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bp response to the National Hydrogen Strategy Review

We welcome a strategic review that articulates the coordinated policy required across all levels of government to deliver an ambitious hydrogen vision for Australia. Our contribution to the Department of Climate Change Energy Environment and Water (DCCEEW) National Hydrogen Strategy Review (the Review) draws on our experience in developing three major renewable hydrogen projects in Australia, as well as our global development experience. Australia is at the cusp of a profound opportunity to seed the next major energy industry that will underpin a low carbon economy. For the many decarbonisation challenges where electrification is not going to work, hydrogen and its derivatives will play an important role. bp's analysis shows that hydrogen could have up to 5-10% share in global primary energy consumption by 2050.[1]

In many respects developing large scale hydrogen projects is like the development of the LNG sector, which has proven crucial to our own domestic and international energy security. Hydrogen and LNG likewise share similarities in their complexity, multi-billion-dollar investments, reliance on long-term international offtake to underpin investment, and requires close collaboration between industry and government to realise the opportunity. The opportunity for hydrogen is both to produce and export renewable energy at globally competitive costs, and to transform Australia into an advantaged manufacturing location that leverages this competitive renewable energy with its abundance natural minerals and resources, skilled workforce, and R&D capabilities. In helping transform Australia into a renewable energy superpower, the hydrogen sector can deliver abundant cheap renewable energy, decarbonise existing industries, and help grow new industries.

Hydrogen will be needed to decarbonise the industrial processes that create the critical products we use domestically and that we export. It will be needed for industrial processes, to decarbonise our transport fleet, to firm Australia's grids, and for many countries that do not have access to abundant renewable energy, to power homes and businesses. However, there is a risk that this potential to shape our energy future will stay just that, potential. Australia is not alone in its ambition and there are several countries that boast similar strengths and moving with greater urgency. Without a carbon price and support to enable timely and affordable power, hydrogen will remain a loss-making business. With the right policy settings, further technology learning curves, economies of scale and securing long-term export offtake contracts, we believe projects that can scale from mega-watt to giga-watt capacity have a commercial

[1] bp Energy Outlook, 2023 edition, p.71 bp-energy-outlook-2023.pdf.

future. It is time for Australia to focus on enduring policy settings that go beyond capital grants and that are driven by market-based and efficient policies. While initial grants have been helpful, ultimately support is spread too thin, and do not address the underlying challenges of decarbonising hard-to-abate sectors.

We recommend the following to establish a globally competitive hydrogen sector:

1. Build on the critically important Hydrogen Headstart Program by delivering future hydrogen production credit / contract for difference rounds to close the gap between low-emission hydrogen production costs and customer's ability to pay.
2. Accelerating hydrogen use through well designed demand targets.
3. Deliver clear signals of Australia's commitment to hydrogen exports, such as by strengthening bilateral government-to-government agreements and developing frameworks to "link" respective policies that support hydrogen projects.
4. Further investment and planning for shared infrastructure, especially transmission assets and ports.
5. Implement policy reform to recognise the value of flexible electrolyser operation in power markets.
6. Maintain a focus of enabling hydrogen developments through hubs. Further policies should be aware of the most competitive use-cases, but not be so narrow that it focuses on a single application.
7. Establish a federally coordinated working group to align on how the hydrogen sector will develop to the benefit of all Australians, including analysing existing supply chain capability and capacity and to make recommendations for growth that best reflects Australia's strengths.
8. Appoint an Assistant Minister to champion and coordinate the many reforms required across government departments, including efforts to align and streamline State and Federal regulations and approvals.
9. Given the inseparable link between renewable hydrogen and affordable renewable generation and transmission, we think that hydrogen should be a key component of a broader national energy strategy and would welcome a deeper Energy White Paper.
10. With the release of the new Hydrogen Strategy, clearly communicate a score card on existing actions and objectives. Consistency is important for investment certainty and a clear understanding of the rationale for strategic change is welcome.

Meeting strategic objectives and reducing barriers

As outlined in the Consultation Paper, the Energy and Climate Change Ministerial Council (ECMC) agreed to a Review of the National Hydrogen Strategy to ensure Australia is on a path to be a global hydrogen leader by 2030 on both an export basis and for the decarbonisation of Australian industries.

bp agrees with the three strategic objectives outlined in the Consultation Paper:

- Australia is on the path to be a global hydrogen leader by 2030.
- Enable domestic decarbonisation through the development of the hydrogen industry.
- Ensure economic benefit for all Australians through the development of the hydrogen industry.

We also encourage further strategic considerations as part of this Review:

- Explicitly examine export as part of Australia's hydrogen industry leadership and include as a strategic objective.
- Recognise hydrogen's role in supporting energy security. Russia's invasion of Ukraine led to a lived experience of energy insecurity and facilitated greater European investment in hydrogen. Hydrogen can meet energy security objectives by providing a local production source for low-carbon fuels. This could be as a direct fuel for heavy transport, as a necessary feedstock for drop-in renewable fuels such as sustainable aviation fuel and renewable diesel, or as a requirement for e-Fuels. Hydrogen also plays a key role in transitioning Australia to an exporter of low carbon products and continuing its leadership role as a secure and reliable energy and resource trading partner.
- Recognise economic and supply chain diversification as part of economic benefits for the country. The development of a low-carbon hydrogen sector can enable the decarbonisation of existing industries and help create new industries, including green steel, critical minerals processing and green aluminium. These industries will support Australian economic growth with new, low carbon revenue replacing existing fossil fuel revenues, as well as support employment in new, low carbon jobs. It also provides the opportunity for greater Australian company participation through these value chains.
- Ensure Australia remains an attractive destination for new foreign direct investment. Significant investment will be required to meet the world's hydrogen ambitions, but we must be competitive to attract this investment ahead of other markets.

While the 2019 Hydrogen Strategy helped put Australia on the map and attracted a great deal of development activity, progress has not reflected the sense of urgency seen elsewhere. The dramatic signal of the Inflation Reduction Act was a reminder that hydrogen is a globally competitive opportunity. Other countries have similarly attractive incentives in place or responded with their own policies that stretch across the value chain.[2] As seen in the EU example below, it is important to tailor mechanisms across the value chain to facilitate hydrogen's growth.[3]

- Hydrogen Import – H2 Global, European Hydrogen Bank
- Renewable Energy – national grid connection subsidy (e.g., EEG in Germany)
- Hydrogen production – H2 Global, IPCEI
- Hydrogen storage and transport – IPCEI, CEF, H2 tariff discounts
- H2 demand side support – IPCEI; RED 1; CCfD, H2Global

There is a window of opportunity for Australia to be a global leader in hydrogen and realise the strategic benefits it brings. The size of the prize is substantial - if bp's current projects in Australia were realised, this alone would deliver tens-of-billions in investment. Several national and global studies have estimated the investment required to meet hydrogen ambitions, with a recent report by Arup estimating that from now to 2040, at least $A340-420 bn ($A19-23 bn a year) of investment in Australia will be required to support the hydrogen ambition envisioned.[4] This will create 170,000-200,000 construction jobs to deliver the required infrastructure and a skilled workforce required to operate and maintain facilities.

[2] These are not the only nations establishing significant support, with announcements from all parts of the globe including India, Canada and throughout the Middle East
[3] List is not exhaustive.
[4] Commissioned by National Energy Resources Australia, Power Up: Seizing Australia's Hydrogen Opportunity by 2040, p. 55.

Ultimately investors require certainty on returns, and customers require clear signals that Australia is invested in a hydrogen future. These signals can be delivered through a clear strategy aligned across Federal and State Governments which introduce tangible policies to reduce costs across the value chain. This is important because of the unique ways the hydrogen market is developing.

There are several industrial and transport applications that would benefit from hydrogen as they decarbonize. However, in many cases, Australian organizations are unlikely to adopt these decarbonization solutions before 2030 without demand side initiatives. Contrastingly, there is earlier demand for green hydrogen in export markets, with Japan and South Korea wanting 20-year offtake agreements in the next few years. Just as we saw with the development of the LNG sector, projects that can secure these offtake agreements are able to scale and become competitively advantaged for future decades. If Australia delays on its policy response and these 20-year contracts are awarded to international projects, it will be much harder to develop domestic hydrogen supply at scale post-2030.

The lag in investment timing, when projects start producing, and when projects breakeven is also a material issue. Projects at the 50-100MW size requires 100s of millions of dollars of investment – for GW scale projects, the investment is in the billions. The amount of investment required at earlier phase gates (pre-FID) is likewise more substantial, for reasons such as securing larger volumes of long lead items in constrained supply chains. Once operational, projects are expected to be loss-making for up to the first decade of production until scale and demand increases and cost curves come down. Hence, it is not possible to finance projects without early visibility to consistent policy frameworks and initial government funding.

Future hydrogen production credit / contract for difference support

bp welcomed the Federal Government's A$2 billion Hydrogen Headstart Program as a critical initiative to facilitate 2-3 early-mover projects that will produce hydrogen from 2026. While the early mover projects will meet short-term demand and give the industry a much-needed start, further investment is required to meet 2030 domestic and export demand. The Australian Industry Energy Transition Initiative, for example, estimates that by 2030 Australia will require 140t tpd of hydrogen, while the opportunity for hydrogen and hydrogen derivative export is immense.[5]

For the sector to grow to gigawatt scale projects this decade, further support beyond the initial round will be required. It is important that Australia's Hydrogen Strategy is developed to ensure projects that need to take final investment decisions (FID) in 2024-28 have the certainty required to make the projects investable. We encourage rolling contract for difference rounds to facilitate investment decisions in consecutive years from 2025. This is not dissimilar to contract for difference schemes for power markets – new rounds are released to meet demand, growing decarbonisation ambitions and other industrial policies.

Well-designed demand targets

bp supports well designed hydrogen demand targets that can effectively and efficiently deliver emission reduction and industry development goals. Australia has a lived experience with the success of the Renewable Energy Target – a decarbonisation objective focused on the electricity sector.

bp supports policy covering as broad a range of demand sectors as possible so a market can develop efficiently. Narrowing hydrogen end-use cases risks inefficiencies, higher costs, and unintended consequences. A scheme that covers a broad range of end use cases will lead to a lower overall cost

[5] Japan for example has set a target of 3mtpa of hydrogen in 2030, Republic of Korea 3.9mtpa in 2030.

while delivering similar or better industry development outcomes. It is possible to design a scheme that covers industrial sectors without being so specific to cover a single use case such as ammonia.

If designed well and in close consultation with industry, a hydrogen demand target would provide a consistent, efficient approach, and would support hydrogen demand stimulation, accelerating the growth of the industry. This could, in turn, encourage increased investment in technology such as electrolyser manufacturing in Australia. We encourage the ECMC to consider this and how a national scheme would interface with proposed state schemes.

Clear signals of Australia's support for hydrogen exports

bp supports a continued focus on exports, both as hydrogen and its derivatives directly, and as products that require hydrogen such as renewable fuels, critical minerals, green steel, and aluminum. bp believes that hydrogen projects with potential to service both domestic and export markets will be the most competitively advantaged. Indeed, the scale achieved through export-scale projects will help reduce the unit cost of hydrogen, making domestic supply and processing opportunities more competitive. Australia has entered into several bilateral agreements[6] with key trading partners focused on hydrogen or where hydrogen is a component of broader emission reduction objectives.

Since the strategy's 2019 release, high level import targets from Australia's key trading markets have progressed to tangible initiatives. This includes production-based mechanisms, demand side developments, and mid-stream infrastructure investment. For example, Japan continues the design of its Contract for Difference (CfD) scheme, while RoK will launch a power market bidding process to provide power from low-carbon hydrogen or ammonia from 2027. While further from our shores, Europe continues to press for hydrogen and derivative supply from markets outside of Europe to meet its anticipated demand and establish supply diversification. A deeper focus on export opportunities for Australia is therefore warranted.

We encourage the Australian Government to maintain the same momentum as our key trading partners. Policies implemented in Japan, RoK and Europe will benefit producers in other countries, and these governments are looking to Australia to see how projects will be supported here. Entire value chains will need to develop, so there's potential for 'country x' to support one initiative, to be matched by different support by 'country y'. In practice, this could include a commitment from one country to help underwrite the difference in production cost and ability to pay, and the other to deliver midstream infrastructure. We appreciate that agreements can take time to execute, but several of the bilateral agreements Australia has entered have been slow to commence. We encourage further work and resourcing on these, taking learnings from those that have developed at greater pace.

Further investment in and enabling of shared infrastructure, especially transmission assets and ports.

bp believes strong coordination and commitment from all levels of governments is required to plan, develop and deliver shared infrastructure. Transmission, water, ports, road and rail infrastructure are all required for a thriving and sustainable hydrogen supply chain. To get to where Australia needs to be, a coordinated approach is needed. While this is true of all measures, shared infrastructure is amongst the most important given the cross-over in Federal, State and local responsibilities, approval processes, and budget decisions. Without coordination, we will repeat the same scenario during the gas and mining booms of WA and QLD where each proponent will work to deliver their own solution against internal

[6] Including Australian Clean Hydrogen Trade Program (ACHTP) under Japan-Australia Partnership on Decarbonisation through Technology as well as Australia-Korea 'Low and Zero Emissions Technology Partnership.

timelines. With the scale and urgency of the decarbonisation challenge, it is increasingly unfeasible for each proponent to build, own, and operate infrastructure in an unplanned way across regions.

Governments will need to work together to align their various infrastructure funding mechanisms to better identify gaps, support growth and prioritise regional economic infrastructure for the hydrogen sector. At the federal level alone, this includes Rewiring the Nation, Powering the Regions, the Infrastructure Investment Program, the Northern Australian Infrastructure Facility and various community infrastructure funds. The National Hydrogen Infrastructure Assessment was informative, but it was too focused on infrastructure needs for the production part of the supply chain, overlooking some of the infrastructure capacity needed for the building and development of hydrogen and renewable projects (i.e., transporting equipment, construction materials) and use of roads and rail. Its modelling on infrastructure adequacy and access will need to factor in the growth and future contestability of other industries and community needs. This will give governments a full picture of where and why government intervention is most needed in funding common use infrastructure and open access arrangements.

Transmission

Delivering affordable renewable generation and transmission remains a challenge. Power is a critical component in the production of hydrogen, and as a result power and hydrogen policies are intrinsically linked and need to be jointly considered. Australia's abundant solar and wind amenity is not enough to deliver globally competitive power prices. Investment in cost-effective transmission is critical to the development of a competitive hydrogen industry. A lack of sufficient transmission capacity being built out within this decade will result in hydrogen projects being delayed or deferred. bp supports the endeavors of Rewiring the Nation to upgrade and expand Australia's energy grids and which is designed to put downward pressure on prices for all electricity users. As it is challenging to align many different customers simultaneously, there is a clear role for Government to coordinate transmission investment. Planning and approvals required to deliver this transmission and the associated renewable energy will also be critical.

We also encourage regulators to establish tariff mechanisms that recognise the greater scale of transmission requirements so that infrastructure operators do not achieve 'super-profits', but rather incentivise building to the capacity required to achieve future decarbonisation targets. While renewable generation and transmission has high capital outlay, it has a long operating life and relatively low operating cost compared with traditional fuel sources. If appropriate debt, taxation and depreciation mechanisms are applied then the delivered cost of power might be lowered for all consumers.

Ports

Port development is another area of common user infrastructure development vital for the hydrogen sector to grow. Access to existing ports is a competitive advantage for proponents, but it is also important to develop and plan for new ports and port upgrades. Port development is necessary both for the export of hydrogen and derivatives, as well as for importing equipment required for construction and laydown areas. The inability to efficiently import equipment is pushing up the price of construction and will impact the cost, timeliness, and competitiveness of projects. The ambition for greater domestic manufacturing capability will also require port upgrades to access export markets. Federal and State governments have demonstrated a willingness to invest, including respective $129.1m and $565m into common user upgrades at Lumsden Point. In strategically assessing the needs for ports across Australia, bp welcomes working with other industry proponents and communities in establishing the case for greater investment in the Oakajee and Geraldton ports.

Beyond further investment, improvements can be made to reduce costs and improve efficiencies at ports. For example, it is important to establish strategic First Point of Energy Status for ports. This has a

substantial impact on project costs and prospective benefits in local communities. This process can take upward of several years to implement, and we would welcome consideration of whether the existing process is fit for purpose and if there are opportunities to improve the timeline.

Recognise value of flexible electrolyser operation

We see a role for Australian electrolysers in demand response, reserve capacity and reducing renewable curtailment in the grid. bp has completed work demonstrating its grid connected H2 Kwinana project delivers overall system benefits to the South West Interconnected System (SWIS). H2 Kwinana will underwrite new renewable capacity in the grid and flexibly operating the electrolyser will deliver further network benefits. In times of high demand, electrolysers can be rapidly turned down to reduce peak demand. As well as helping firm the grid, this mitigates the need for more expensive gas or diesel and the incremental renewable energy that the electrolyser would have used is available to other users. In periods of low demand during the middle of the day, the electrolyser can ramp-up to reduce solar curtailment and remove the need for more expensive options to maintain grid balance.

It is important for power markets to be equipped to recognise this value because it will help underpin investment decisions. Some of this value can be recognised in existing market structures, but others require additional reform.

Maintain focus on hubs, with sectoral focus broader than a single use case or application

bp is supportive of hub models and don't think there are fundamental reasons to change course. In practice, Australia's large emitters that are expected to need clean hydrogen tend to be clustered, and so new sectoral initiatives are likely to assist hubs in some way. Policies will require some differentiation when considering sectoral demand and we encourage the government to focus on hydrogen use in industry, transport, as process feedstock, and in renewables firming. This can be done without being too specific to a use case – for example, a hydrogen target can be implemented to cover several use cases rather than being tailored just to ammonia.

Vector Choices

One key consideration for the Australian hydrogen industry is how large-scale projects will best move green energy to customers overseas. While some export customers are requesting ammonia, it is by no means the only way of transporting hydrogen and many customers seek hydrogen in other forms.

We recommend the strategy does not focus on a single hydrogen vector technology but adopts a derivative/technology agnostic approach. It is important to encourage Australian hydrogen producers to adopt a flexible approach and develop projects that enable hydrogen supply in various forms as required by the market. This ensures supply is not limited to only particular customers or applications and that Australian projects participate in the innovation and technology development that will almost certainly take place in hydrogen transportation and storage.

In considering options to enable export vectors, including port master planning and implementation of port infrastructure assessments, other vectors such as liquid organic hydrogen carriers (LOHC) and liquid hydrogen should be included.

Hydrogen Mobility

Hydrogen also has the potential to play a material role in decarbonising on-road trucking in Australia. The majority of Australia's freight task (tonne kilometers) is linehaul using prime movers with 60+ tonne gross combination mass (GCM). First generation battery electric and fuel cell electric trucks are

unsuitable for this very heavy segment making Australian road freight's pathway to net zero more challenging than markets like Europe where the largest trucks are significantly smaller at ~42 tonne GCM. It is therefore critical that Government and industry work together to develop a clear decarbonisation roadmap for on road heavy transport to provide the industry with investment confidence for this hard to abate sector. Australia is lagging other markets in seeding a hydrogen for transport industry. Vehicle availability is limited as demonstration quantities are being directed to EU due to mandated minimum production, supply targets and fuel efficiency standards.

There are strict Australian Design Rules that further limit availability of zero emission trucks. In addition, there are limited incentives for transport operators and freight customers to participate in hydrogen vehicle trials unless it is supported by government. We understand that updating the Australian Design Rules (specifically steer axle weights and vehicle widths) will form part of the regulatory reform process outlined by DCCEEW and support this measure. There are several regulatory opportunities that can support more supply of low emissions and zero emissions trucks, local supply and refueling infrastructure. bp has previously recommended:

- A nationally consistent approach across jurisdictions is needed to create truly efficient hydrogen highways for long heavy haul transportation.
- Ambitious targets and incentives to support long term adoption (more than 10 years) will help drive down technology costs and contribute to decarbonization – aim for scalability not pilots.
- For hydrogen specific programs, focus on the establishment of refueling infrastructure and take a technology-agnostic approach in supporting hydrogen vehicles (fuel cell and hydrogen internal combustion). Relative to first generation fuel cell electric trucks, hydrogen internal combustion engines are better suited to Australia's very heavy freight task (improved range and payload), are typically cheaper, and are compliant with Australian Design Rules.
- Setting targets for OEMs to increase supply.
- Investment support for the construction of liquefaction facilities – liquid supply chains are essential to scale hydrogen for transport.

Delivering for all Australians

A local hydrogen sector should deliver outcomes that benefits all Australians, and this can be measured in several ways. We recommend establishing a government, industry and community working group to analyse the opportunity within the context of the Federal Government's policy suite. This is important because while hydrogen will have unique considerations, outcomes should be aligned with broader government expectations and requirements.

A strong, market-led commercial hydrogen industry will add further benefit to the Australian economy in the same way that our resources and energy sector does today. As a nascent sector it will not be commercial in early years, and we are in a period where deep partnership with government to build the sector is required. However, once projects are established, costs decline, decarbonisation efforts increase, and the market grows, financial benefits will flow. Most hydrogen proponents and prospective users contribute to the Australian economy today. In 2021/22, the energy and resources sector provided almost $100 billion in direct economic benefit, including $28.9 billion in payments to the Commonwealth Government[7]. All Australians stand to benefit from these payments and will continue to do so into the future. To help ensure that revenues flow to government as projects become commercial, demonstration of market maturity can be built into support mechanisms. For example, this is the case being taken by the Hydrogen Headstart Program.

[7] Chamber of Minerals and Energy WA, Economic Contribution Fact Sheet 2021/22.

Growing supply chain capability and capacity

bp welcomes an opportunity to work with government and other industry proponents to collectively assess the local supply chain and collaborate on initiatives that can grow capability and capacity. First-of-a-kind projects are limited in their ability to source major equipment locally because local supply chains are undeveloped. Building new supply chains to meet the strategic opportunities of hydrogen cannot be achieved by a single proponent alone and it will require a collective effort across industry and government.

Australia is home to promising technology and manufacturing electrolyser capability and this should continue to be supported. In addition to pursuing commercial relationships, bp is also supporting R&D and commercilisation outcomes through university and Cooperative Research Centre partnerships.[8] Electrolysers are a significant component of hydrogen production project spend, and so we understand the drive to assess what can be delivered locally. Having access to competitively priced and reliable supply chains would also be beneficial to proponents. Globally, electrolyser technologies and vendors are very early in their journey of scaling up – a challenging task for companies ranging from start-ups through to established conglomerates. The challenge becomes greater in jurisdictions like Australia where capability and capacity are at an earlier stage. A challenge facing proponents is balancing the timing of manufacturing and technology readiness and the need to make short-term procurement decisions to meet financial investment decisions and start-up timeframes. The supply chain is not fully developed in Australia and therefore accessing existing supply chains is critical for keeping project timeframes on track.

Attracting established electrolyser manufacturers to Australia is also an option, potentially in partnership with local manufacturers. However, electrolyser manufacturers typically look for significant commitment (10+ years) to locate production in Australia and want to supply multiple projects to underwrite their business case. This is also a competitive area with other countries typically offering attractive support to attract new manufacturing capacity.

There are other components in an electrolyser beyond the electrolyser stack, such as compressors, water coolers, membranes, purification systems, separation vessels, transformers, and instrumentation. These are likewise specialized products and additional investment in required plant and kit might be difficult to justify by an Australian manufacturer if there is not a visible pathway to export markets or adjacent domestic markets.

A skilled workforce is needed to build Australia's participation in the supply chain and build and operate hydrogen projects. bp agrees with the Consultation Paper that "Australia's development of a hydrogen-ready workforce is critical" and looks forward to the finalization of workforce policies and initiatives to build Australia's future energy workforce.

Community benefits and support

Critical to hydrogen's future is community acceptance and benefits. Building and maintaining community support across the hydrogen value chain should be a priority for industry and government alike. To-date, community support for bp projects has been positive. While different communities will have difference perspectives (and indeed, there will be diversity within a community), we have found that our local communities are very interested in economic diversification and social benefits that the sector can bring. Water use and management is a common topic raised by communities. For H2Kwinana, bp expects its

[8] We are a member of the Future Energy Exports CRC and core participant in the Scaling Green Hydrogen CRC bid.

primary source of water to be the Kwinana Reclamation Plant. This is a wastewater treatment plant located close to the project site, which sources its water from the Woodman Point Wastewater Treatment Plant. It includes microfiltration and reverse osmosis to treat the water to a quality suitable for site use. For bp's other projects, bp is actively working with stakeholders to explore desalination options that would provide for multiple users. This could be a positive outcome for water scarce areas and support efficient multi-user investment.

bp is guided by First Nations communities in response to how they benefit and can be empowered by the development of the hydrogen industry, and we operate under the principles of free, prior, and informed consent. The answer here is diverse, and we think different perspectives should be considered. bp has a commitment to adequately resource Traditional Owners in our areas of operation so Prescribed Body Corporates (PBC) and its Board are provided the information required to negotiate at arm's-length and freely enter negotiations. It may be useful to consider how specific funding for First Nations people can be directed to improving capability to reach free, prior, informed consent with proponents. We encourage the Government to consider how funding to PBCs are managed so they can effectively discharge their obligations as PBCs on behalf of the Traditional Owners they represent. The hydrogen and renewables sector are one example of several sectors that PBCs will need to work with, and we encourage a solution that can be found across different sectors. This question on how First Nations communities would like to receive information on renewable energy and hydrogen is best answered by the First Nations and local communities themselves. To use an example from one of bp's projects, communications relating to the Australian Renewable Energy Hub have been developed in consultation with the Nyangumarta people and designed in a way that is culturally appropriate and respectful.

Assistant Minister to coordinate across federal agencies and states

As the new Hydrogen Strategy is shaped and actions agreed, it would be beneficial to task an Assistant Minister with coordinating outcomes across different government agencies. While it will be important for the Minister for Climate Change and Energy to maintain ultimate responsibility and to progress actions through the ECMC, an Assistant Minister can lead the reform measures that cut across several portfolios including infrastructure, transport, environment, trade, foreign affairs, and industry. In addition to other recommendations made in this submission, an effective way that government can help grow the hydrogen industry and reduce barriers is by streamlining approvals processes to make them faster and simpler to navigate for renewable energy, transmission, pipelines, hydrogen production and associated value-adding processing projects. We support reforms to streamline and simplify approval processes and regulation to address the growing regulatory burden and facilitate timely project development while still appropriately managing risk. The importance of this is only set to grow as more projects take shape across different sectors to capture new opportunities and meet 2030 emission reduction targets. If appropriately resourced and urgently executed, this measure does provide investors and customers with a positive signal.

Conclusion

Australia is at the cusp of a profound opportunity to seed the next major energy industry that will underpin a low carbon economy. In the same way that government support worked in tandem with industry investment in establishing our current resource and energy sectors, such is required for hydrogen. Australia's first LNG facility was established because of symbiotic relationship between domestic demand and export. The Western Australian State Government's investment in the Dampier-to-Bunbury Pipeline connected remote gas fields to large sources of demand in the State's South West. This helped underpin both the investment to supply gas locally and for export, and delivered cheaper gas

domestically than otherwise would have been possible. The same bold decisions for transmission are required now.

Long-term supply contracts with key trading partners will be awarded in the next two years, but there is significant competition to secure these from each continent. Australian success will not be secured unless this Review articulates a tangible path with material policies. The 2024-28 period is particularly critical. This is a period where projects must take FID to deliver domestic supply from as early as 2026 and export from 2028, but which will not see a commercial return for 5-10 years.

Our recommendations point to the key issues, including critical infrastructure, demand stimulation, and further contract for difference support. We have also proposed ideas on developing local capabilities to help ensure benefits are delivered across Australia. While some parts of hydrogen development require specific attention, it is important not to implement narrow policies and to maintain a technology agnostic approach where possible. For example, ammonia is one of several industrial customers for hydrogen and an industrial target can be implemented to cover more than one use.

Bp looks forward to continuing the work with government to realise hydrogen's opportunity and welcomes further discussion on the content of this submission.

Appendix

About bp

bp's purpose is to reimagine energy for people and our planet. Our ambition is to become a net zero company by 2050 or sooner and to help the world get there too.

Globally, by 2050, bp aims to be net zero across our entire operations (scope 1 & 2), and with the carbon from our oil and gas production (scope 3) and in the energy products we sell (life-cycle emissions intensity). For each of these, we have set short-term (2025) and medium-term targets (2030). Progress on our net zero plans is outlined in our Net zero ambition report.

Globally, we're aiming to be a different company by 2030. We've always said that the energy transition needs to be orderly. Since 2019, our capital investment in our transition growth engines has increased from 3% to 30%. We are:

- Reducing our oil and gas production by 25-30% (from 2019 levels) by 2030 and lowering emissions while high grading our hydrocarbon portfolio and growing bioenergy.
- Investing in low-carbon energy to rapidly scale up in solar, onshore, and offshore wind and develop new opportunities in carbon capture and clean hydrogen.
- Installing 100,000 EV charging points and opening more than 1,000 new strategic convenience sites worldwide.
- Progressing five transition growth businesses: bioenergy, convenience, EV charging, renewable power, and hydrogen by 2025. bp's investment in its transition growth engines is expected to reach $7-9 billion a year in 2030 - with cumulative investment over 2023-2030 around $55-65 billion.

In Australia, bp is developing projects consistent with this global strategy:

- We are the operator of the Australian Renewable Energy Hub (AREH) joint venture in the Pilbara (with InterContinental Energy, CWP Global and Macquarie Capital and Macquarie's Green Investment Group). AREH is planned to provide green electrons and green hydrogen to help decarbonise local customers in the Pilbara and to provide hydrogen for export, with the free, prior, and informed consent (FPIC) of the site's traditional owners, the Nyangumarta people.
- bp's Kwinana refinery site is being transformed into a clean energy hub. This is currently in front-end engineering design for the Kwinana Renewable Fuels (KRF) project. The hub includes the planned production of green hydrogen known as H2Kwinana, with KRF as an anchor offtake.
- GERI, a bp-owned, multi-gigawatt scale development low-carbon hydrogen and renewables project, is being planned at Oakajee in Western Australia (WA)'s Mid-West
- bp owns 50% of Lightsource-bp, an independently operated global business with a significant renewable generation portfolio in Australia.
- We have substantial gas interests in WA as part of the Northwest Shelf Joint Venture, and bp is the largest joint venture partner of the Browse gas project, incorporating Carbon Capture and Storage, which is operated by Woodside.
- bp is also working with Woodside (Operator) to develop a Carbon Capture and Storage (CCS) hub, Angel, off the coast of WA.
- Since November last year, the bp pulse brand in Australia has been growing rapidly, rolling out electric vehicle charge points.

- We're exploring options with partners to decarbonise heavy transport, including hydrogen refueling.

bp is going big in Australia, with three major hydrogen projects that will deliver low-carbon hydrogen locally and for export.

Australian Renewable Energy Hub

AREH is a joint venture that has the potential to be one of the world's largest renewable energy hubs, with plans to use solar and wind resources to produce green hydrogen. The project intends to supply renewable power to local customers in the world's largest mining region, produce green hydrogen for the domestic Australian market, and export to major international users – helping countries such as South Korea and Japan to decarbonise. AREH will be a phased development and deliver 26GW of combined solar and wind power generation at full scale.

AREH has an opportunity to help power the Pilbara with renewable electrons and green hydrogen, with the first tranche of those green electrons from 2027. Once complete, AREH is expected to abate around 17 million tonnes of carbon in domestic and export markets annually, equating to roughly 0.5 gigatonnes (Gt) of carbon savings over the project's lifetime.

GERI

GERI is a 10 to 14-gigawatt scale development in the Mid-West of Western Australia that we see supplying renewable hydrogen and power to help decarbonise existing industry and supply chains and potentially deliver a range of new low-carbon opportunities. We've been granted an option to lease land in the Oakajee Strategic Industrial Area (SIA) by the Western Australia State Government. bp has also purchased and is leasing property in the Mid-West, on which we plan to begin wind and solar generation. The Mid West's abundant wind and sun means the site could serve as a powerhouse of hydrogen production for both domestic and export supply – creating jobs and attracting international investment.

H2Kwinana

H2Kwinana is advantaged as an early mover in competitive hydrogen production for several reasons. It will repurpose existing refinery infrastructure, has strong demand for hydrogen in the surrounding local industrial precinct, benefits from existing grid-connected transmission, and existing jetty infrastructure enables a tangible pathway to greater scale through export.

After operating the Kwinana refinery for more than 60 years, bp made the difficult decision to cease refining operations in 2020. We have since progressed plans to transform it into an Energy Hub, with a 10,000 barrel per day renewable fuels plant and a 100MW renewable hydrogen production facility. The renewable fuels (KRF) plant requires hydrogen to produce sustainable aviation fuel and renewable diesel.

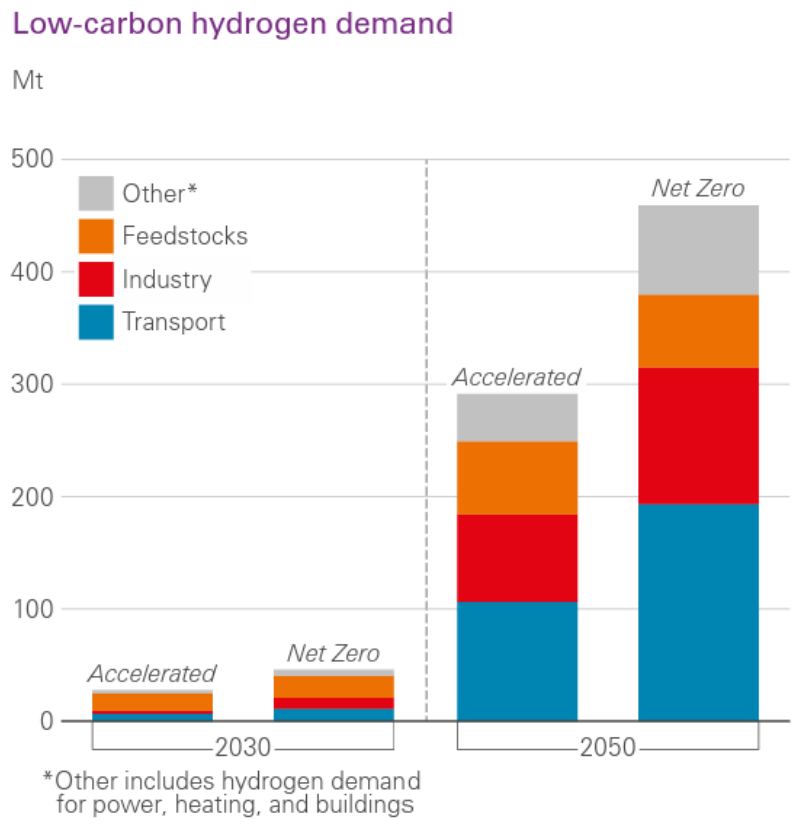
The H2Kwinana project plans to start producing hydrogen in mid-2026. bp's KRF is a key anchor hydrogen off-taker, and we plan to use existing hydrogen pipelines to supply local industrial customers. In Phase 2, H2Kwinana will expand its hydrogen production capacity and manufacture a hydrogen export derivative to supply trading partners in North Asia and Europe.

The development of H2Kwinana has been supported by a Hydrogen Hub Program grant of up to A$70m from the Australian Government and A$300,000 from the WA Government to support feasibility work.

Why government should develop hydrogen to support the energy transition

We agree that in most cases, electrification is the most efficient way to decarbonise. However, for the many decarbonisation challenges where electrification is not going to work, hydrogen and its derivatives will play an important role. bp's analysis shows that globally hydrogen could have up to 5-10% share in primary energy consumption by 2050. We see low-carbon hydrogen primarily used in industry, transport, as process feedstock, and in renewables firming. There will be a role for both green hydrogen, made via electrolysis using renewable power, and blue hydrogen, made from natural gas (or coal) with associated carbon emissions captured and stored. Although the uptake of low-carbon hydrogen will accelerate more rapidly post 2030[9], it is critical to enable pathfinder projects now to grow capability and capacity through the supply chain, reduce costs through learnings, and to build required expertise. Failure to do so means delaying action on emissions reduction and export-scale opportunities that will be built from early projects. As carbon emissions tighten and production costs fall, demand for low-carbon hydrogen increases in the 2030s. Our view on how hydrogen demand will develop is reflected in our project development strategy, starting first with our own requirements from low carbon hydrogen, supplying our customers in the same regions, and then progressing to export scale projects.

We have provided guidance to the market that we globally aim to produce 0.5 – 0.7 million tonnes a year of primarily green hydrogen by 2030 while selectively pursuing blue hydrogen projects.



[9] bp Energy Outlook, 2023 edition, p.71 bp-energy-outlook-2023.pdf.