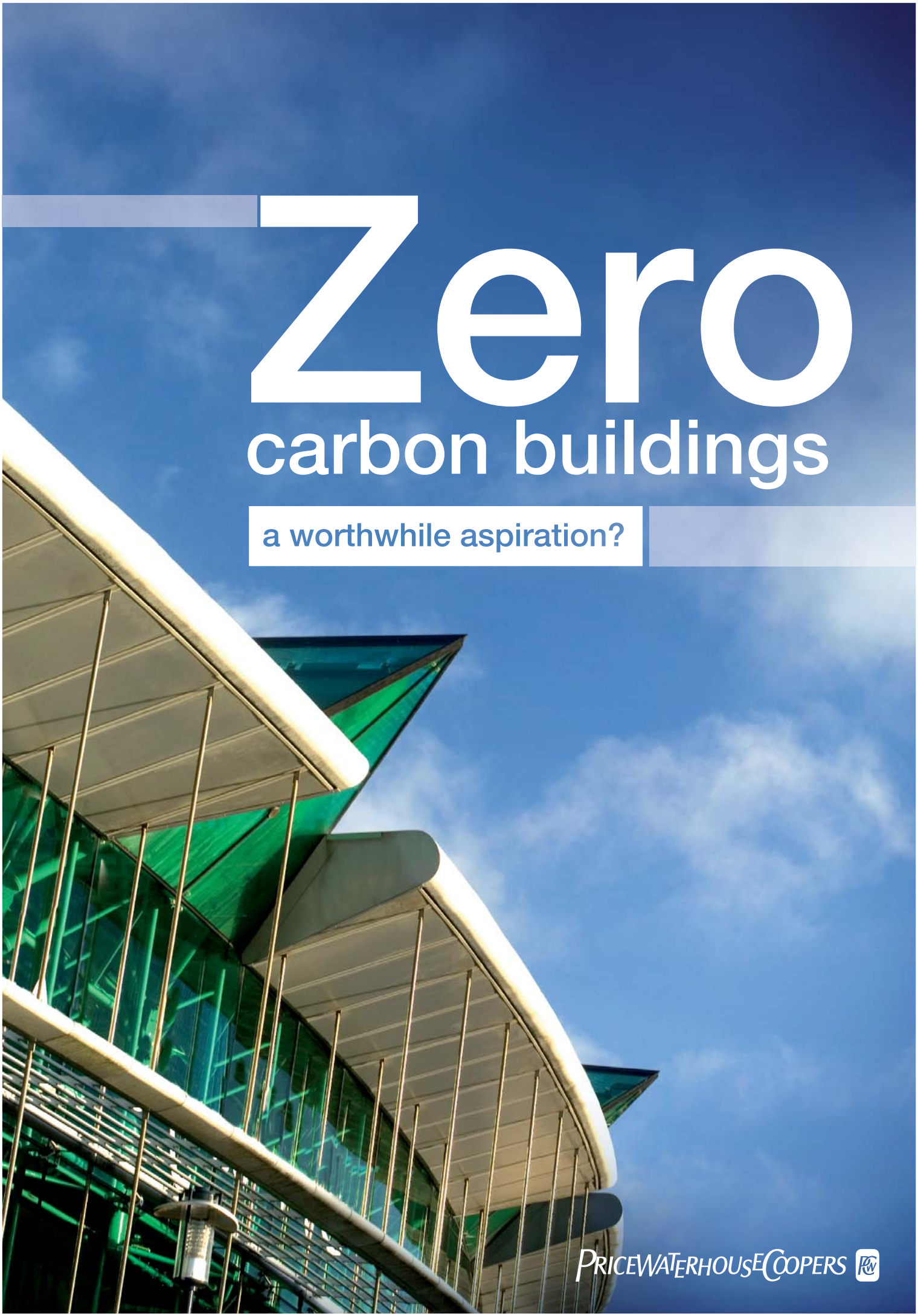
Zero
carbon buildings
a worthwhile aspiration?
PRICEWATERHOUSECOOPERS

In December 2006, the Department of Communities and Local Government in the UK launched 'Building a Greener Future' — a policy package towards zero carbon residential development comprising a target for zero carbon new homes by 2016, a Planning Policy Statement on Climate Change, and the Code for Sustainable Homes — a voluntary standard for sustainability which charts the way towards a lower carbon future.

Over two years on from this, how have we progressed — not only in the UK, but internationally on this issue? In particular, are building industry stakeholders in Australia and the US keen to proceed on a similar path?

The United Nations Sustainable Buildings & Construction Initiative estimates that buildings are responsible for 40 per cent of total global greenhouse gas emissions – if you consider a building's lifespan, including construction, operation, maintenance, fit-outs and demolition. Furthermore, sources suggest that they offer substantial opportunities for low cost carbon abatement. They therefore have a vital role to play in addressing the issue of climate change. So, should we be aiming for stringent emission reduction targets in the building sector? Should we be aiming for zero carbon buildings? What, in fact, do we mean by a zero carbon building?

This study by PricewaterhouseCoopers, involved discussion with stakeholders from Australia, the US and the UK, from sub-sectors spanning architecture, design and development, construction, facilities management, and building finance, with the aim of gaining answers to these questions, and a deeper insight into stakeholder perspectives on a shift towards zero carbon buildings.

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How do you define a zero carbon building?

When the UK Government launched its policy package at the end of 2006, the term zero carbon was intended to mean zero net operating carbon (over a year), achieved through renewable sources connected by a pipe or a wire to the development. Since then, there has been substantial debate over what the meaning should be, and the UK Government has only recently completed a consultation on the subject which considered seven different definitions.

Participant feedback from this study also reflected this lack of clarity and was generally in the form of questions rather than answers. For example, should zero carbon be measured at the unit level, development or community level? Should the zero carbon definition allow offsite abatement? Should it include embodied energy? Should it allow for the connection of any fossil fuel energy?

Stakeholders across all three countries agreed that there needs to be a common language for zero carbon as the basis for any progressive discussion on what carbon reduction targets for the building sector could be.

Should we be aiming for zero carbon buildings?

The majority of stakeholders viewed zero carbon as a positive aspiration, although raised concern over the practical reality of achieving it.

The issue of cost effectiveness was raised a number of times — at what point do lower carbon buildings cease to be the most cost effective solution relative to other sectors and how should this influence a carbon reduction target for buildings?

Paul King, Chief Executive of the UK Green Building Council highlighted one major benefit experienced through the establishment of the 2016 target for zero carbon homes in the UK. 'The target for zero carbon homes has created a shift in mindset amongst housebuilders. They were previously considering how to make incremental changes to improve energy efficiency. Now they are rethinking their designs completely — it is driving innovation.'

A number of stakeholders questioned the respective roles of the building sector and the energy sector in achieving zero carbon buildings, and highlighted the importance of shared responsibility for any target. It was suggested that a target for buildings should be energy efficiency only, with building energy supply left to the energy sector. Any target for zero carbon which required both transformation in building energy efficiency and supply (as is the case in the UK) would then require building and energy sector stakeholders to work together in new ways.

> "The target for zero carbon homes has created a shift in mindset amongst housebuilders."

What are the barriers?

A wide range of barriers were mentioned, encapsulated by some as 'the challenge of implementation'. A number of stakeholders highlighted the need for a plan or pathway which details all of the challenges involved and actions required.

The UK Government has established a Zero Carbon Hub to share information and address the implementation challenges for the zero carbon homes target. The US Department of Energy has launched a Net-Zero Energy Commercial Building Initiative which aims to achieve marketable net-zero energy commercial buildings by 2025 and encompasses all activities that support this goal including industry partnerships, research, and tool development.

Australia is taking action now through the Council of Australian Government's National Energy Efficiency Strategy, to develop the skills and knowledge required for a transition to a low carbon economy. Should Australia wait for a target to be established before identifying and addressing other implementation barriers or can stakeholders accelerate work now to understand and resolve some of the practical challenges to lower carbon buildings?

Other specific barriers identified by stakeholders included the lack of a clear definition highlighted above, and lack of a measurement tool linked to that definition; the cost of technology; limited tenant awareness of how a building should be used for realisation of lower carbon opportunities; and lack of skilled experts in lower carbon buildings.

What should Government and other stakeholders do to help us in the direction of zero carbon buildings?

Stakeholder recommendations to Government covered a range of policy responses: regulation (a more stringent Building Code); fiscal incentives which reduce the payback period for lower carbon measures;

involvement of buildings in carbon or energy efficiency trading markets; and Government leadership by example. Two key messages stood out. Firstly, if you make the financial case work for lower carbon buildings, then the major property companies will respond. Second, Government investment in the building sector needs to be lower carbon to help drive higher standards in the market place.

The other major recommendation was for the finance sector. Innovative financing measures are needed to incentivise investment in lower carbon buildings. This might for example, include subsidisation of capital costs (in the form of energy performance contracting), green mortgages and preferential lending rates for lower carbon buildings.

> "Through a coordinated look at other incentives we could get to a much higher level of performance. Mandating zero carbon may be a blunt instrument."

A US stakeholder noted innovative financing proposals by internationally renowned architect, and founder of Architecture 2030, Ed Mazria. His proposed 14x Stimulus plan would use state and local stimulus money to create a local mortgage buy-down program that offers reduced mortgage interest rates contingent upon renovating or building to meet specific energy reduction targets — leveraging US$14 of private funding per US$1 of Government stimulus money.

Should zero carbon buildings be mandated?

Opinions diverged widely on this issue, particularly amongst Australian stakeholders. Some believed that zero carbon could not be achieved without legislation, and that a mandatory target, possibly ratcheted up over time, would create a firm basis for assessing the value of investment in lower carbon measures. Others felt that considerable progress could be made without such a mandate and that this should only be used 'as a last resort'.

Nick Edgerton, Research Analyst, Sustainable Alpha, AMP Capital for example suggested that 'through a coordinated look at other incentives we could get to a much higher level of performance. Mandating zero carbon may be a blunt instrument.' Stakeholders interviewed in the US were not in favour of a zero carbon mandate, considering it unrealistic for the time being.

But how many housebuilders in the UK would have considered zero carbon homes to be unrealistic prior to the announcement in 2006 — unaware that by 2009 the issue would have entered mainstream consciousness.

What role should low carbon buildings play in an international agreement?

Although there was unanimous agreement that buildings have an essential role to play in meeting carbon reduction targets, there was far less clarity over the role that buildings might play in an international agreement. Stakeholders advocated information sharing internationally, recognising the limitations caused by appropriateness of different building designs and techniques in different climatic zones. The idea of efforts towards an international target for zero or lower carbon buildings was not supported, with concern over 'carbon miles' involved in negotiating such a target and the possibility of any agreement equating to the 'lowest common denominator'. However, international dialogue towards a common language and measurement methodology for zero carbon buildings was supported by the majority.

So, although we do not know yet whether the right target for buildings will be zero carbon, or some other intermediate target, stakeholders believe it's a worthwhile aspiration — one that would require a range of policy responses and involve complex implementation challenges — and one that we should continue to discuss.

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Thanks go to Romilly Madew, Paul King and Nick Edgerton for their input to this article, and for all stakeholders that kindly participated in the study.