Cut Carbon, Cut Cost – Feasibility of Applying PAS 2080

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ABSTRACT

State of Qatar is committed to delivering its Intended Nationally Determined Contributions (INDC) submitted to the United Nations Framework Convention on Climate Change (UNFCCC) secretariat. (Ministry of Environment, 2015). Though the INDC are voluntary, without any specific target threshold to commitments, Qatar has over the years developed robust policies and action plans with the intention to reduce greenhouse gas (GHG) emissions by 2030. As a host country for the World Cup 2022, sustainable tourism and carbon neutral tournament are already high priority on the agenda. Meeting GHG emission reduction targets by 2030 will be a challenge for all sectors across Qatar and reduction of emissions from Qatar's infrastructure will soon be a regulatory requirement. The paper will be based on a literature review of the standard available in the industry, such as PAS 2080, for carbon management in infrastructure. The feasibility of applying such standards in Qatar will be reviewed in detail, with the objective of managing whole life carbon in infrastructure and achieve reduction in carbon and cost. The study will also detail how carbon reduction can not only be achieved by quantifying carbon and addressing carbon hotspots to improve efficiency but also by including changes in behaviors/culture, processes and systems, in addition to implementation of low carbon solutions.

Keywords: Climate change; Infrastructure carbon; PAS 2080; Low carbon solutions

1 INTRODUCTION

State of Qatar is committed to delivering its Intended Nationally Determined Contributions (INDC) submitted to the United Nations Framework Convention on Climate Change (UNFCCC) secretariat (Ministry of Environment, 2015). Even though the INDCs are voluntary, Qatar has over the years making efforts to reduce its national greenhouse gas emissions. As a host country for the World Cup 2022, sustainable tourism and carbon neutral tournament are already high priority on the agenda (The Penninsula, 2019). Infrastructure is the backbone of Qatar's economy, providing essential services to the society. The INDCs report issued by the Ministry of environment in 2015, specially identifies infrastructure as a potential mitigation measure against climate change impacts and reduction of emissions from Qatar's infrastructure will soon be a regulatory requirement.

1.1 Infrastructure carbon

Infrastructure refers to transport, energy, water, waste and communications sectors, as defined in the UK National Infrastructure Plan 2014 and support the essential societal services of a country (bsi, 2016). Typically, infrastructure projects are energy and carbon intensive and studies indicate approximately 70% of global greenhouse gas emissions (GHGs) come from infrastructure construction and operations (World bank blogs, 2018).

Carbon in infrastructure will be used as the short-hand for GHGs as defined by the UNFCC Kyoto Protocol. Carbon is a key concern for infrastructure assets and the term is split into three: capital carbon which refers to emissions associated with creation of an asset, operational carbon which refers to the emissions associated with the operation and maintenance of an asset and whole life carbon which is a collective term for both capital and operational carbon. (UK Green Building Council, 2017).

1.2 Drivers for carbon reduction

There are number of drivers for opting carbon reduction measures in infrastructure. As climate change impacts are exacerbating and climate talks are gaining momentum, globally, it is crucial that carbon mitigation actions are captured locally via reducing carbon footprint and improving resilience. Other than the environmental consideration, cost of energy and material prices are key drivers for adopting a low carbon approach as carbon is a proxy for material / energy used during the construction and operation of assets (Okereke, 2007). As majority of the carbon emissions are from the construction, operation and maintenance of the asset, focusing on these key areas have demonstrated that considerable carbon and cost reduction can be achieved. Carbon reduction from end user (usecarb) is attributed to behavioral changes, though can be influenced by the infrastructure asset owners /value chain, will require buy in from other stakeholders (Infrastructure Working Group, 2013). A study that explores the motivations, drivers and barriers to carbon management in businesses, (Okereke, 2007), identified that market shift, technological changes and governmental regulations can push the envelope to kick start the carbon management process.

For carbon foot printing of an asset or an organization, there are tools available in the industry to assist in quantifying emissions and reporting. With a complex structure of delivery and interrelations with multiple stakeholders, carbon assessment in infrastructure had a dearth for a common platform that connects the entire value chain and maximize efforts (HM Treasury, 2013).

In alliance with the Paris agreement, UK government has specific climate change commitments and infrastructure carbon review (ICR) undertaken in 2013, indicated that 16% of UK's total carbon emissions were from the construction, operation and maintenance of the infrastructure assets (UK Green Building Council, 2017). The ICR alluded various carbon reduction opportunities that support UK's emission reduction target and it included a recommendation to create a specification that integrates the entire value chain involved in creating infrastructure assets (HM Treasury, 2013). This led to the development of PAS 2080.

2 WHAT IS PAS 2080

Typically, publicly available specification (PAS) are a precursor to development of a

standard and aims to fulfil an immediate requirement in the industry for such a process. PAS 2080 was driven by the need in the construction industry to streamline the carbon management process in infrastructure projects. PAS 2080 came into effect in May 2016 (bsi, 2016), commissioned by the Green Construction Board (GCB) and facilitated by BSI standards limited. It was supported by technical experts in the field of construction (including the team from Mott MacDonald and Arup) and supported by the organizations and stakeholders during the development and deployment phase of the document. It is world's first specification that details the process to be adopted for managing carbon reduction in infrastructure projects and provides general guidance to promote carbon management in infrastructure delivery on a whole life basis (bsi, 2016). It aims to provide a consistent methodology for gathering data, benchmarking, setting baseline, quantification and reporting of infrastructure carbon and cannot be regarded as a carbon assessment tool for quantifying GHG emissions. Acknowledging the responsibility of asset owner / managers as well as the parties involved in the design, construction of the assets, PAS 2080 aims to integrate and align the work of the value chain to push boundaries for innovation. A new culture of design and construction that challenges the current practices and innovates to reduce cost and carbon are the expected outcomes, when PAS 2080 is applied.

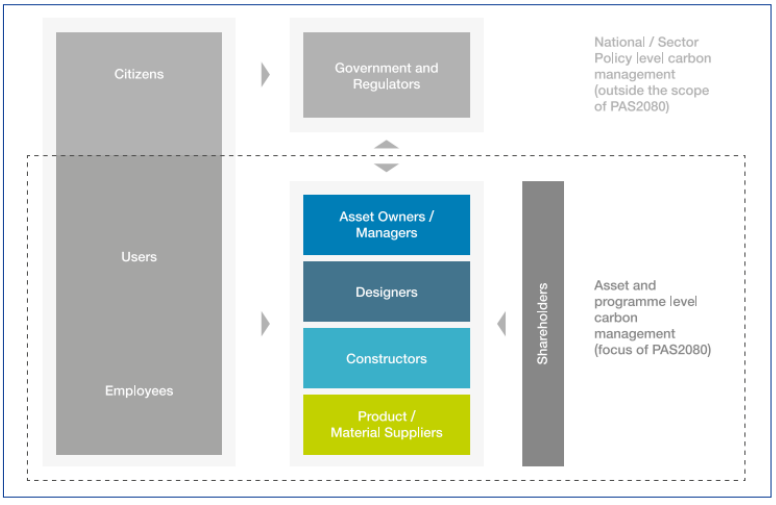

Figure 1: Infrastructure value chain members responsible for carbon management (bsi, 2016)

2.1 Key enablers

PAS 2080 is based on key principles that underpin the whole life carbon management and provides a comprehensive set of responsibilities for each party in the value chain, via specific clauses. As indicated in the below Figure 2, the whole life carbon reduction can be applied across 8 work stages that denote the infrastructure delivery. A separate guidance document which should be read in conjunction with PAS 2080, provides guidance, case studies and support for better understanding and efficient application of the specification (The Green Construction board , 2016) .

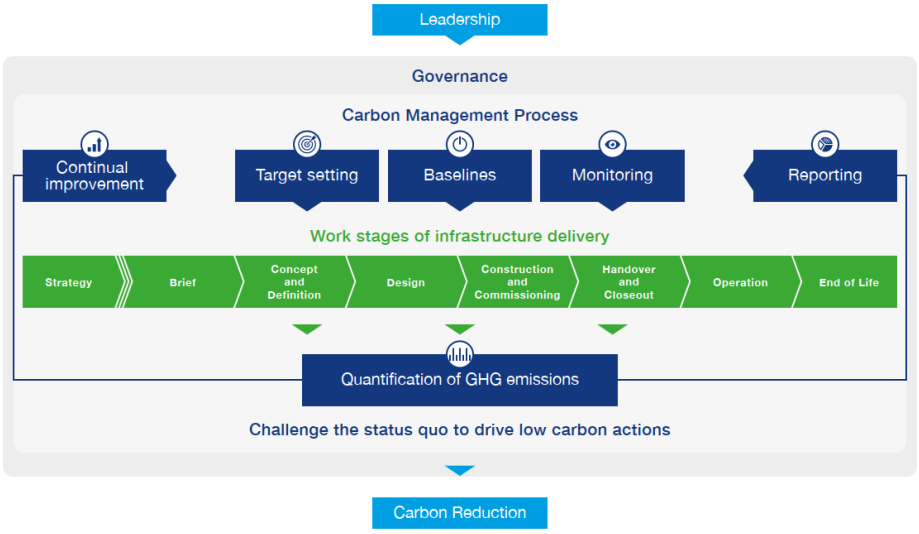

Figure 2: PAS 2080 Carbon management process (bsi, 2016)

3 FEASIBILITY OF CARBON MANAGEMENT

The feasibility of applying carbon reduction measures can be demonstrated through two key case study examples.

3.1 Case study example-1 Cut carbon, cut cost

As early adopter of PAS 2080, Anglian water in the UK has demonstrated the causal link between carbon and cost by analyzing its data for 8 years and establishing correlation between reduced carbon and reduced cost. Understanding this, Anglian Water is the first water company to set a target of becoming carbon neural by 2050. Their annual integrated report for 2019 states that they are on track to achieve this, demonstrates the reduction in capital carbon from their 2010 levels by 58% and operational carbon emission by 29% (Anglian water services limited , 2019). Attention to design, material, installation and commissioning techniques has contributed to the 58% reduction in capital carbon and focus on carbon has been commercially beneficial , achieving a capital cost saving of more than 20%, measured against a 2010 baseline (Davide Stronati, 2019). This is a fine example of how a top down approach, with the right leadership and governance, has contributed to the successful delivery of reduced carbon targets.

3.2 Case study example-2 Carbon foot printing

In the context of wider interest in carbon reduction in the UAE, including national reduction targets, one of the government entities wanted to understand its carbon footprint and how to reduce the climate change impact of operations, cut costs and provide carbon performance data to internal and external stakeholders. The exercise identified potential carbon savings of over 2.3 million tCO2e/year by 2030 by developing a carbon footprint calculation tool and forecasting scenarios. The project also helped to identify reductions in emissions of 35-54% as well as operational cost savings. The roadmap included significant quick wins that could be implemented in the short term as well as

investments over the medium/longer term. The project also built carbon management capacity within the company and enabled to develop a carbon reduction and energy efficiency investment program for the short and medium term, across all similar assets.

4 CONCLUSION

As Qatar aspires to transition into a low carbon economy, it is imperative to understand that change will be required when managing infrastructure assets (Ronan Bolton, 2015). Taking cue from the list of perceived and actual barriers in the UK for the uptake of low carbon infrastructure (HM Treasury, 2013), based on professional expertise, the authors note the same set is applicable in Qatar as well.

In-depth studies will be required to verify and establish the veracity of these observations and will be helpful to understand the preferred route for stakeholders in response to a potential market shift (Okereke, 2007). Hence based on the literature review, the below set of recommendations have been drafted to support the way forward for adopting PAS 2080 in Qatar for infrastructure projects.

Leadership is key

As demonstrated by various case studies, leadership is of paramount importance while aiming to adopt PAS 2080 in infrastructure. Government organizations should aim to take lead in setting strategy for managing carbon in infrastructure assets, understand the baseline and aim to improve against those baselines through targets setting and monitoring (Granoff, 2016). Prior to that it is important to note that main ingredients of carbon reduction include shift in behaviors/culture, processes and systems in addition to implementation of low carbon solutions. Typically carbon reduction is not embedded in the current mindset of organizations, therefore having a clear vision and communicating the objective within the organization, as a core value, and percolating it to the supply chain and wider industry partners will assist in quicker acceptance and adoption of the specification (HM Treasury, 2013).

Capacity building

Carbon awareness is not a skill that is viewed as a requirement for the team managing and creating infrastructure assets and appropriate training are not typically provided to assist in building the skill set. It also needs to be acknowledged that with a plethora of carbon tools, models etc., and carbon management can be viewed as a complex and daunting process (HM Treasury, 2013). Nevertheless, it is imperative to note that carbon management is the responsibility of the entire value chain and only when the whole value chain is aligned, then the maximum potential for cost and carbon reduction can be realized. (Institution of Civil Engineers, 2016) . Development of carbon skills at all levels and tiers of the supply chain, from class room to board room, is critical and investment in human capital will add value to the infrastructure industry.

Mindset for innovation

Innovation triggers change in technology and application of unique solutions to achieve the desired carbon reduction. This may include novel designs, products or practices which are new and can be perceived as ‘risky’ in comparison to tried and

tested carbon intensive solutions (Granoff, 2016). The perception of increased cost or reduced level of service can be a hindrance to adoption of low carbon solutions by clients and discourage new thinking in the supply chain (UK Green Building Council, 2017). Early engagement with the supply chain to provide low carbon solutions at the project onset and having a dialogue with the service providers, product suppliers, designer and contractors on the possibilities to reduce cost and carbon , can foster creativity and innovation (HM Treasury, 2013).

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