

ENERGY
TRANSITION

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Where are attitudes on climate change in Australian boardrooms right now? How receptive are major corporates to cutting their carbon footprints?

Climate change continues to increase in importance in Australian boardrooms and from all of our stakeholders. Our focus on climate change is multi-faceted. It includes transitional risk and decarbonisation of operational emissions (Scope 1 and 2), physical risk and adaptation as well as value chain emissions (Scope 3).

For BHP, climate change strategy is central to our portfolio strategy for three reasons- demonstrating accountability, meeting expectations, and protecting and creating value.

- Demonstrating accountability- recognising we have a role to play in addressing climate risk and we embrace our responsibility to act.
- Meeting expectations- rising expectations of our investors, employees, and other stakeholders, and our need to act to preserve our access to capital and ability to operate.
- Protecting and creating value- firstly, there is potential value to be created in displacing diesel and switching to efficient and renewable energy sources, and secondly, we believe BHP's commodities are well placed through strengthened demand in a low carbon future.

What areas of green energy technology do you see as having the most potential? For example, solar, wind, offshore wind, hydrogen, biofuels, mega-battery power stations?

Our decarbonisation strategy seeks to retain optionality with zero emissions technologies. We are studying a range of technologies and decarbonisation pathways, and our approach to decarbonisation investments is done at the portfolio level through a range of risk and return metrics seeking to optimise our path to net zero.

To date BHP, and the industry more broadly, have made significant progress in decarbonising our electricity supply sourcing energy from wind and solar. We see continued opportunities in adopting these technologies with an increasing need to utilise firming technologies based on hydropower and large-scale batteries. There is potential for niche utilisation of alternative storage technology and biofuels to support wind and solar generation.

A long run challenge is how to displace the significant diesel consumption used in material movement across the industry, with mobile equipment fleets being a core focus

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of innovation. BHP and the mining industry holistically are evaluating a balanced mix of transitional energy technology options with battery electric trucks, hydrogen and e-fuels. Energy storage, transport and fuelling/charging all offer potential for improvement.

The integration and management of variability within renewable energy supply chains, particularly with regard to electrification or hydrogen production will likely offer considerable opportunity for integration platforms to capture value. Transport, storage and recycling of batteries will also be an area to watch.

We do not yet see one technology option as having the most potential. However, we do recognise the diversity of different mining equipment load factors and use cases across BHP as well as the industry more broadly. In future, we may need to manage more than one fuel type in our operations to achieve zero emissions.

What are the particular challenges of cutting emissions in the mining and minerals sector?

From a power perspective, one of the challenges is for isolated / non grid connected assets. Extensive storage is needed in order to provide firm and renewable power while maintaining system security and reliability, which comes with high capital requirements.

Diesel is a key component of BHP's operational emissions and technology readiness for zero emissions material movement is one of the key challenges. We're working with OEMs through the International Council of Mining and Metals (ICMM) Innovation for Cleaner Safer Vehicles Initiative (ICSV) to accelerate tech implementation, recognising this needs a holistic mining industry approach. It is absolutely essential that we work together as an industry comprised of both operators and Original Equipment Manufacturers (OEMs) in order to develop a solution that is standardised and accepted across the industry.

Furthermore, we have just launched the Charge On Innovation Challenge (www.chargeoninnovation.com) in collaboration with Rio Tinto, and Vale and facilitated by Austmine to find ways of charging battery electric trucks safely and without loss of productivity. We are inviting other mining companies to join using this challenge and it is a terrific example of collaboration to solve an industry wide problem. To do this we are also reaching out to non-mining sector vendors to encourage diversity of problem solving.

This is not just a technology challenge- embedding decarbonisation is about people, processes, systems and change management. Energy is the source of 85% of our emissions and as we change the energy source and the way we use that energy, it brings about change for our operations, which is one of the key challenges- and opportunities. Preparing our organisation for these impending changes to our ways of working is perhaps as big of a challenge as preparing the technology for the mining and heavy industry environment.

How do you see the commodities and mining sectors moving towards cutting carbon emissions in the next five years?

We expect investments over the next 5 years will be primarily directed to renewable energy (both power purchase agreements inducing renewable capacity in the market and behind the meter builds). Reliable, firm and low cost renewable energy is a key enabler to decarbonisation pathways and a technology ready, low operational risk solution, so this is a priority for the mining sector. In addition, we expect to see a focus on R&D and industry collaboration on trial technologies, with increasing capital spend from the mid-2020s.

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How practical is it to move to 100% renewable energy in electricity markets in the next 10 to 15 years? Do the economics stack up?

It's practical to expect decarbonisation of the vast majority of electricity markets in the next 10-15 years. In some locations, 100% renewable energy may not be feasible, particularly where the electricity market is driven by lower carbon intensity and efficient gas power plants or in non-grid connected environments. Getting to 100% renewable energy is significantly more challenging than getting to 80-90% just as absolute zero emissions is significantly harder than net zero emissions. For this reason, a portfolio perspective and balance of structural abatement coupled with strategic, multi-benefit carbon offsets presents a more feasible approach to decarbonisation.

The economics do stack up in many regions, demonstrated by BHP's recent execution of renewable energy power purchase agreements to varying extents in Chile, Queensland and at our Nickel West assets. Economics are expected to continue to improve as technology develops, new supply is induced and competition in the market evolves.

We are committed to using our legal and sector expertise, networks and corporate responsibility initiatives to enable sustainable practices across all of our operations and the industries that we service, and to drive meaningful and lasting change. Please visit our dedicated sustainability hub;

www.hfw.com/Sustainability-hub.