

Three Scenarios for Workforce Change

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Industry Growth Centres

- Industry led and independent
- Trusted brokers of innovation
- Drives productivity & competitiveness
- Transfer investment in **knowledge & capabilities** into **commercial value & capacity** here in Australia
- Connected to global export markets



**Supply Chain
Clusters and Export
Hubs**

**Low Carbon
Technology**

**Regulation
and
Reputation**

Decommissioning

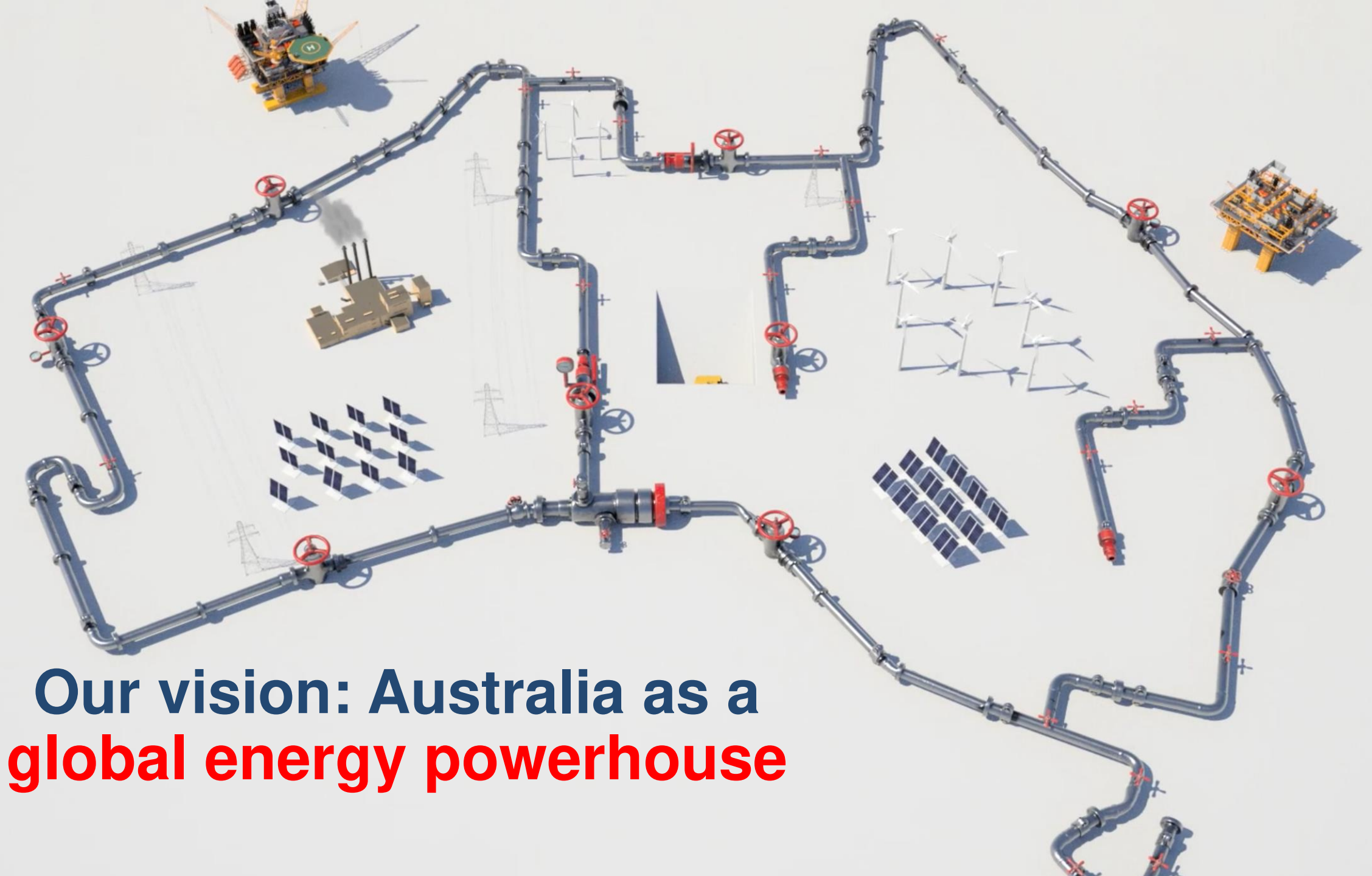


**Industry & Research
Collaboration to
Commercialise
Innovation**

**Skills &
Workforce
Transition**

**Digital &
Automation**

**Maintenance
& Operational Optimisation**



**Our vision: Australia as a
global energy powerhouse**

A plan for the future of Australia's energy resources sector

- Australia is the **largest exporter of LNG** globally following an unparalleled investment.
- However, **the future of the oil and gas workforce is uncertain**. The drivers of the oil and gas workforce are highly volatile which makes prediction difficult.
- As an industry growth centre, **NERA has a mandate to foster collaboration and innovation** and help the energy resources sector respond to workforce trends.
- This Report is a step towards developing a common expectation about the **skills needed** in the oil and gas industry by 2030.
- **Report available for download and access the digital tool from www.NERA.org.au**



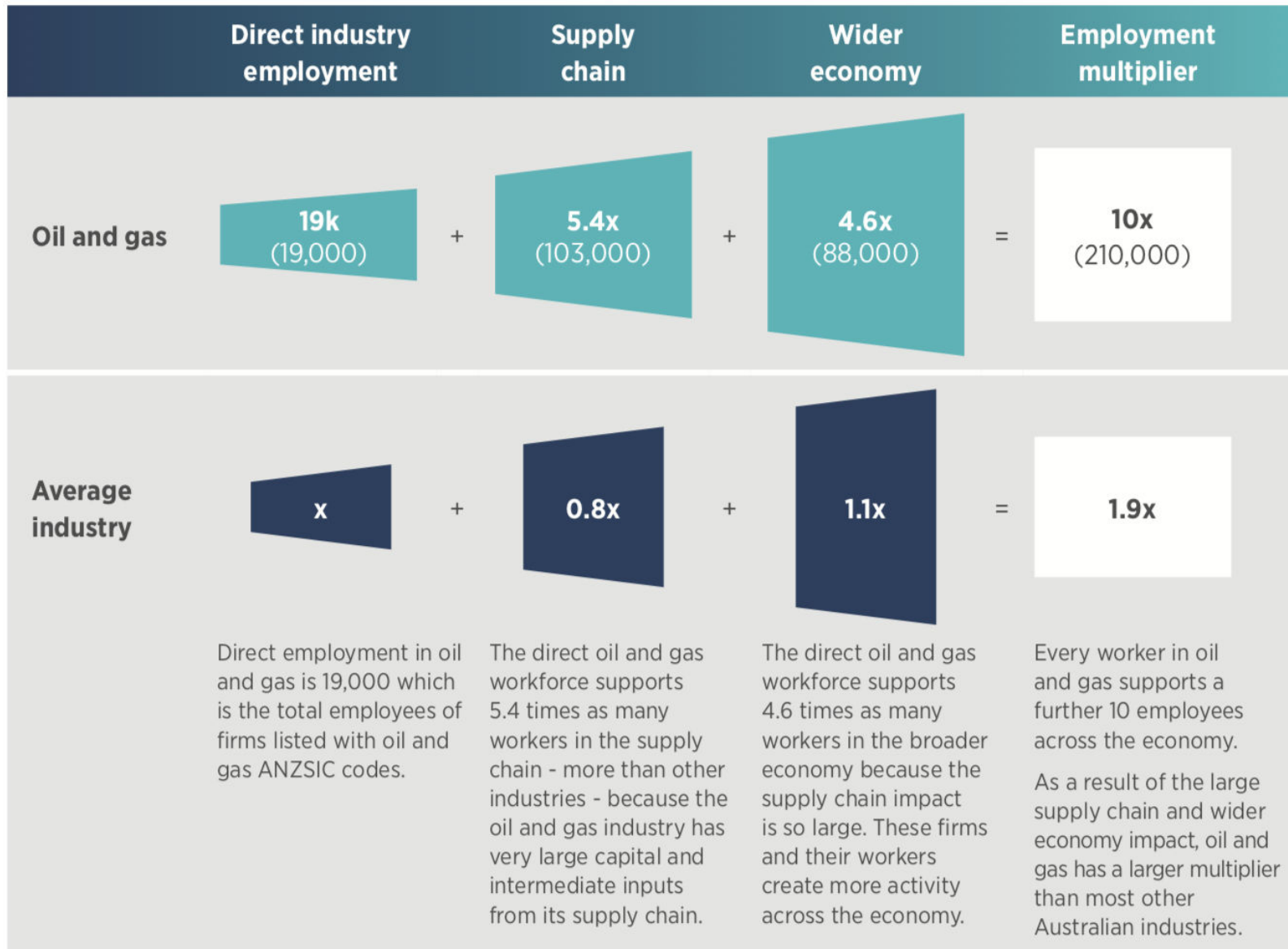


Australia has developed
one of the strongest
natural gas industries in
the world

x10 High value industry

Every job in the oil and gas
industry sustains another 10
jobs elsewhere in the
economy

Oil & Gas 10x employment multiplier



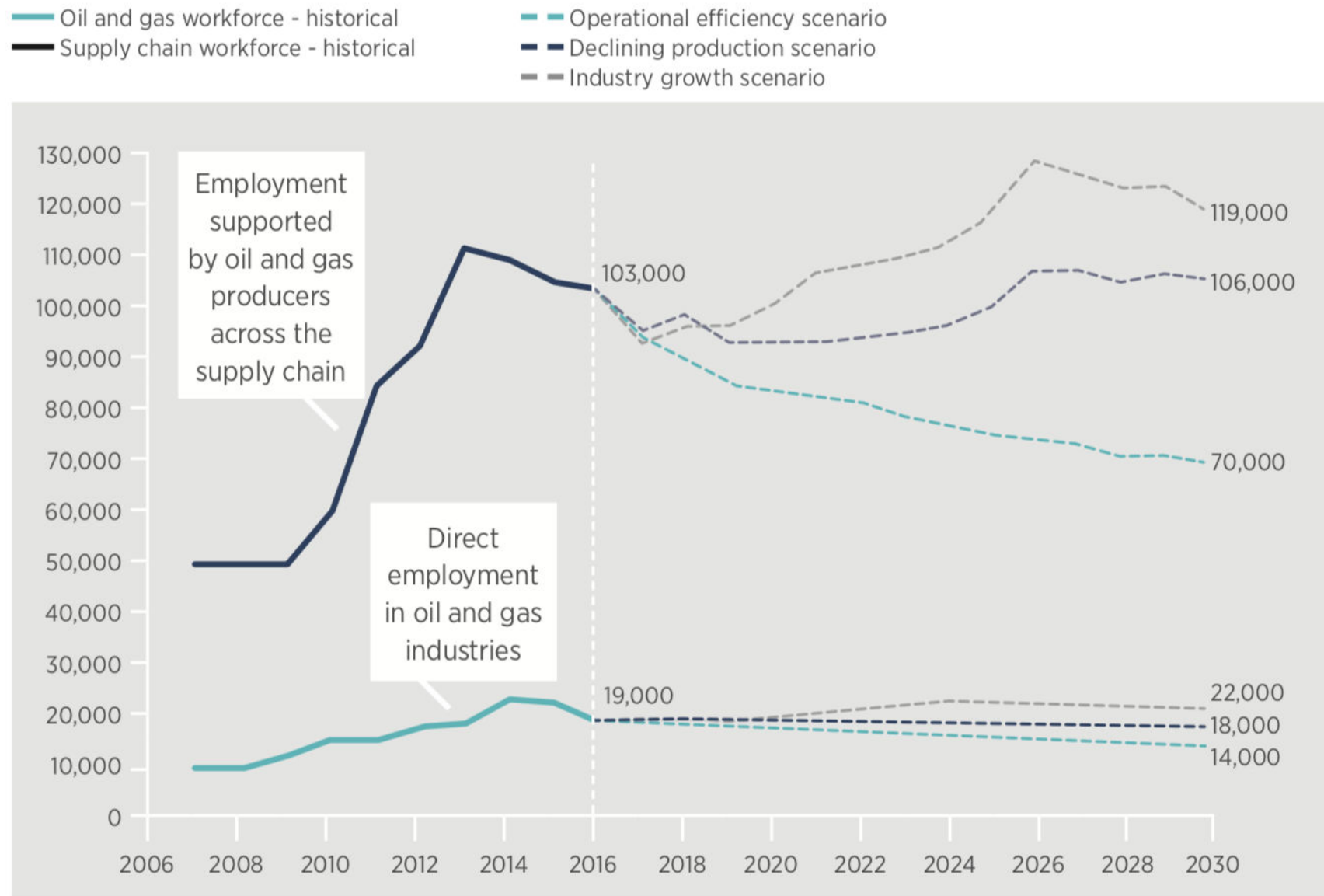
Scenarios for the sector's potential future

The report developed three potential scenario's for the future of the sector:

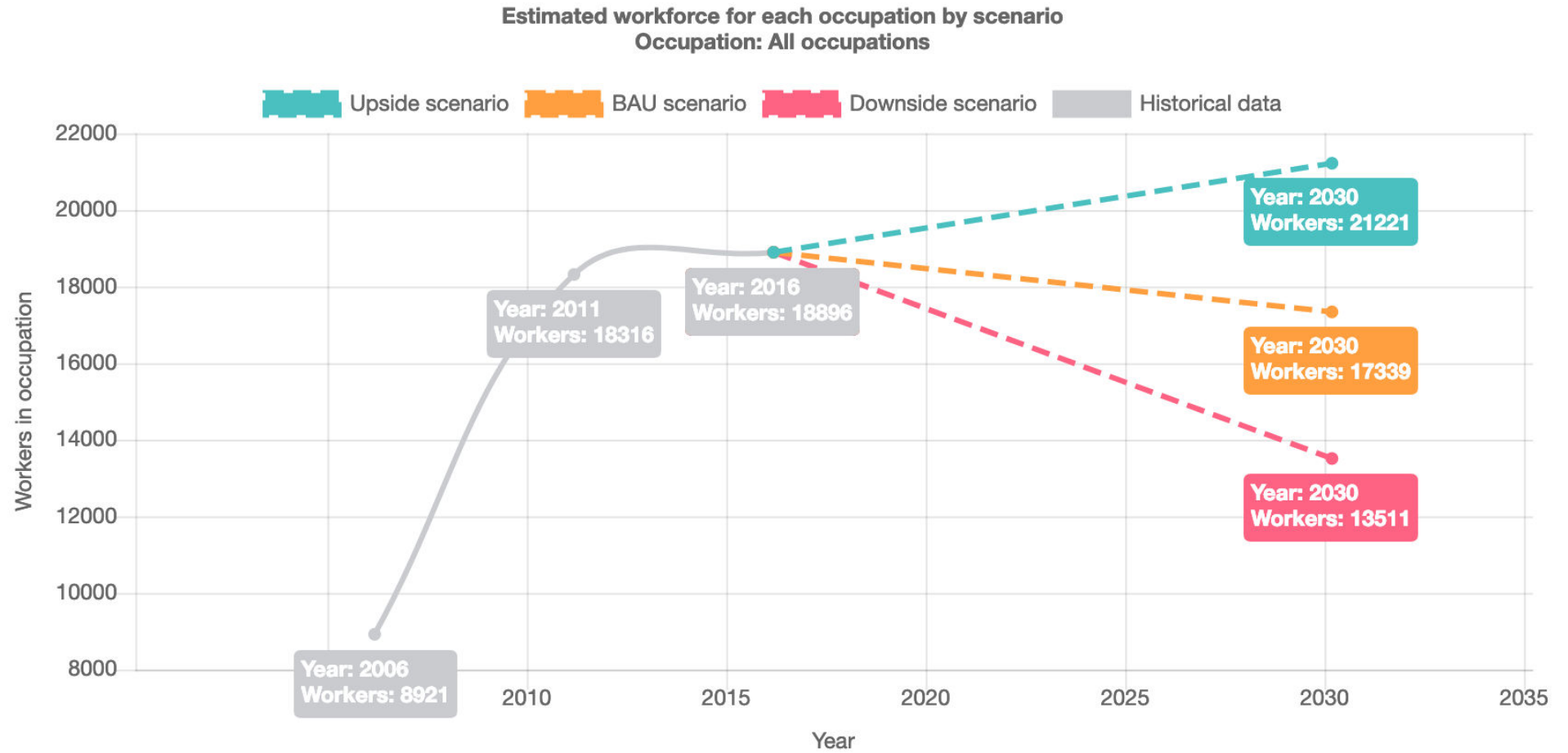
- Operational Efficiency
- Industry Growth
- Production Decline

① Operational efficiency (BAU)	② Industry growth (upside)	③ Production decline (downside)
Focus: using technology to lower costs, increase efficiency	Focus: new exploration and construction	Focus: managing production downturn caused by sharp decline in oil price
Drivers <ul style="list-style-type: none"> Oil price range US\$60 to \$80 for barrel (supply-demand trends unchanged) No policy change On-trend decline in exploration and construction spending Significant new investment in efficiency-enhancing technology 	Drivers <ul style="list-style-type: none"> Oil price rises to US\$100 per barrel (due to strong Asian demand for LNG) Positive policy change (moratoria lifted, tax changes) Exploration, development and production spending rises New investment in exploration / development technologies 	Drivers <ul style="list-style-type: none"> Oil prices falls to US\$40 to \$60 per barrel (due to strong supply from Qatar, USA, Africa) No policy change Production decline; stronger focus on production efficiency Steep decline in exploration and construction spending
Industry outcome <ul style="list-style-type: none"> Production increases -13% for CSG and -50% for conventional gas to 2022; flat for rest of period Total capital expenditure ~\$120B 30% decrease in time spent on automatable tasks 	Industry outcome <ul style="list-style-type: none"> Production increases ~30% for oil, ~50% for CSG and ~96% for conventional gas Total capital expenditure ~\$200B 15% decrease in time spent on automatable tasks 	Industry outcome <ul style="list-style-type: none"> Production declines ~45% for oil, ~50% for CSG and ~17% for conventional gas Total capital expenditure ~\$80B 20% decrease in time spent on automatable tasks
Workforce outcome <ul style="list-style-type: none"> Direct workforce declines 5% (-1,000 jobs) Total workforce in 2030: 212,000 Companies would require more workers with strong operational, maintenance and technology skills 	Workforce outcome <ul style="list-style-type: none"> Direct workforce grows 16% (+3,000) Total workforce in 2030: 239,000 Dramatic expansion could lead to talent shortages and require stronger skills training and retraining 	Workforce outcome <ul style="list-style-type: none"> Direct workforce declines 26% (-5,000) Total workforce in 2030: 138,000 Downturn would require policy intervention to help large number of workers transition into new roles

Change in the number of workers by scenario



Online modeling tool



What to expect - 3 stages of automation to 2030

	PRESENT	2025	2030+
	① Automated equipment	② Connected, digitised pieces of equipment	③ Integrated value chain
Example technology	Proprietary drones, autonomous underwater vehicles, semi-autonomous drills	Smart sensors that both monitor and control equipment in plant/mine	Automated machinery and equipment that is working in concert together e.g. maintenance, logistics, production
Level of interoperability	Low: technology developed by a handful of OEMs; not standardised or interoperable	Medium: equipment and data from a range of different vendors capable of operating together	High: open source platforms which allow integration and interoperability across value chain
Drivers	<ul style="list-style-type: none"> • Safety • Operational and capital productivity 	<ul style="list-style-type: none"> • As with stage 1 • Reduced automation costs 	<ul style="list-style-type: none"> • As with stages 1 and 2 • Integration benefits / access to new resources
Level of automation	Mainly semi-automated tech; but with some full automation	Most equipment now fully automated; limited self-learning	Equipment and processes capable of self-learning and making decisions without human input
Data maturity	Low: identifying value of existing data sets using machine learning	Medium: filling gaps in datasets to enhance machine learning	High: advanced data analytics across value chain



A person wearing a white lab coat is using a VR headset. The background is a chalkboard filled with chemistry equations and formulas. A semi-transparent white circle is overlaid on the left side of the image, containing the title and a list of bullet points.

The future of education and training

- Industry-focused qualifications
- Micro degrees
- Lifetime training and education passports
- Experiential learning

Making innovation part of our culture

- Leadership
- Trust
- Multidisciplinary teams not siloed jobs
- Incentivising employees and the supply chain
- The future of education and training – lifetime learning



Remote Control Centre and Advanced Visualisation Cluster

Australia is recognised internationally as a world leader in operating plant in extremely remote environments and, as a result, in the design and implementation of remote operating centres (ROCs).

WA is home to numerous cutting-edge ROCs, spread between mining and oil and gas and emerging in other sectors such as Agriculture.

With some industry and government support there is an opportunity to secure for WA a national cluster of specialist companies and universities working in the design of these ROCs, further establishing the state's position as a global leader in remote mining and oil and gas operations.



Industry Case Study: LNG Futures Facility

NERA is supporting the concept development for the LNG Futures Facility proposed to be built in Western Australia

Providing a industry led common user facility for operators and technology providers to test new technologies and for small to medium enterprises to qualify and certify their products, services and skills before market entry and export.

Multi-industry, government and academic consortium.

Unlocking and underpinning opportunity for a resilient small to medium Australian supply chain by providing a trial site for highly digitised, automated and specialised products, services and skills of the future.



Impact:

- Increased number of businesses providing specialist skills, products, services
- Increased highly-skilled workforce
- Increased research outcomes for business certainty, productivity, efficiency and longevity
- Increased taxation and resource income through new developments and increased asset life extension



Creating connections for growth

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