

Mapping the Energy Storage Value Chain Capabilities in Australia and Indonesia: Identifying Opportunities for Collaborations & Partnerships

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Purpose

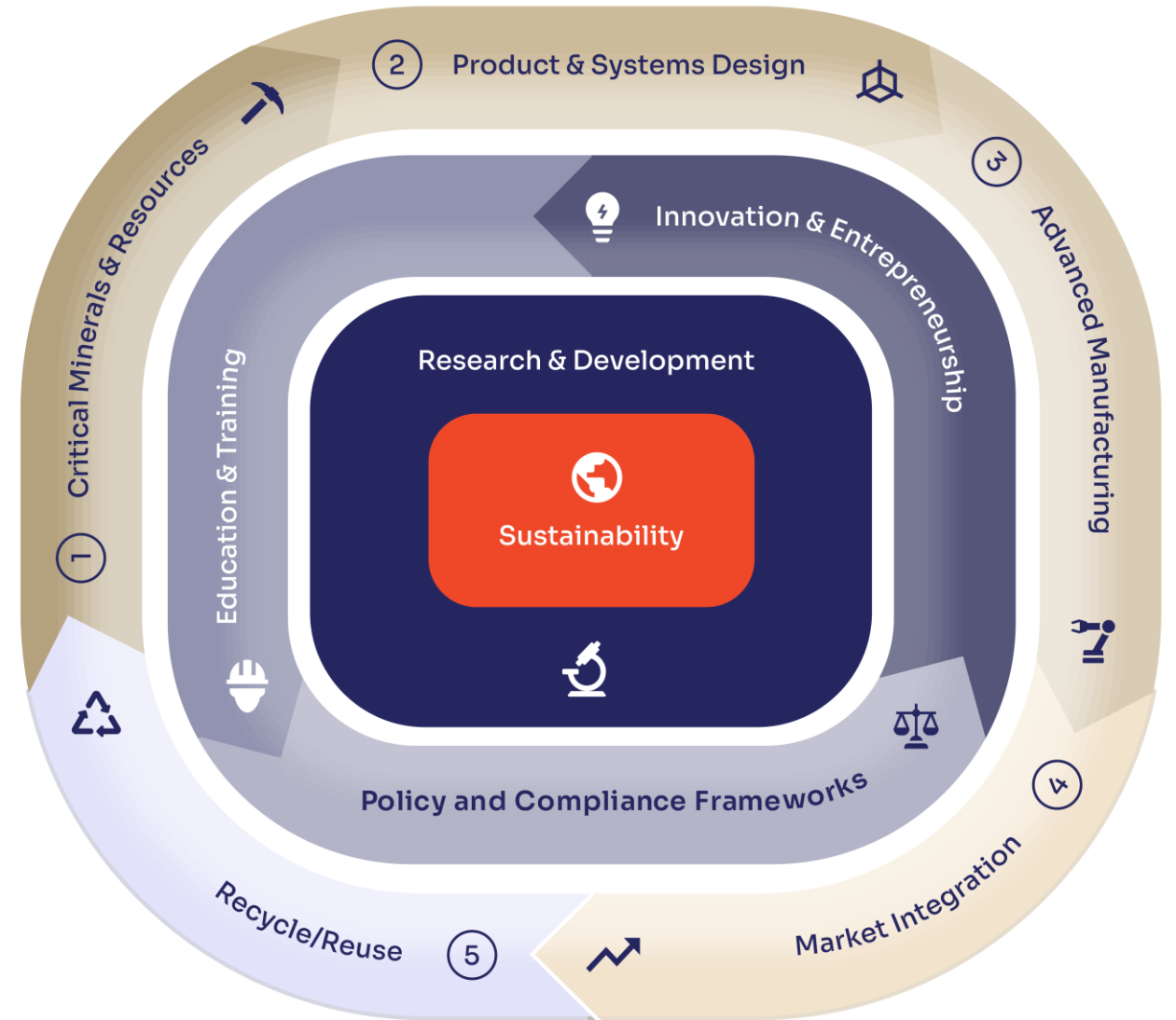
- Indonesia and Australia are emerging as dominant participants in many aspects of the energy storage value chain, and strengthened global **collaborations and partnerships** are increasingly viewed as essential to collectively succeeding in the energy transition
- Mapping bilateral capabilities will help us identify and focus collaboration and partnership opportunities

Background

- 2022 (Asian Development Bank + Bappenas + MoECRT) + (ITB, IPB, UI, UGM) = PRIME STeP investing in research and innovation
- 2022 Australia and Indonesia advancing partnerships in critical minerals and future battery industries
- 2022 Nationally Determined Contributions submissions to the United Nations Framework Convention on Climate Change (UNFCCC) to reduce greenhouse gas emissions.

Concepting the Circular Value Chain Model

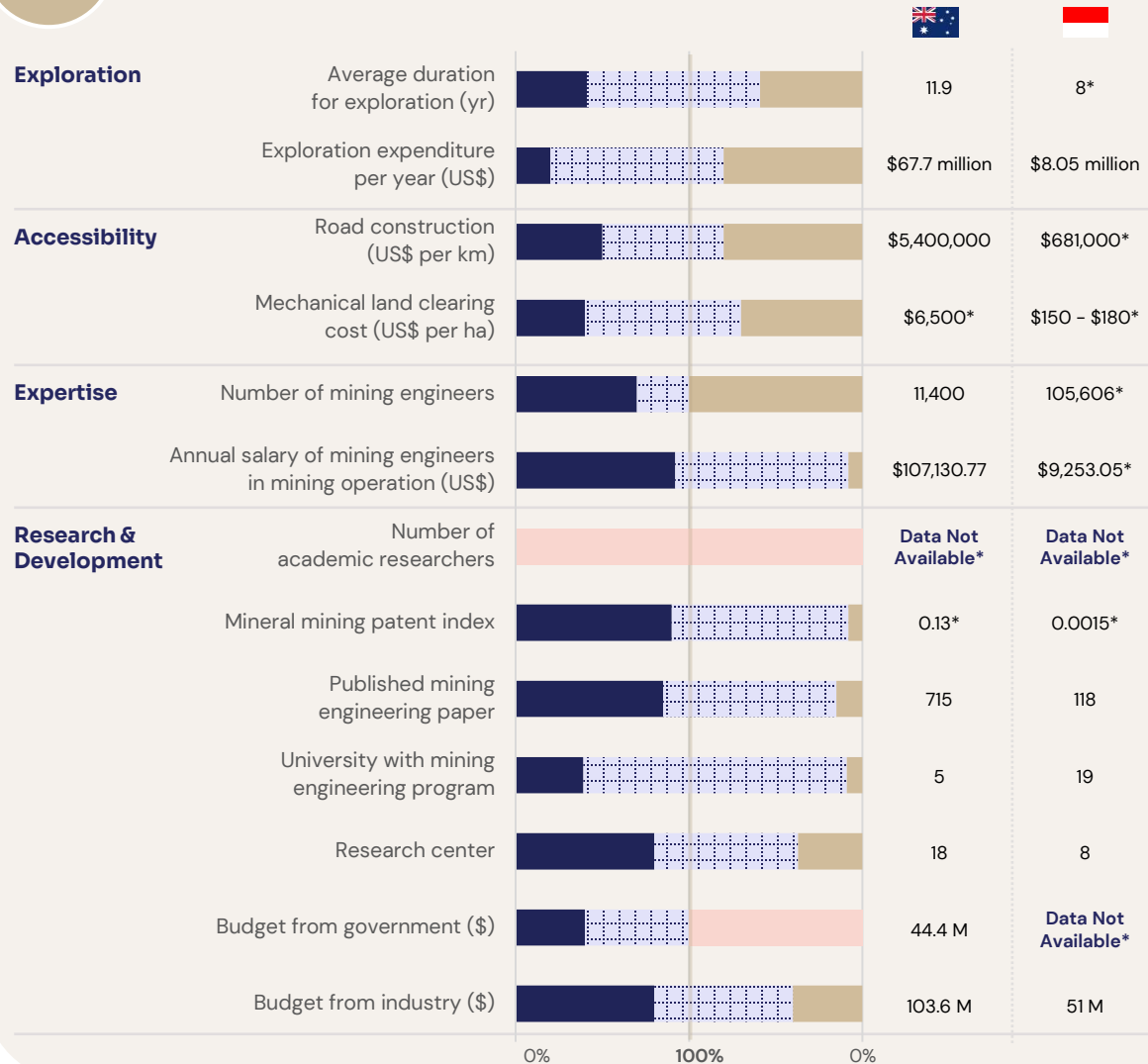
- Sustainability at the core
- R&D driven innovations and entrepreneurship
- Knowledge and Skills through education and training
- Good Policies and Compliance Frameworks accelerate solutions and protect consumers
- Circularity from raw materials to second life and recycle.



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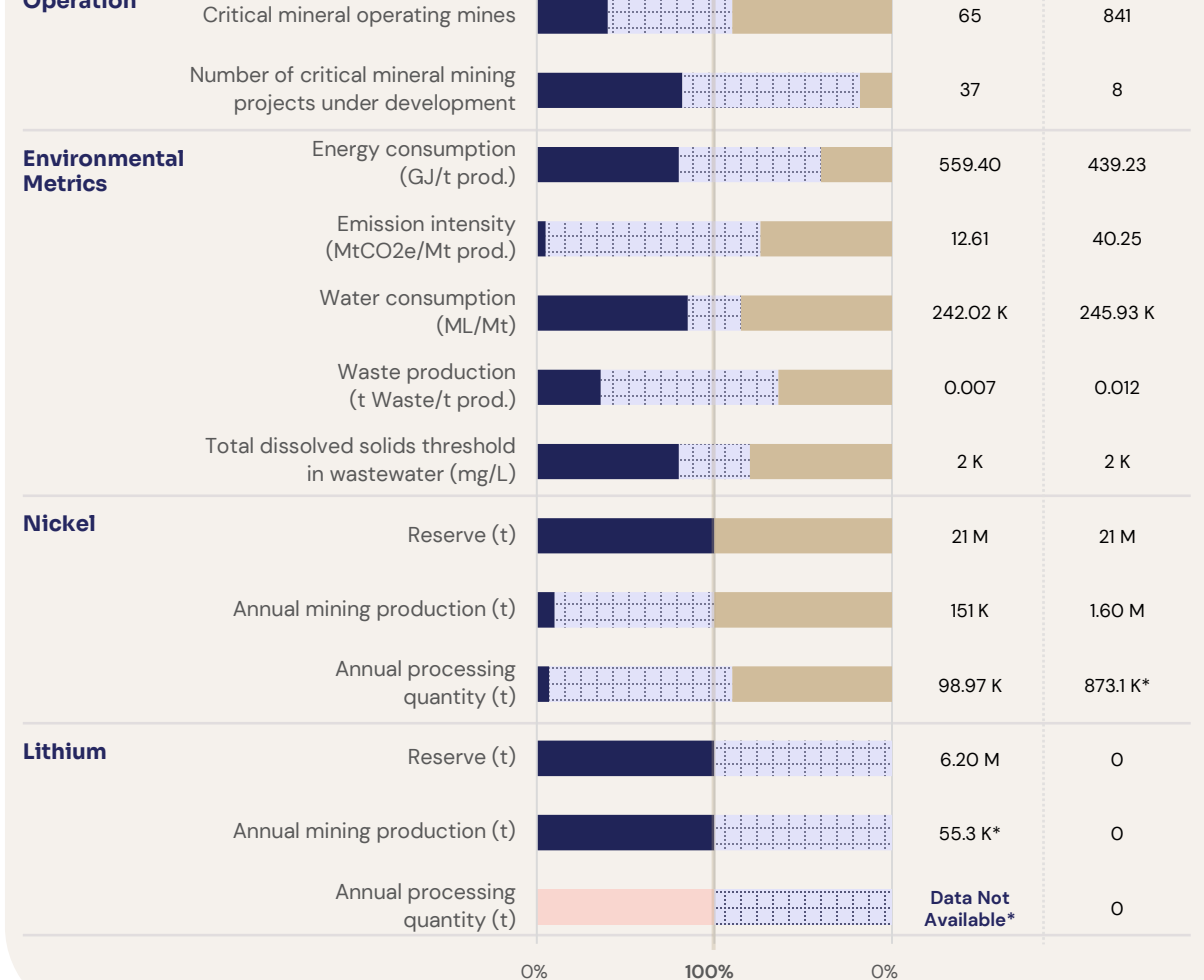
Critical Minerals & Resources (CM)



■ Australia ■ Indonesia ■ Gap ■ Data Not Available

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Operation

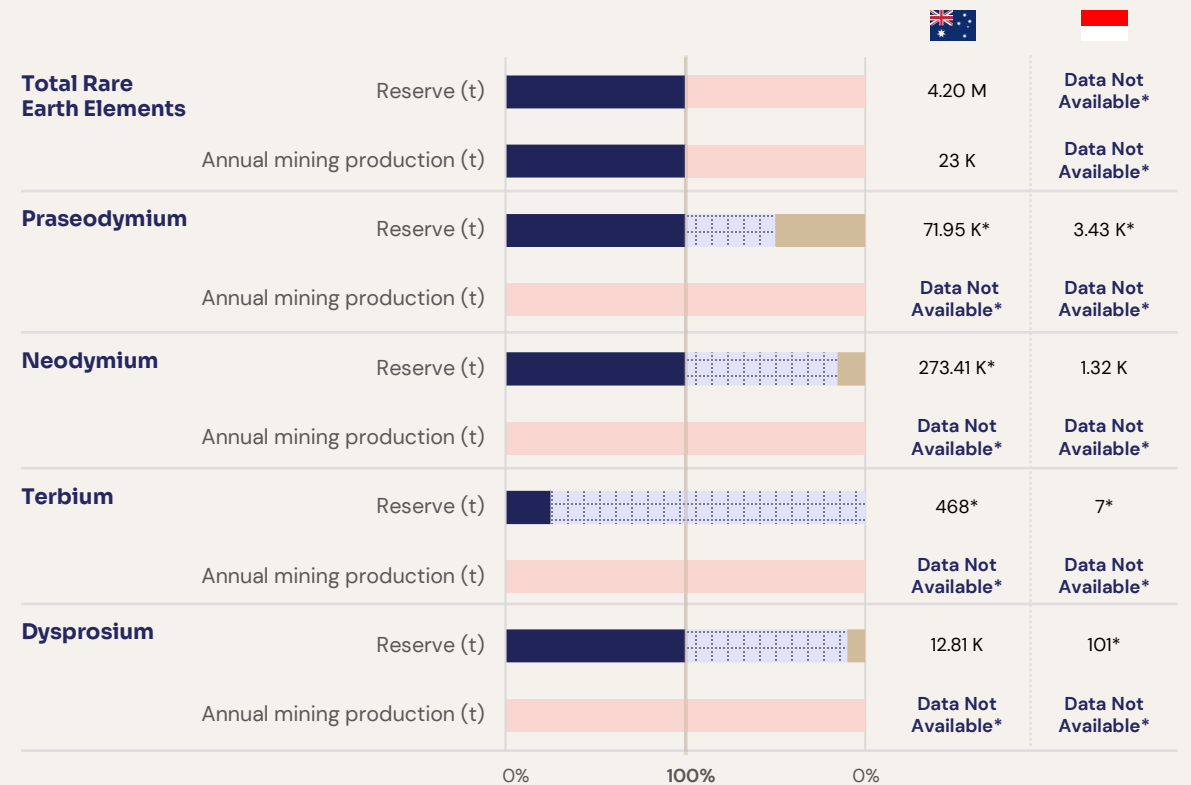
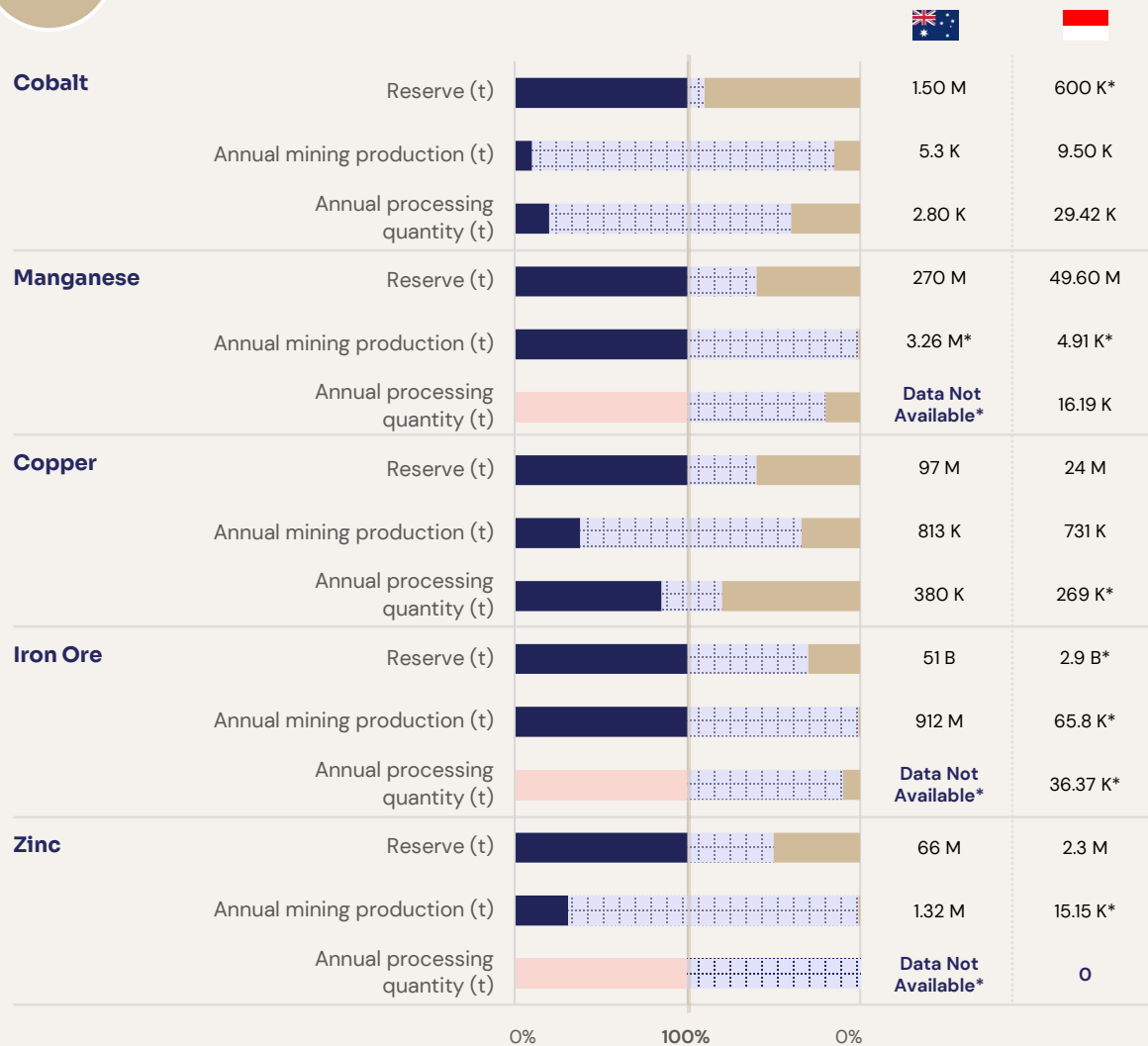


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Critical Minerals & Resources (CM)



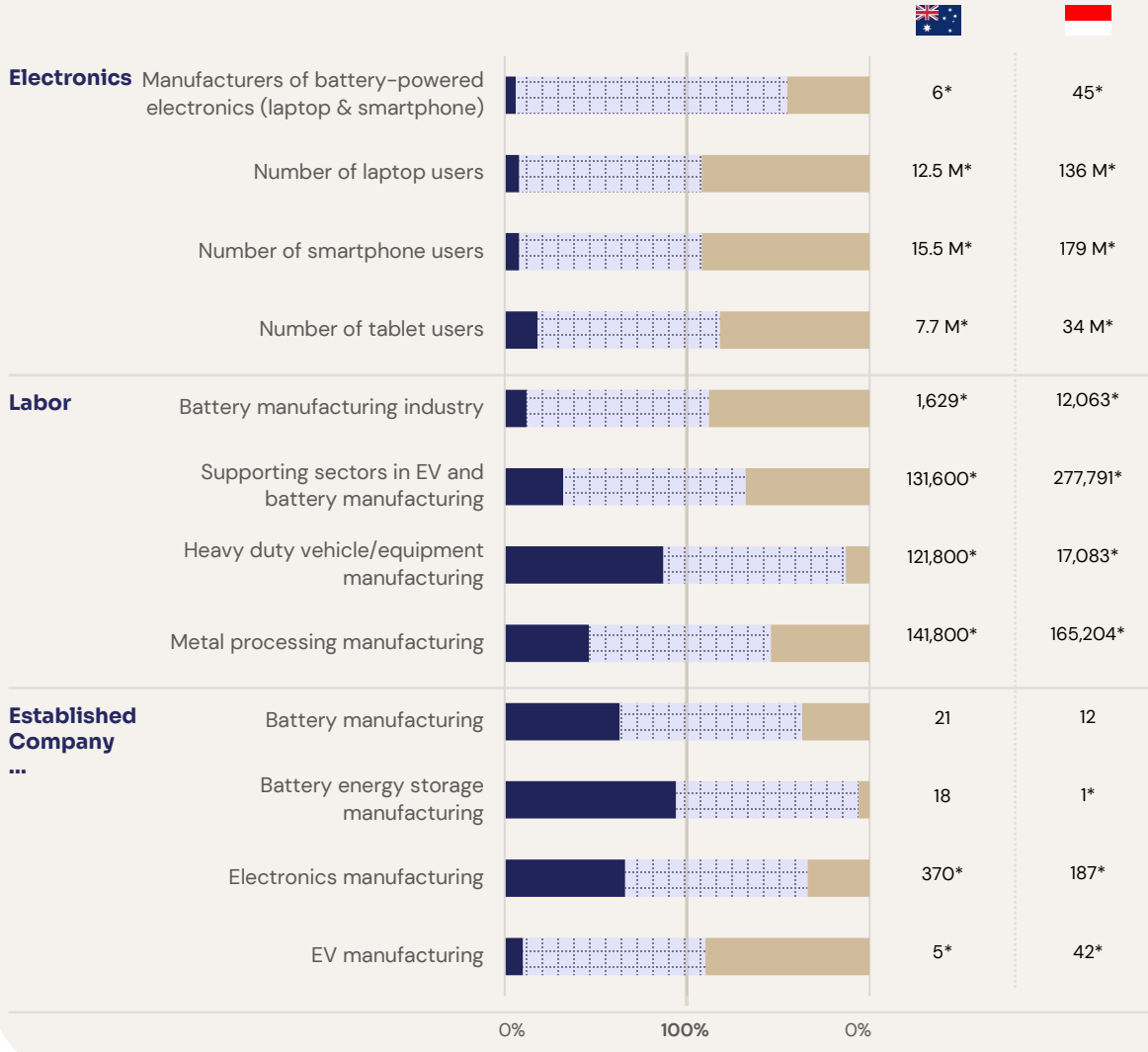
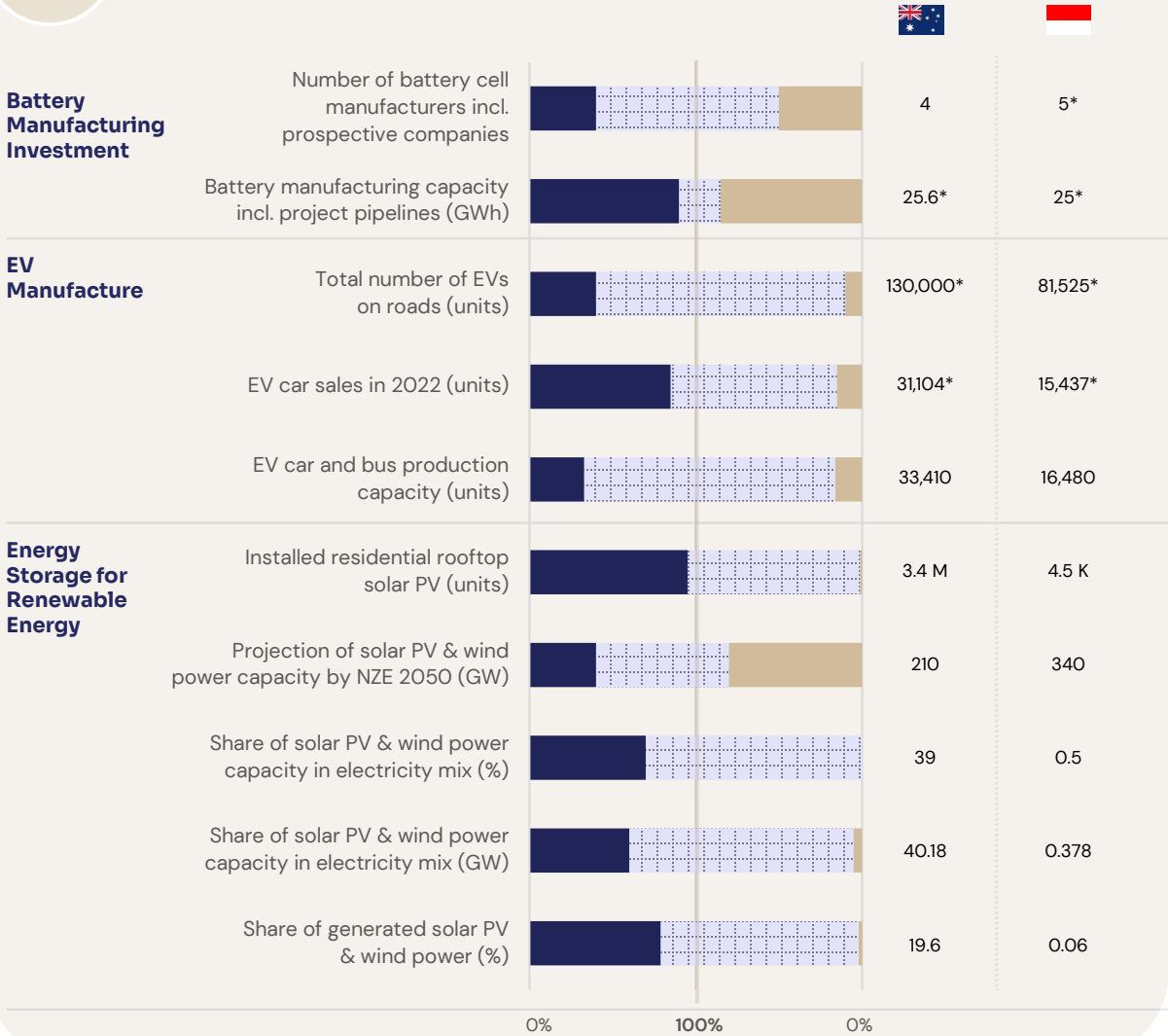
 Australia  Indonesia  Gap  Data Not Available

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Advanced Manufacturing (AM)



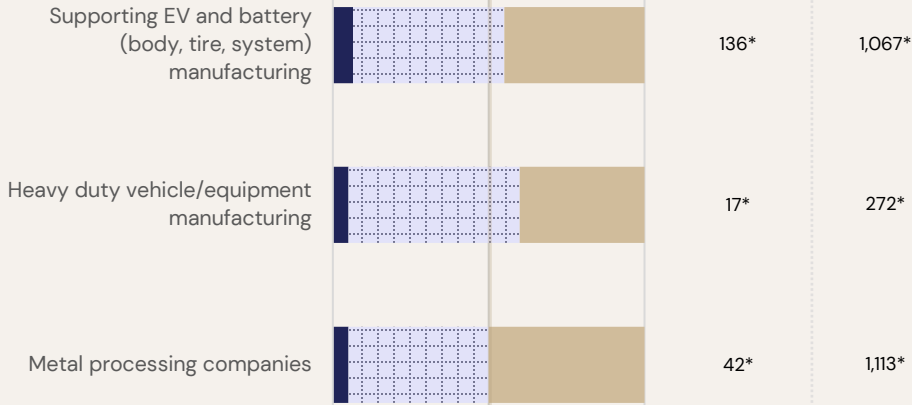
Legend: Australia (Dark Blue), Indonesia (Gold), Gap (Dotted Blue), Data Not Available (Red)

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Advanced Manufacturing (AM)

... Established Company

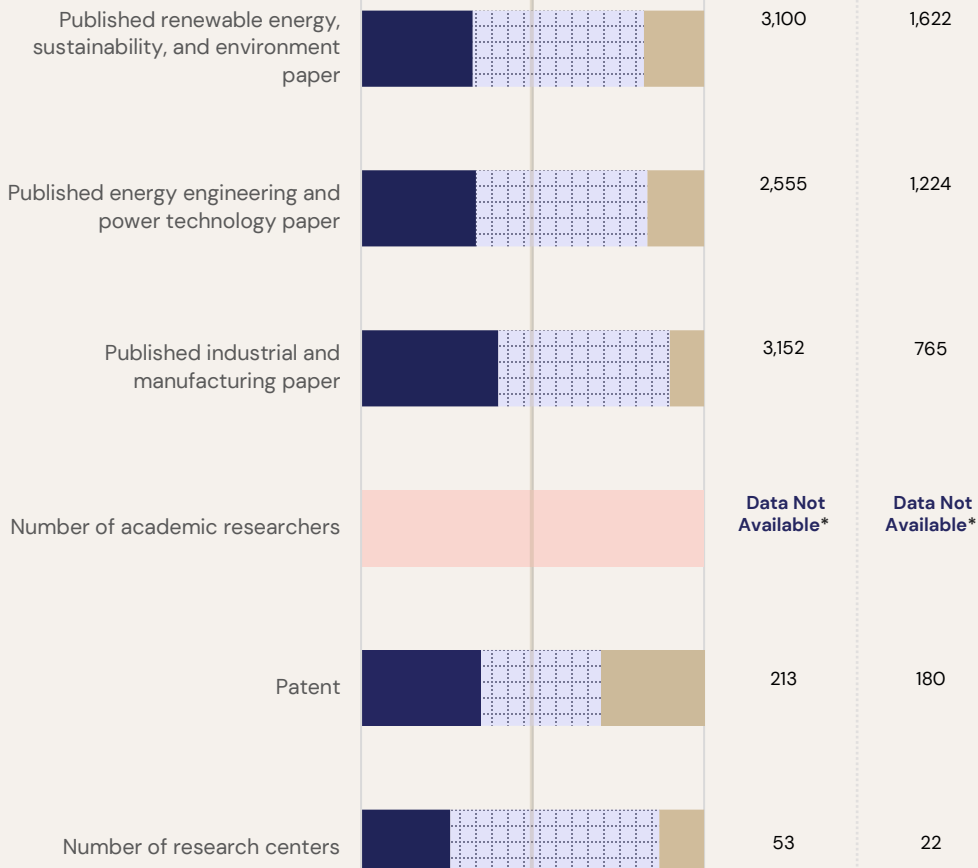


Environmental Performance



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Research & Development

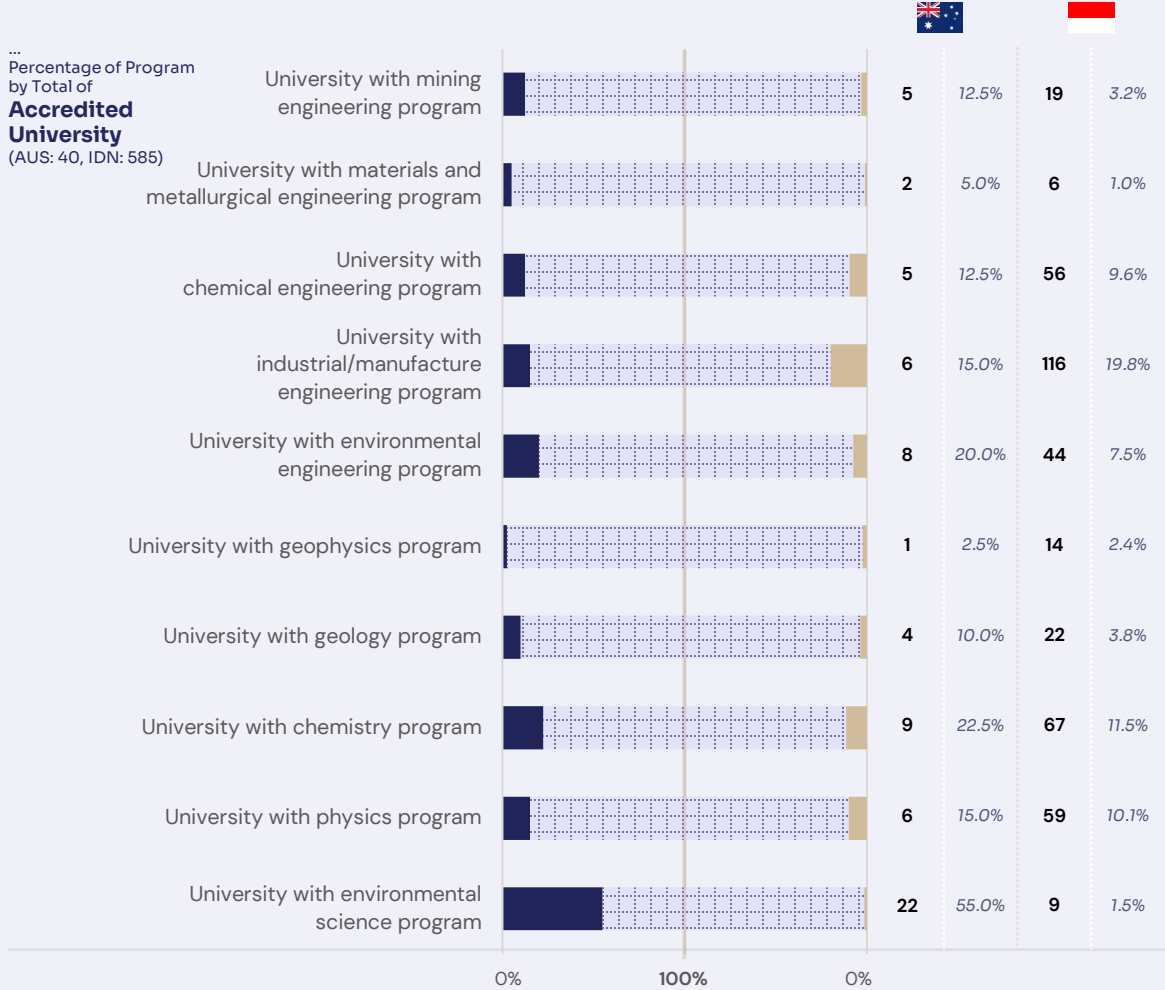
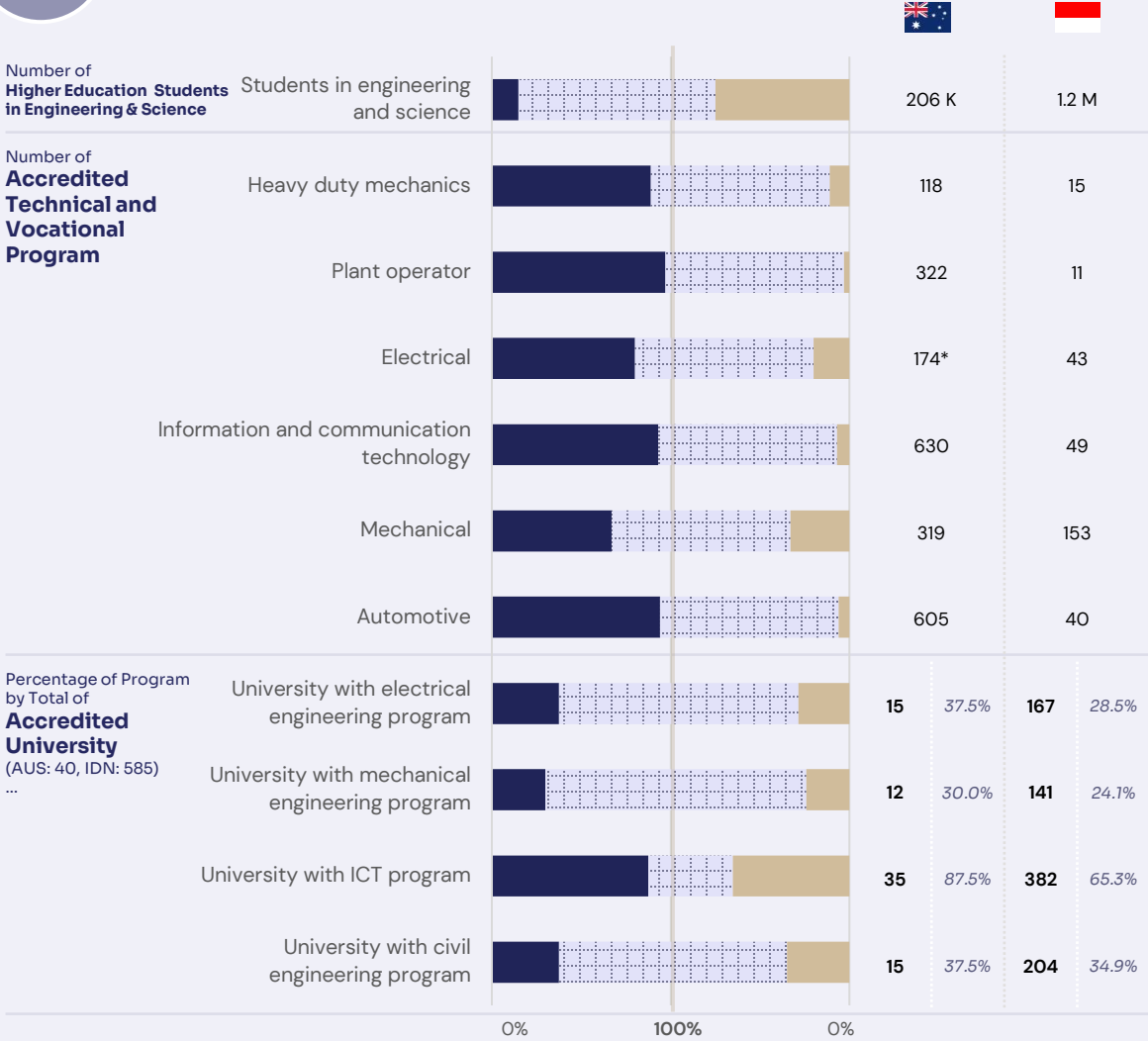


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Education & Training (ET)



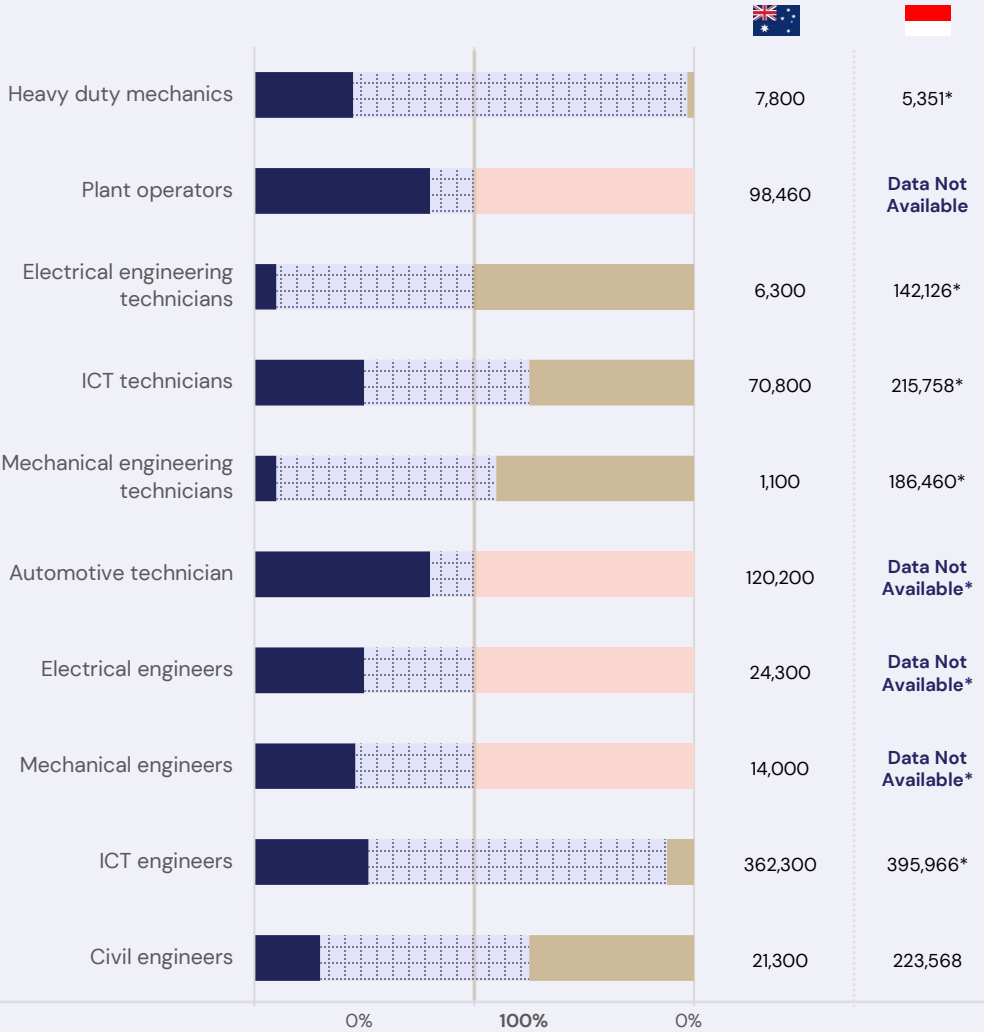
■ Australia
 ■ Indonesia
 Gap
 ■ Data Not Available

Mapping the Energy Storage Value Chain Capabilities in Australia and Indonesia: Identifying Opportunities for Collaborations & Partnerships

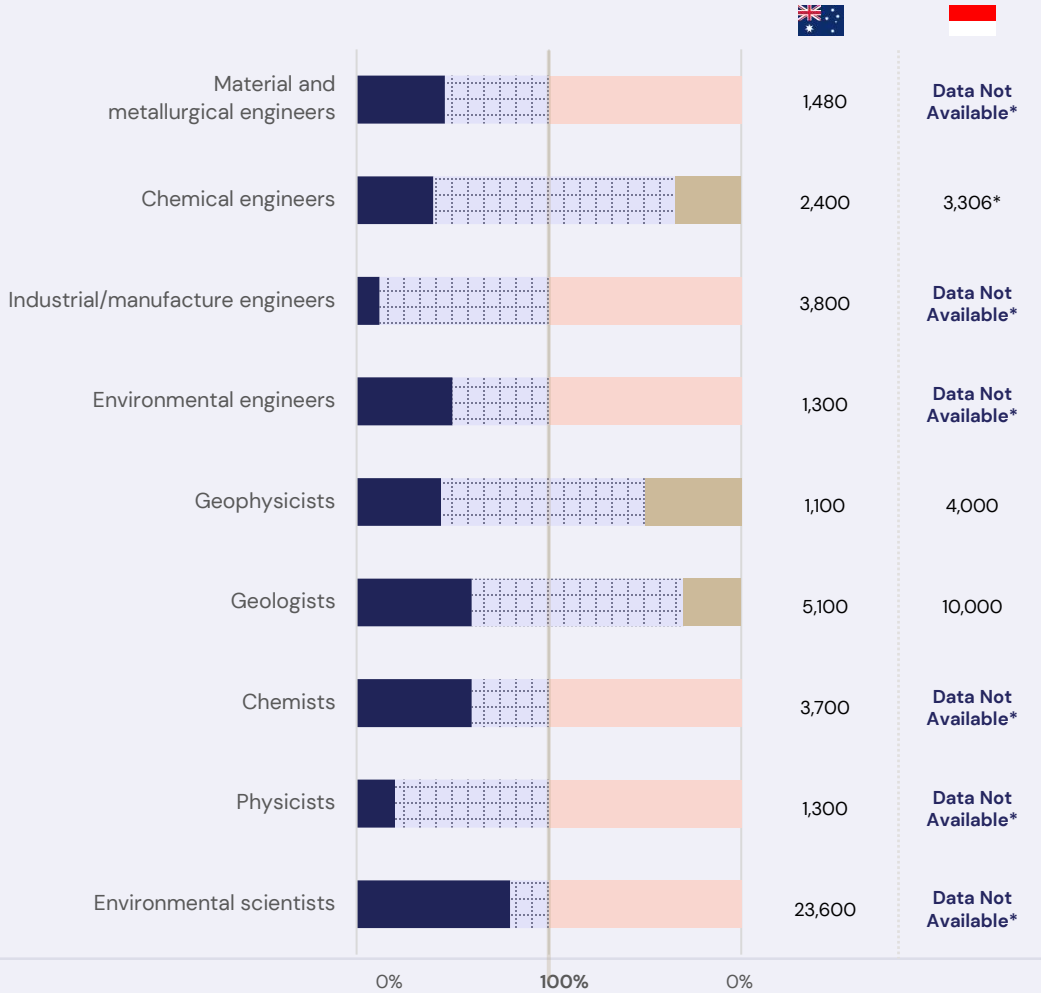


Education & Training (ET)

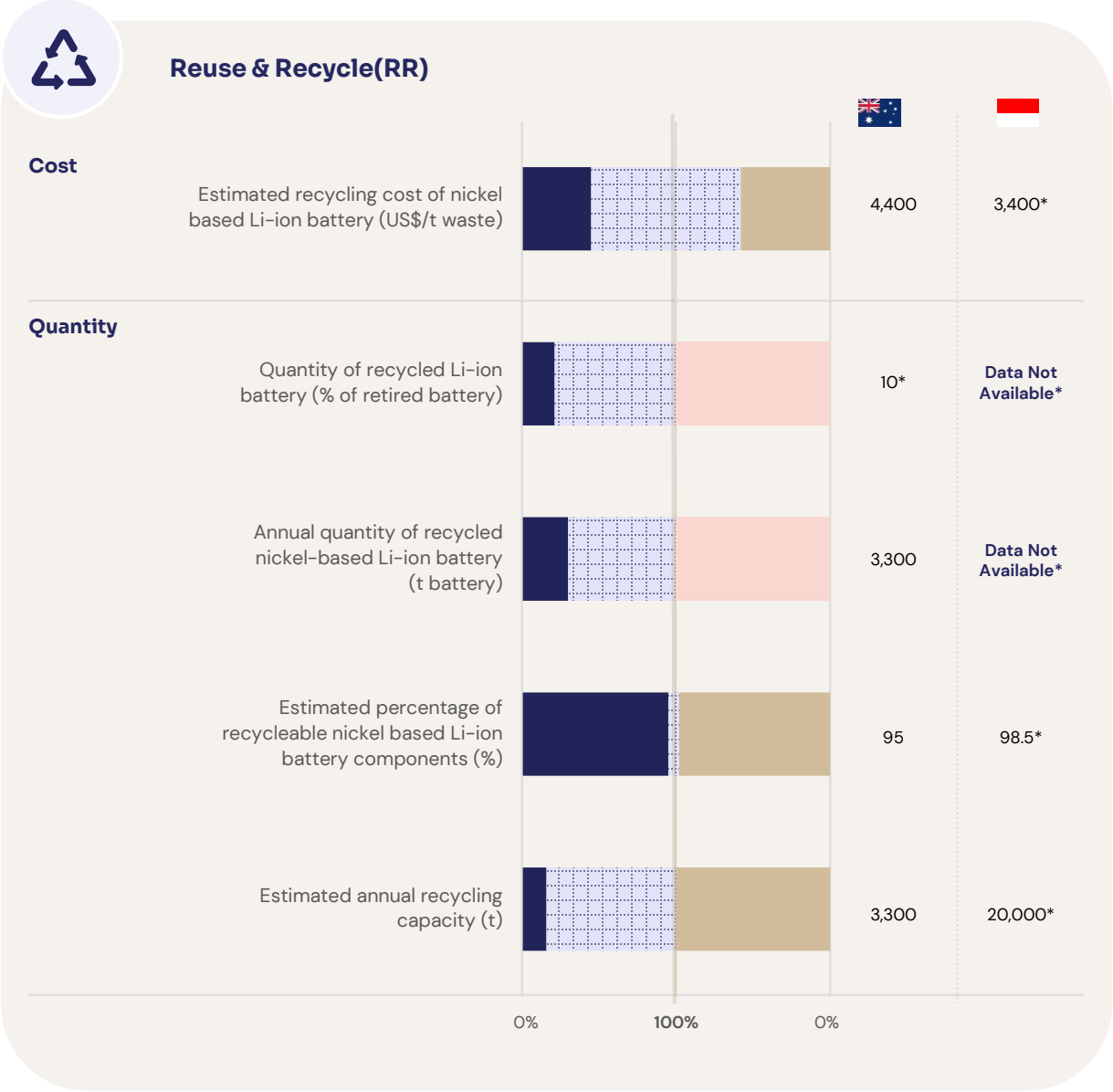
Number of Expertise



Number of Expertise



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■ Australia ■ Indonesia ■ Gap ■ Data Not Available

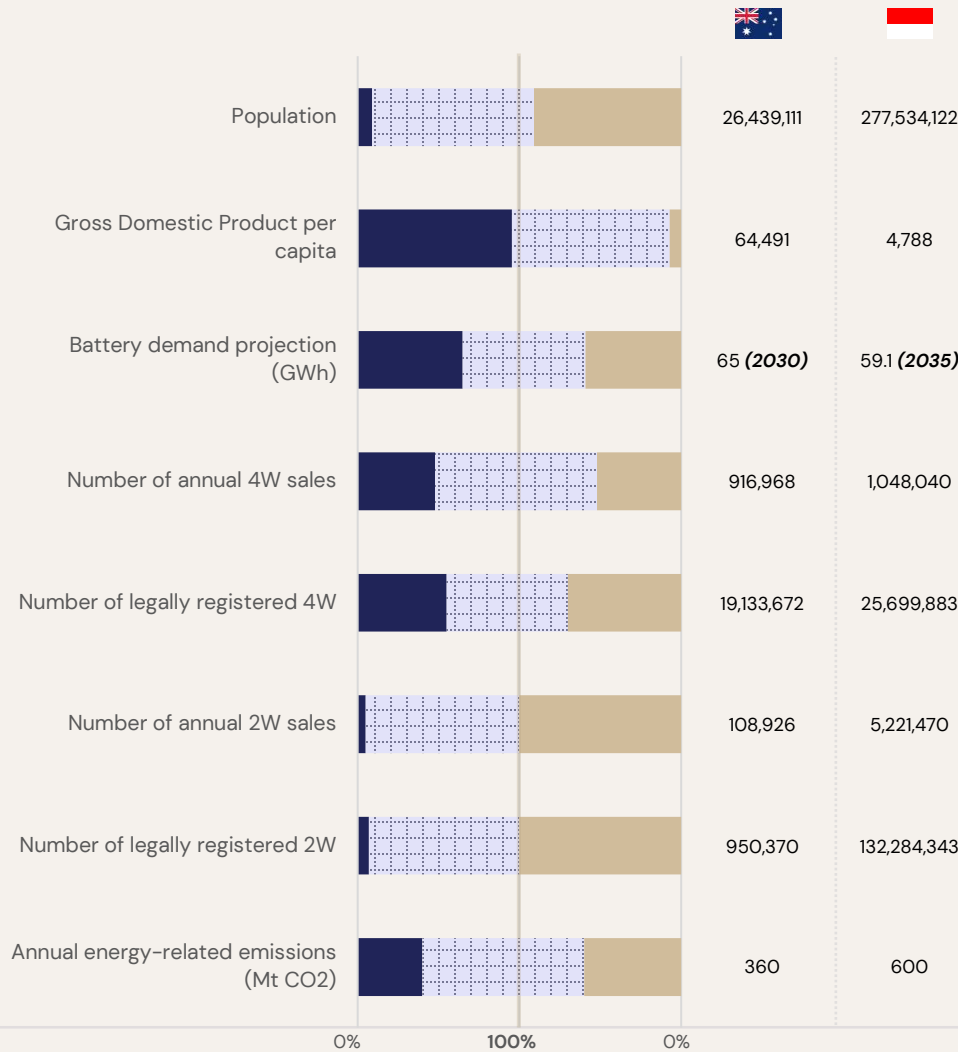
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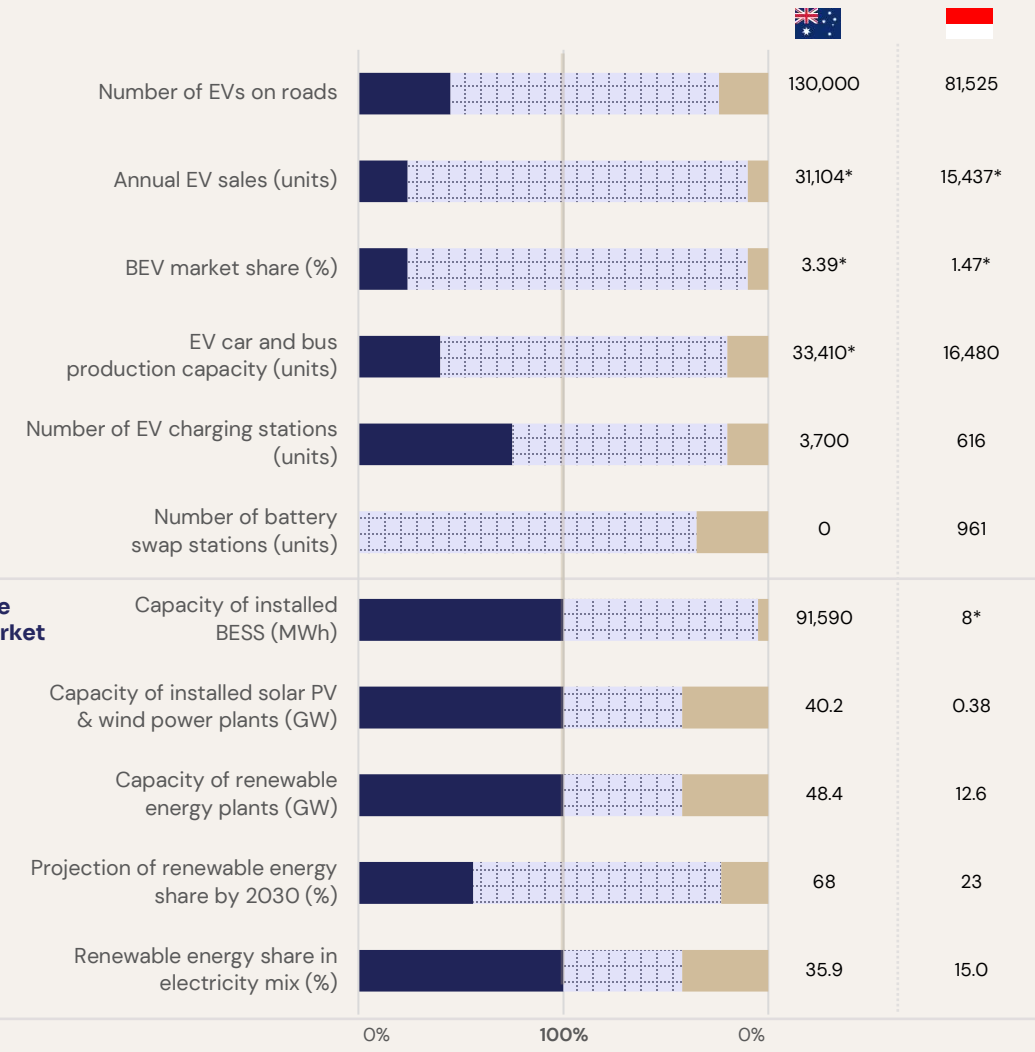


Market Integration (MI)

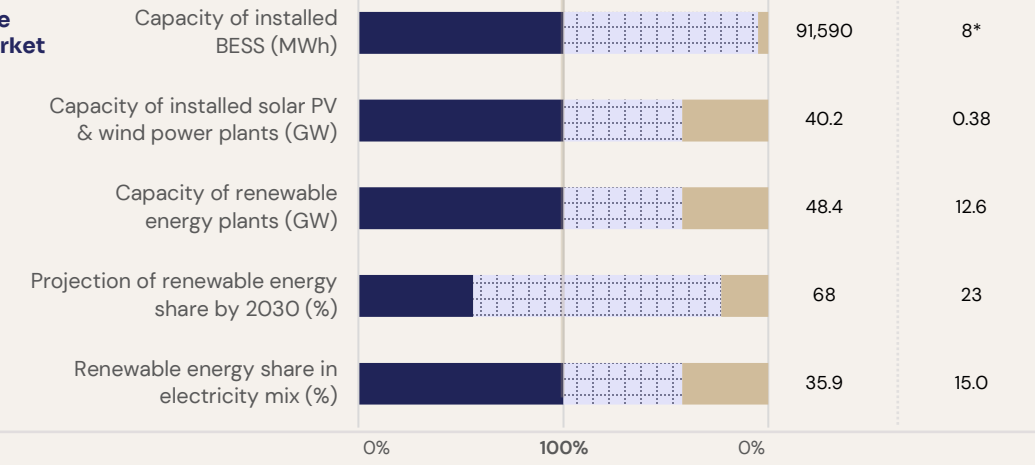
General Market



EV Market



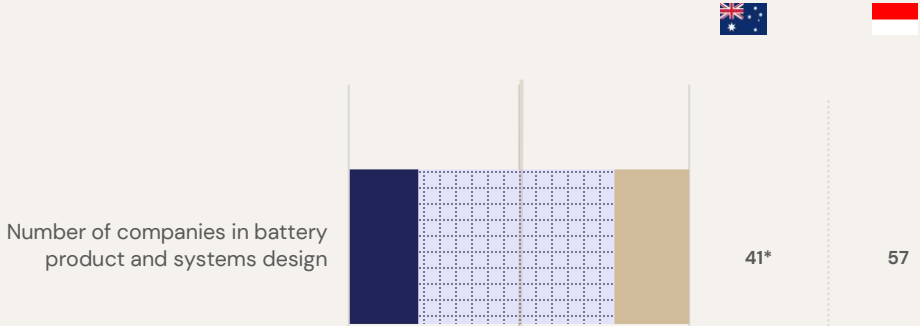
Renewable Energy Market



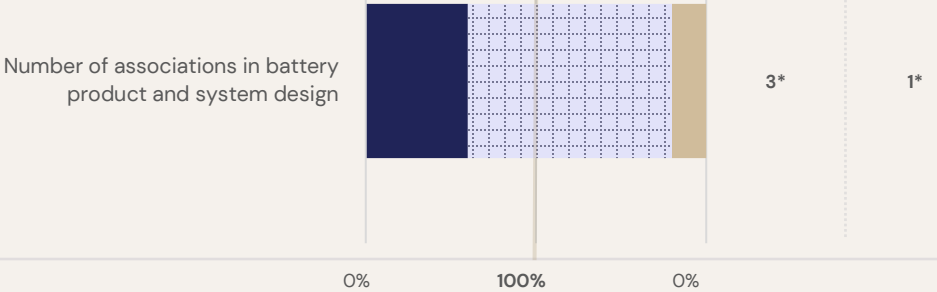


Product and System Design (PS)

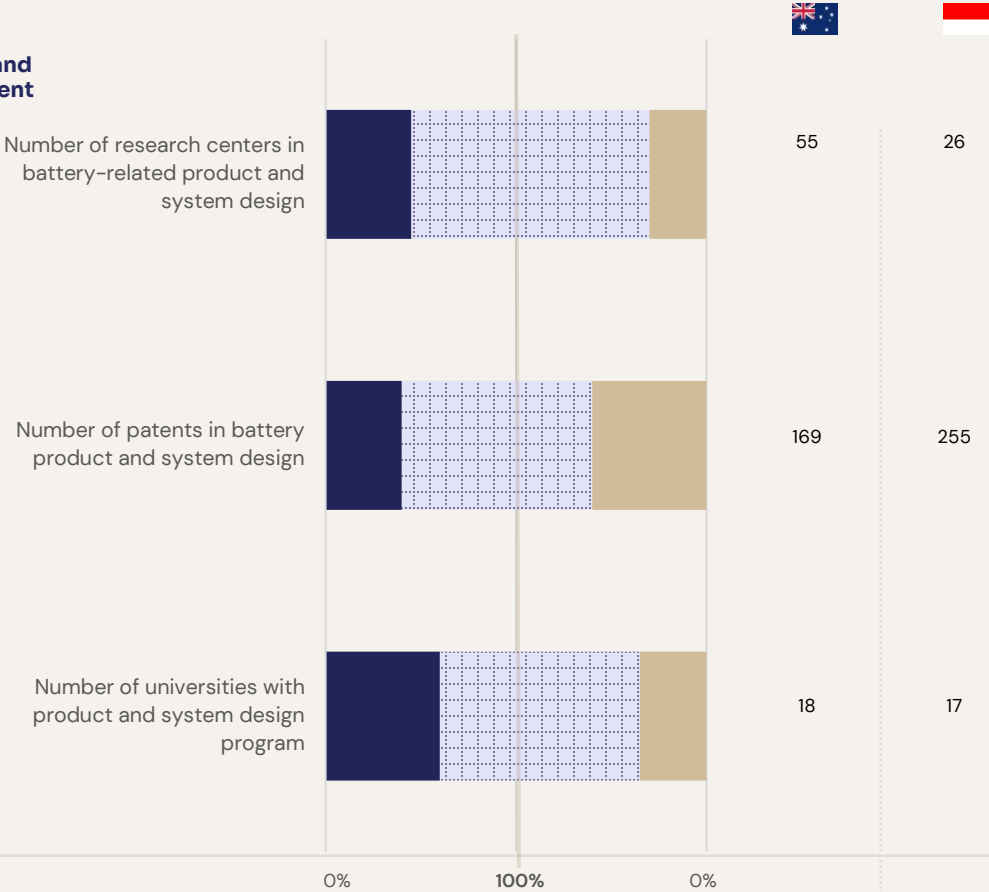
Company



Association



Research and Development

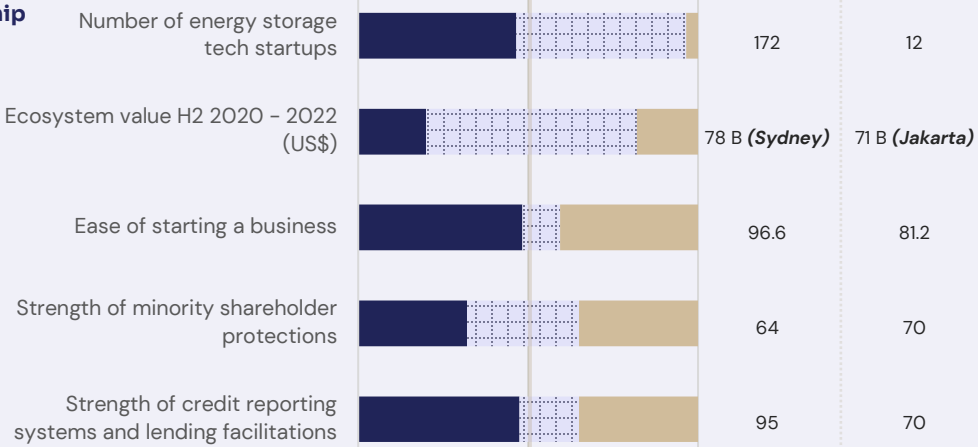


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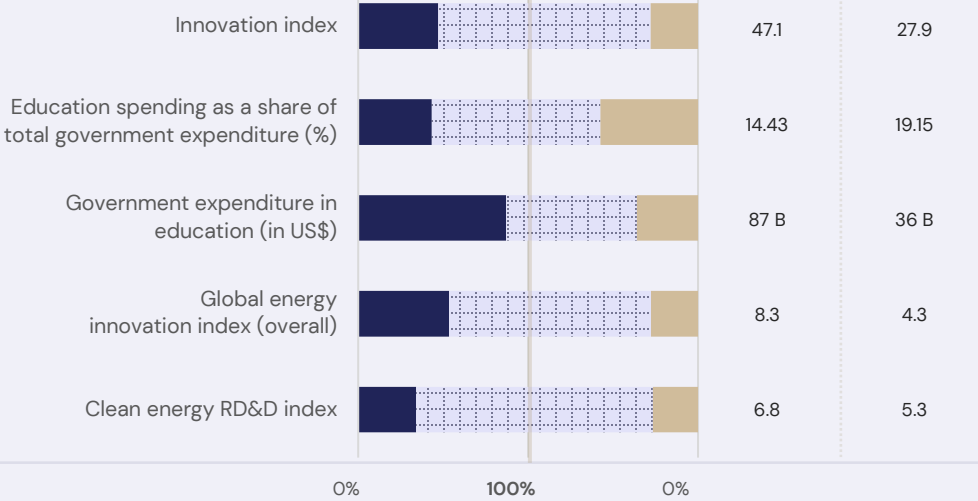


Innovation & Entrepreneurship

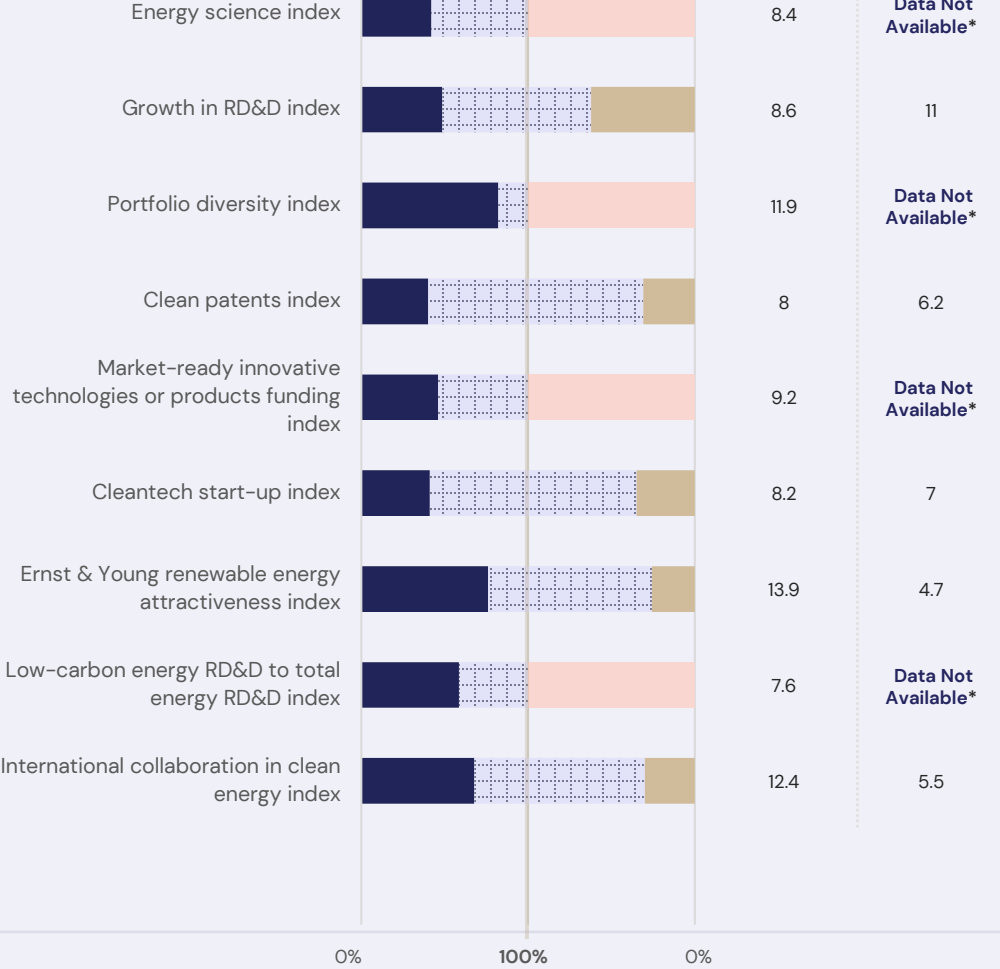
Entrepreneurship



Innovation









Innovation















Policy and Compliance Frameworks





















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	Critical Minerals & Resources			Product and System Design			Advanced Manufacture			
Import - Export	 <ul style="list-style-type: none"> Regulated by Australian Trade and Investment Commission Mining companies are permitted to export and import raw materials 	 <ul style="list-style-type: none"> Regulated by Directorate General of Customs and Excise and Ministry of Mining RI Indonesia stops raw material export activities (UU No.3/2020) 	Standard for EV design	 <ul style="list-style-type: none"> Covered by Standards Australia: <ol style="list-style-type: none"> Safety Material Installation Electricity and Energy Storage Charging Facilities Electromagnetic Radiation Limits 	 <ul style="list-style-type: none"> Covered by Badan Standarisasi Nasional (National Standardization Agency of Indonesia) and the Ministry of Industry: <ol style="list-style-type: none"> Safety Material Charging Facilities Electromagnetic Radiation Limits Battery Testing 	Standard for EV production	 <ul style="list-style-type: none"> Covered by Standards Australia: <ol style="list-style-type: none"> Safety Material Installation Electricity and Energy Storage Charging Facilities Electromagnetic Radiation Limits 	 <ul style="list-style-type: none"> Covered by Badan Standarisasi Nasional (National Standardization Agency of Indonesia) and Ministry of Industry: <ol style="list-style-type: none"> Safety Material Charging Facilities Electromagnetic Radiation Limits Battery Testing 		
Refining	<ul style="list-style-type: none"> Mining companies can build smelters by considering environmental impacts of mining and minerals processing 	<ul style="list-style-type: none"> Mining companies are obligated to build their smelter (UU No.3/2020) 		Renewable Energy	<ul style="list-style-type: none"> Regulated by Electrical Equipment Safety System (EESS), Australian Energy Market Operator (AEMO), and Standards Australia: <ol style="list-style-type: none"> Safety Battery Energy Storage System (BESS) System Reliability Consumer Protection 		<ul style="list-style-type: none"> Badan Standarisasi Nasional (National Standardization Agency of Indonesia) and Perusahaan Listrik Negara (PLN) get direct deposition by Indonesian Government. <ol style="list-style-type: none"> Photovoltaic Battery Energy Storage System (BESS) 	Battery	<ul style="list-style-type: none"> Adopts international battery standards from International Electrotechnical Commission and International Organization for Standardization 	<ul style="list-style-type: none"> Adopts international battery standards from International Electrotechnical Commission and International Organization for Standardization
Expertise	<ul style="list-style-type: none"> Min. requirement: VET, Diploma, and Standard II Certification Minimum salary: National Minimum Wages (per hour) Safety Certification ISO 45001 	<ul style="list-style-type: none"> Min. requirement: Regulated by the Ministry of Energy & Mineral Resources, referring to SKKNI standards Minimum salary: Regional Minimum Wages (per month) Safety Certification ISO 45001 	Battery		<ul style="list-style-type: none"> Adopts battery standards from the International Electrotechnical Commission (IEC) 	<ul style="list-style-type: none"> Adopts battery standards from the International Electrotechnical Commission (IEC) 	Renewable Energy		<ul style="list-style-type: none"> Regulated by Electrical Equipment Safety System (EESS), Australian Energy Market Operator (AEMO), ARENA, and Standards Australia: <ol style="list-style-type: none"> Safety Battery Energy Storage System (BESS) System Reliability Consumer Protection 	<ul style="list-style-type: none"> Badan Standarisasi Nasional (National Standardization Agency of Indonesia) and Perusahaan Listrik Negara (PLN) receive direct deposition by the Indonesian Government: <ol style="list-style-type: none"> Photovoltaic Battery Energy Storage System (BESS)
National Strategies or Initiatives	<ul style="list-style-type: none"> Australia does not have a holding state-owned enterprise of its mining industry Critical Minerals Strategy 2023–2030, including incentives, grants, and support for CRCs: <ol style="list-style-type: none"> Future Battery Industries Cooperative Research Centre (FBI-CRC) MinEx CRC Cooperative Research Centre for Transformations in Mining Economies (CRC-TIME) 	<ul style="list-style-type: none"> Establishment of a holding state-owned enterprise of the mining industry, MIND ID: <ol style="list-style-type: none"> PT ANTAM Tbk PT Bukit Asam Tbk PT Freeport Indonesia PT Indonesia Asahan Aluminium (PERSERO) PT Timah Tbk Indonesia does not have a national critical minerals strategy 			National program / strategy	<ul style="list-style-type: none"> Adopts battery standards from the International Electrotechnical Commission (IEC) 			<ul style="list-style-type: none"> Adopts battery standards from the International Electrotechnical Commission (IEC) 	Environment Performance Standard
Sustainability	<ul style="list-style-type: none"> Certification of Raw Materials (CERA) Initiative for Responsible Mining Assurance (IRMA) 	<ul style="list-style-type: none"> Government Regulation for Implementation of Environmental Protection and Management (PP no.22 2021) *general, not specific to mining 	Worker Assurance	<ul style="list-style-type: none"> Adopts battery standards from the International Electrotechnical Commission (IEC) 		<ul style="list-style-type: none"> Adopts battery standards from the International Electrotechnical Commission (IEC) 	Environment Performance Standard	<ul style="list-style-type: none"> Environmental standard referring to Certification of Raw Materials (CERA) and ISO 14001 Environmental Management 	<ul style="list-style-type: none"> Obligated environmental assessment and analysis for industry (AMDAL) 	
Worker Assurance	<ul style="list-style-type: none"> Work, Health, and Safety in the mining industry is regulated by states and territories 	<ul style="list-style-type: none"> Work, Health, and Safety in the mining industry is regulated by the central government through UU No.6/2023 								

Policy and Compliance Frameworks

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	Market Integration		
Incentive	 <ul style="list-style-type: none"> Free Fringe Benefits Tax (FBT) Subsidy for first purchase of 4W EV (the amount differs for each state) Federal and state rebates for rooftop solar and battery storage Loan and subsidy to install EV chargers at homes Higher Luxury Car Tax threshold for low-emission vehicle 	 <ul style="list-style-type: none"> Tax incentive for purchasing new 4W EV Subsidy for purchasing new 2WEV Subsidy for converting 2W ICE into EV 	Financial Support <ul style="list-style-type: none">  <ul style="list-style-type: none"> 1. Scholarships and research funding related to energy transition, from several government institutions, such as: ARENA, FBICRC, and MRIWA 2. Research Training Program block grants to higher education providers to support students undertaking research doctorate and research masters degrees 3. Higher Education Loan Program provides financial help for University and VET students  <ul style="list-style-type: none"> 1. Scholarships and training assistance for local communities around mineral sourcing area 2. Scholarships for vocational and higher education study in battery, EV and renewable energy related programs from LPDP and Bidikmisi
Trade Policy	<ul style="list-style-type: none"> Removal of customs duty on certain EV 	<ul style="list-style-type: none"> Zero percent tariff for imported EV in both intact or incompletely knocked down (IKD) conditions 	Qualification Framework <ul style="list-style-type: none">  Australia Qualification Framework (AQF)  Kerangka Kualifikasi Nasional Indonesia (KKNI) / Indonesian Qualification Framework
Energy Storage – Safety Standard	<ul style="list-style-type: none"> Covered: <ul style="list-style-type: none"> 1. Battery Safety and Standard 2. Charger 3. Socket and plug 4. Power Generation ARENA Project: Battery Storage System Performance Standard 	<ul style="list-style-type: none"> 1. Battery Safety and Standard 2. Charger 3. Socket and plug 4. Power Generation 	Certification Agency <ul style="list-style-type: none">  Australian Skills Quality Authority (ASQA)  Badan Nasional Sertifikasi Profesi (BNSP) / National Agency of Profession Certification
Consumer Protection	<ul style="list-style-type: none"> Institution: <ul style="list-style-type: none"> - Australia Competition and Consumer Commission (ACCC) Certification schemes: <ul style="list-style-type: none"> - CERA (Certification for Raw Material) - Australian Standards (AS) - Product Safety Australia Regulation: <ul style="list-style-type: none"> - Lithium-ion batteries and consumer product safety standards imposed by the Australian Consumer Law (ACL) 	<ul style="list-style-type: none"> Institutes: <ul style="list-style-type: none"> - National Consumer Protection Agency - Roadworthy Testing Center and Motor Vehicle Certification - Badan Standarisasi Nasional (National Standardization Agency of Indonesia) Certification schemes: <ul style="list-style-type: none"> - Standar Nasional Indonesia (SNI) - Sertifikat Uji Tipe (SUT) / Test Type Certificate and Sertifikat Registrasi Uji Tipe (SRUT) / Type Test Registration Certificate Regulation: <ul style="list-style-type: none"> - General consumer protection law (UU no.8 1999) 	Training and Assessment Agency <ul style="list-style-type: none">  Vocational Education and Training (VET) provider  Lembaga Sertifikasi Profesi (LSP) / Indonesian Certification Agency
Emission Reduction	<ul style="list-style-type: none"> Carbon Farming Initiative (CFI) framework 	<ul style="list-style-type: none"> Official Carbon Trading for Power Generation Subsector 	
Renewable Energy	<ul style="list-style-type: none"> Private power producers can sell electricity to the power retailers through the electricity market regulator, the Australian Energy Market Operator (AEMO) Various state and private-owned providers can distribute and supply end users. 	<ul style="list-style-type: none"> Private power producers can only sell electricity to Perusahaan Listrik Negara (PLN) / State Electricity Company Perusahaan Listrik Negara (PLN) is the sole power distributor and supplier for end users. 	

 Innovation & Entrepreneurship	 Reuse and Recycle	
<p>Energy R&D Startup Incentive</p> <ul style="list-style-type: none">  Research and Development Tax Incentive with up to 43.5% cash back to help mitigate some of this risk and cost  Super Tax Deduction for companies that provide training and R&D activities: 200% for costs incurred for training activities and 300% for costs incurred for R&D activities 	<p>Battery Waste Management</p> <ul style="list-style-type: none">  B-cycle: Official battery stewardship scheme 	<ul style="list-style-type: none">  Regulation for B3 waste management (business to business only)
<p>National Agencies</p> <ul style="list-style-type: none">  The Cooperative Research Centres Program, including: <ol style="list-style-type: none"> Future Battery Industries Cooperative Research Centre (FBI-CRC) MinEx CRC Cooperative Research Centre for Transformations in Mining Economies (CRC TiME)  National Research and Innovation Agency: <ol style="list-style-type: none"> Energy and Manufacture Research Organization Nanotechnology and Material Research Organization  The Commonwealth Scientific and Industrial Research Organization (CSIRO) energy research  National Battery Research Institute (NBRI)  Australian Renewable Energy Agency (ARENA) 	<p>State-owned organization/ program</p> <ul style="list-style-type: none">  B-cycle: Official battery stewardship scheme Government support for the Association for the Battery Recycling Industry Lithium-ion battery recycling R&D by the Commonwealth Scientific and Industrial Research Organisation 	<ul style="list-style-type: none">  Open investment for battery recycling company
<p>Financing Program</p> <ul style="list-style-type: none">  <ol style="list-style-type: none"> Clean Energy Finance Corporation Export Finance Australia Loans Green Financing from state-owned banks Startup Year  <ol style="list-style-type: none"> Kredit Usaha Rakyat (People Business Loan) Green Financing program from state-owned banks LPDP Entrepreneurship Scholarship 2023 Etc. 	<p>Renewable Energy Waste Management</p> <ul style="list-style-type: none"> - Initiated by the Department of Climate Change, Energy, the Environment and Water - Wired for change: Regulation for small electrical products and solar photovoltaic system waste - Product stewardship scheme for photovoltaic systems 	<ul style="list-style-type: none">  No available data indicating waste management activity.
<p>Startup Program by Government</p> <ul style="list-style-type: none">  <ol style="list-style-type: none"> CSIRO ON Accelerate: innovation support program for startups Greenhouse Tech Hub  1000 Startup: Government initiative supporting tech startups' growth 	<p>EV-Battery-Renewable Reuse</p> <ul style="list-style-type: none">  B-cycle: Official battery stewardship scheme National Product Stewardship Scheme to reuse all batteries 	<ul style="list-style-type: none">  2W EV conversion Trade in old Lithium-ion battery for electric motorcycle

Practical Recommendations



Recommendation # 1

Coordination of Continuing Australia-Indonesia Focused Research for the Energy Transition

We recommend an independent focal point for coordinating continuing Australia-Indonesia focused energy transition research, and that energy storage technologies and industries, critical minerals, sustainable mining, policy and compliance frameworks, trade and investment issues, and human capital development be prioritized in its purpose.

Recommendation # 2

Coordination of Skills Exchanges in High Impact Areas of Sustainable Critical Minerals Mining

We recommend a coordinated and deliberate strategy to support the critical minerals mining sector to develop a program of strategic skills exchanges, and people-to-people collaborations that promote advanced sustainable mining.

Recommendation # 3

Promoting Energy Storage Industry Partnerships

We recommend that Indonesia's leading university science and technology parks (STP's) develop industry connect events to promote research, development, and innovation services to Australian energy storage industries, particularly those that are concurrently exploring market entry strategies and ongoing research at the technological readiness levels around testing systems in operational environments.

Recommendation # 4

Expanding Professional Human Resource Development in Environmental Science

We recommend a more detailed analysis of the landscape of professional environmental science education in Indonesia and the capacity for bilateral academic and research partnerships, and human capital development planning initiatives to accelerate ongoing professional expertise that secures the future for environmental and sustainability oversight.

Recommendation # 5

Promoting Green Skills Development

We recommend that Australia and Indonesia accelerate their partnerships around skills training with particular focus on the broad range of green skills throughout the energy storage value chain and the energy transition more generally.

Recommendation # 6

Government Renewable Energy Agency Cooperation

We recommend the establishment of an Indonesia–Australia joint working group to explore cooperation amidst the compliance and standards frameworks throughout the energy storage value chain identified in this study.

Recommendation # 7

Innovation and Entrepreneurship Partnerships

We recommend that Indonesia's PRIME STeP program, and other innovation and start-up incubation communities actively strategize to co-opt industry partners, investors, tech innovators, and researchers to connect, co-innovate, and catalyze start-up incubation and job creation throughout the energy storage value chain.

Recommendation # 8

Isolated and Small Community Grid Networks

We therefore recommend a practical project initiative to explore industry-based technology solutions specific to isolated and small communities. One form that the project could explore is that of a technology solution challenge, in which industry leaders, entrepreneurs, investors, climate tech experts, scientists, or policymakers connect, collaborate, and co-innovate.

Summary

We aimed to highlight with compelling evidence, the opportunities for Australia and Indonesia to expand on decades of collaborations and partnerships and work together to co-create value, create meaningful jobs, and innovate together to solve an integral part of a just energy transition.

