can be sustained through knowledge management thus: (1) education and communication, (2) involvement and participation, (3) facilitation and support, (4) negotiation and agreement, (5) manipulation and co-option, and (6) explicit and implicit coercion (Galpin, 1996).

Hogg (1996) believes for a public body, employee commitment is the way forward, utilising a marketing strategy of "trust, empowerment and effective communication". However, trust relies on having the confidence that people will do what they say they are going to do or are competent to do the things they say they are going to do (Mink et al., 1993 cited in Ibbotson, *ibid*).

## **5. Further research**

In order to test the appetite for change and in particular the prioritisation of a low carbon in Public Sector Flood Risk Management projects, a pilot survey has been undertaken to focus on the areas explored within this paper. A quantitative approach is used to obtain results which may be inferred to reflect the whole of the population. The questionnaire comprises 33 questions, which include both quantitative and qualitative answers, and is divided into three main themes: (i) background information, (ii) organisational culture and organisational leadership, and (iii) low carbon initiatives. It has been designed to explore the current culture of public and private sector organisations, and to gain an insight as to whether it is public or private sector organisations leading on low carbon initiatives. Questions were developed based on issues in the literature, with the pilot survey highlighted the need to refine some questions on organisational culture and leadership. It is expected that the survey will result in greater insight into the strategies employed to promote low carbon initiatives and the level of success within each sector. The inclusion of a qualitative narrative has been undertaken to assist the individuals in responding to the implementation of new initiatives and their response to change. The survey was sent to 1000 public sector and private sector supplier staff involved in public sector flood risk management projects, a total of 37 returns were submitted in the three week timeslot. A further 150 automated emails were returned stating individuals were either no longer with the organisation or on long term leave. The analysis and results of this survey will be explored in a future paper. It may be anticipated that, consistent with authoritative sources in the literature being underwhelmed by progress being made to improve construction efficiency, that organisational culture and leadership is lacking and there is insufficient attention paid to low carbon initiatives.

## References

- Agency, E. (2011). Engineering a Better Place. Sustainable Engineering Procurement Strategy 2010 - 2020. Bristol: Environment Agency.
- Alavi, M., & Kayworth, T. R. (2005). An empirical examination of the influences of organisational culture on knowledge management practices. *Journal of Management Information Systems*, 191 - 224.
- New Civil Engineer (2012). BIM: Change Culture. *New Civil Engineer* .
- Arayici, Y., Coates, P., Koskela, L., Kagioglou, M., Usher, C., & O'Reilly, K. (2011). BIM adoption and implementation. *Structural Survey*, 7 - 25.
- Barney, J. B. (1986). Organisational culture: Can it be a source of sustained competitive advantage. *Academy of Management Review*, 656 - 665.
- Bernstien, P. G. (2004). Barriers to the Adoption of Building Information Modelling in the Building Industry. California: Autodesk Publishing.
- BIS (2010). Estimating the amount of CO2 emissions that the construction industry can influence. London: BIS Department of Business, Innovation and Skills.
- Bryne, M., Collie, H., Corbin, R., Evans, G., Fernandes, C., and Jarman, N. (2010). 2050 Group Final Report. *New Civil Engineer*, 10.
- Burnes, B. (1996). *Managing Change: A Strategy Approach to Organisational Dynamics*. 2nd Edition. London: Pitman.
- Construction, G. (2010). BIM points way to efficiency. *New Civil Engineer*.
- Eastman, C., Teichloz, P., & Sacks, R. a. (2008). *BIM Handbook: A Guide to Building Information Modeling*. Mississauga: John Whitley and Sons.
- Egan, J. (1998). *Rethinking Construction*. London: Department of Trade and Industry.
- Fisher, J. (1999). *Transitional Curve*. Tenth International Personal construction Congress. Berlin.
- Galpin, T. (1996). Connecting culture to organizational change. *Society for Human Resource Management*, 84.
- Hogg, C. (1996). Selling your soul. *Human Resources*, 88 - 90.
- HM Government (2005) *Sustainable Development Strategy: Securing the Future – Delivering the UK Sustainable Development Strategy*. Department for Environment, Food and Rural Affairs, London. See [http://www.defra.gov.uk/sustainable/government/publications/uk-strategy/documents/SecFut\\_complete.pdf](http://www.defra.gov.uk/sustainable/government/publications/uk-strategy/documents/SecFut_complete.pdf) for more details (accessed 11/02/2011).
- HM Government (2010) *National Risk Register 2010*. See <http://interim.cabinetoffice.gov.uk/media/349023/nrr2010-chapter5.pdf> for further details (accessed 11/02/2011).
- HM Government (2011). *The Carbon Plan: Delivering our low carbon future*. London: HM Government.
- HSE (Health and Safety Executive) (2007) *CDM – Construction (Design and Management) Regulations 2007*. HSE, London. See HYPERLINK "<http://www.hse.gov.uk/>" <http://www.hse.gov.uk/construction/cdm.htm> for further details (accessed 11/2/11).
- Ibbotson, K. (2009). *Change Management*. Unpublished appraisal. University of Bolton.
- Innovation and Growth Team, H. G. (2010). *Low Carbon Construction, Innovation and Growth Team. Emerging Findings*. London: HM Government.
- Janz, B. D. (2003). Understanding the antecedents of effective knowledge management: The importance of knowledge centred culture. *Decision Sciences*, 351 - 384.
- Kotter, J. P. and Schlesinger, L. A. (1979) *Choosing strategies for change*. *Harvard Business Review*, 106 - 114
- Kubler-Ross. (2009). *Five Stages of Grief*.  
[http://www.businessballs.com/elisabeth\\_kubler\\_ross\\_five\\_stages\\_of\\_grief](http://www.businessballs.com/elisabeth_kubler_ross_five_stages_of_grief). Retrieved June 4, 2009, from <http://www.businessballs.com>:  
[http://www.businessballs.com/elisabeth\\_kubler\\_ross\\_five\\_stages\\_of\\_grief](http://www.businessballs.com/elisabeth_kubler_ross_five_stages_of_grief). 4<sup>th</sup> June

- Latham, M. (1994). *Constructing the Team*. London: HMSO.
- Mehmet, Y. (2006). The fit between the concepts of organizational culture and climate. *Journal of Organisational Culture, Communication and Conflict*, 77.
- Mink, O. G., & Owen, K. Q. (1993). *Developing High Performance People: The art of coaching*. New York: Persueus Press.
- Ng, S. T., Wong, J. M., & Skitmore, M. (2012). Challenges facing carbon dioxide. *ICE Proceedings*, 20-31.
- Cabinet Office (2012). *Government Construction Strategy. One year on and action plan update*. London: Cabinet Office.
- Sathre, R., & Gustavasson, L. (2007). Effects of energy and carbon taxes on building. *Energy and Buildings*, 488 - 494.
- Scott, C. A. (1989). *Managing Organisational Change - A guide for Managers*. California: Crisp Publications.
- Sundar, S. B. (2013). Impact of change management over personal behaviour and culture on construction projects. *International Journal of Marketing and Technology*, 49 - 70.
- Taylor, G. (2013). Implementing and maintaining Knowledge Share Culture via Knowledge Management Teams: A Shared Leadership Approach. *Journal of Organisational Culture, Communications and Conflict*, 69 - 91.
- Thornley-Walker, R. (2010). Carbon footprint and risk. *ICR Proceedings*, 147-160.
- Willis, J. A. (2008). *Springboard-womens development workbook*. Stroud: Hawthorne Press.
- Wolstenholme, A. (2009). *Never Waste a Good Crisis*. London: Constructing Excellence.