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RESKILLING TO UNLOCK VALUE

Building for net zero





Put simply, net zero means cutting greenhouse gas emissions to as close to zero as possible, with any remaining emissions re-absorbed from the atmosphere, by oceans and forests for instance¹.

United Nations

Summary

As one of the world's biggest economic ecosystems, the AEC (architecture, engineering and construction) sector has a role to play in achieving global sustainability goals. As the world targets reaching net zero by 2050, there are clearly implications for the sector. For the world to decarbonize at the scale required, the AEC industry has to evolve, changing how it operates and the materials it uses.

Record temperatures, raging wildfires, rising sea levels, melting ice sheets. Climate change poses challenges to infrastructure, with the potential for loss of homes, livelihoods and lives. Yet the Earth's population continues to grow. More people need housing, more often than not in cities. AEC professionals need to meet the demand for housing and infrastructure on a planet with already-stressed resources.

It is critical that the sector takes steps now to combat environmental risks and reverse the slide towards climate catastrophe. Whether through integrating technology or new design and construction methods, the industry is striving to become more efficient as it supports collective ambitions for net zero.

This report is for policymakers, educational institutions, employers and training organisations with a vested interest in the AEC sector's response to the climate emergency. It outlines some of the challenges and opportunities facing the sector, and looks at some of the skills solutions which have the potential to reduce impact on an already fragile ecosystem.

The challenge:

A sector striving for efficiency

The opportunity:

Deploying technology to unlock value

The solution:

Investing in skills to capitalise on digital

The challenge

A sector striving for efficiency



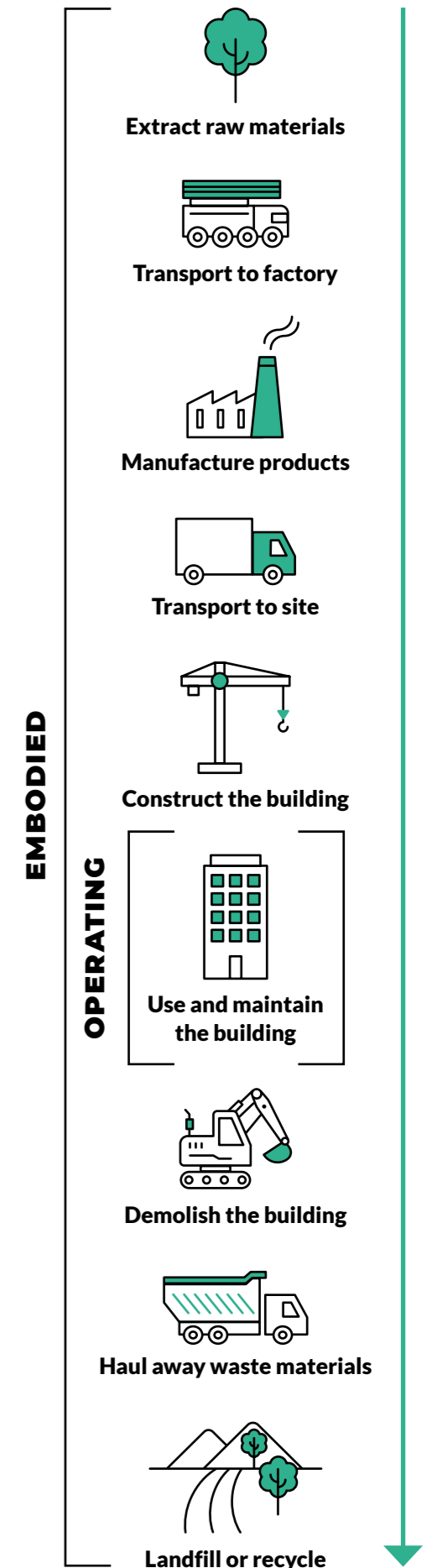
Construction is often viewed as inefficient – projects run over budget and take longer than expected. The sector also has significant impact on the environment. The buildings and buildings construction sectors combined are responsible for almost one-third of total global final energy consumption and nearly 15 per cent of direct CO₂ emissions².

As an example, in 2018, the African buildings sector accounted for 61 per cent of final energy use and 32 per cent of energy-related carbon dioxide (CO₂) emissions, excluding emissions from manufacturing building materials and products such as steel, cement and glass³. Growth in emissions has been driven by population growth and increase in wealth – these pressures will continue as Africa’s population is expected to grow by 63 per cent and could more than double its economic wealth by 2040⁴.

In broad terms, there are two ways the sector impacts the environment:

1. Operational impacts: those which result from operating a building
2. Embodied impacts: those which are emitted in the manufacturing, maintenance and eventual disposal of materials

Operational and embodied impacts of a building through its lifecycle⁵



Data suggests raw-material processing for buildings and infrastructure account for about 30 per cent of total construction greenhouse gas (GHG) emissions per year (largely cement and steel) and buildings operations, about 70 per cent⁶.

Clearly there's a need to reduce the environmental impact at every stage of the construction process (i.e. building, maintenance, demolition) and in the ongoing management and operation of buildings. Growing demand for environmentally-friendly and sustainable building materials is expected to propel the growth of the market.

Investments in renewable energy, energy-efficiency technologies and actions to mitigate against climate change are all likely to drive changes in the global workforce, the types of jobs required and the skills and knowledge needed.



Building construction projects contribute

40%
of the waste in landfills⁷



Today's buildings produce

1/3
of the world's greenhouse gas emissions⁸

Reaching net zero by 2050 will require the buildings and construction industry to decarbonize three times faster over the next 30 years versus the previous 30⁹

The opportunity

Deploying technology to unlock value



Going green makes economic sense.

According to analysis by McKinsey, growing demand for net zero offerings could generate more than \$1.2-1.8 trillion of annual sales by 2030 in the building “value pool” (comprising sustainable design, engineering, and construction advisory, green building materials, high-efficiency equipment and green building tech/operations)¹⁰.

Moreover, the UN highlights how compact, connected and coordinated cities are worth up to \$17 trillion in economic savings by 2050 and will stimulate economic growth by improving access to jobs and housing¹¹. On a micro level, reportedly the average reduction in operating costs in the first 12 months for new green buildings is 10.5 per cent and five-year operating costs savings is 16.9 per cent¹².

Digital technologies can unlock value across the construction value chain. Architects, engineering companies, contractors, and other parties throughout the AEC ecosystem are starting to realise the benefits of digital technologies. These technologies are proven to connect assets, people and processes – they help make everyone and everything work smarter. Put simply, downtime is reduced, materials usage and operations are optimised.

These technologies include building information management (BIM), digital supply networks, digital twins, prefabrication and modular construction and

asset tracking. In a recent Deloitte survey, 43 per cent of those asked suggested they plan to greater investments in new design processes, such as focusing on BIM, over the next year¹³.

BIM is being widely adopted by the construction industry for better planning, resource utilisation, collaboration, and cost control. In an increasing number of markets, it is being mandated for use on some, if not all, construction projects. In Australia, the reasons for adoption are defined as “to increase productivity and improved asset management in the built industry. Value for money, procurement transparency and emission reduction”¹⁴. BIM provides more visibility during the design phase of a construction project. Architects and engineers can use this to their advantage to boost the sustainable credentials of their designs.

How can the process of construction itself be more environmentally conscious and green? How does the AEC industry gear itself up to leverage BIM to further net zero ambitions?



Across the Kingdom of Saudi Arabia we see that many of the huge projects are using green building and sustainable architecture techniques. Similarly, project design is based on green building solutions.

The government and organisations across the Kingdom are implementing green solutions including sustainable construction materials, sustainable energy sources and the efficient use of space. Adoption of BIM as a tool in green construction is also increasing, and we can see significant opportunities for its adoption.

Basheer Mustafa, Engineering Science Institute (Esi), Saudi Arabia United Nations

Design is the most important factor in determining GHG emissions over a building's lifetime. By the time the construction process begins, the majority of decisions affecting the project's GHG emissions are locked in.

The ability to influence a building's lifetime emissions is highest very early in a project and before construction has started. Fundamental design decisions — such as new construction versus upgrading, building size and shape, level of insulation, and floor-space flexibility — can have a significant impact on emissions for decades to come⁶.



30 to 80% of building energy consumption can be reduced using proven and available technology¹⁵



Global green construction market

\$610.6bn
by 2027¹⁶



BIM market

\$5.4bn
in 2020 to
\$10.7bn
by 2026¹⁷

The solution

Investing in skills to capitalise on digital



As the AEC sector deploys more technology, it not only needs to create more digitally oriented roles, it needs to upskill to capitalise upon the environmental benefits these technologies can afford.

Companies are seeking data engineers, data scientists, coders, and developers. Companies are investing in employees to develop the skills needed to perform the job and gain knowledge of digital technologies such as BIM, digital twins, smart project management, and connected construction. The sector has woken up to the fact that workers need access to training that provides these in-demand skills.

Adoption of BIM is increasing. A BIM survey in 2020 revealed that in the previous 10 years, the use of BIM made a leap from 13 to 73 per cent in the United Kingdom's design and construction sectors¹⁸. However, in some markets – such as the UK – the lack of training is one of the main barriers to the adoption of BIM¹⁹.

This need for training is going to intensify as the AEC sector races to meet climate change challenges over the next 30 years (and beyond). A concerted effort is needed.

Organisations across the AEC ecosystem should be prioritising their talent and skills requirements as they embrace a sustainable future. Reskilling, upskilling and education curricula updates are key to equipping existing and new workers with the skills they need. BIM skills need to be integrated within academic programs, and viewed as a priority investment for players in the AEC ecosystem. Existing workers need access to training programmes, allowing them to develop the skills their employers need to achieve the efficiency gains associated with digital technologies.

Clearly investing in digital skills in the construction sector alone isn't going to get us to net zero. The construction ecosystem is highly fragmented, with so many factors and players. As part of a collaborative effort, investing in skills will get us some of the way.



The adoption of green building techniques in Jordan is still in its infancy. The reason for this is a lack of awareness and a shortage of skilled workers in green construction techniques.

Digital transformation has the potential to accelerate collaboration and innovation across the AEC sector, allowing companies to play a part in achieving a sustainable future. To realise this vision of sustainability, we need to showcase the benefits of digital tools and techniques, including BIM, and widen access to the skills needed.

**Mohannad Zahran, Public Relations Manager,
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Green construction often requires hundreds or even thousands of small adjustments to the building process to reach the goals of the finished structure. As a result, construction workers may need comprehensive training to become familiar with current techniques. Simply specifying the use of the new methods and not training the workers on them will only lead to low rates of adoption and a return to the familiar work processes. All the design improvements in the world can't make a structure green if the workers constructing it are failing to follow the specifications due to a lack of belief in its value²⁰.

It makes green sense

Digital technologies clearly have a major role to play if we're to get to net-zero by 2050. Digitally-enabled processes have been proven to drive efficiencies across the AEC ecosystem – helping to make better decisions in design, the choice of materials and in the operation of buildings.

The adoption of BIM is only going to grow, as more and more nations mandate its use, and more organisations realise its green benefits. Supporting the adoption of new working practices and investing time in developing BIM skills today, makes green sense.

Academia, industry and training providers can all play a part in reskilling and upskilling to realise net zero ambitions.

For further information about KnowledgePoint and our role as the Autodesk Learning Partner Distributor for the EMEAR territory, or to find out about training local to you, visit:

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