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CREATE CHANGE

Best-Practice Regulatory Principles for the Adoption of Standards

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Acknowledgement of Country

The University of Queensland (UQ) acknowledges the Traditional Owners and their custodianship of the lands on which we meet.

We pay our respects to their Ancestors and their descendants, who continue cultural and spiritual connections to Country.

We recognise their valuable contributions to Australian and global society.

Glossary

Australian or New Zealand Standards	Voluntary standards developed by Standards Australia or Standards New Zealand, which are sometimes made compulsory by regulation.
Compliance	It refers to the process of confirming that a product or service meets the requirements set out in voluntary or regulatory standards.
Dated standard	It refers to a particular version of a standard. If a standard is undated, it refers to the latest version of the standard.
Harmonisation	It refers to the process of aligning and integrating various regulations, practices, and regulatory standards across different jurisdictions.
International standards	Voluntary standards developed by international standards-setting organisations such as the International Organization for Standardization (ISO), and the International Electrotechnical Commission (IEC), which develops standards for electrical, electronic, and related technologies. These international standards incorporate input from various countries, including Australia and New Zealand.
Mandatory (or regulatory) standards	Voluntary standards that are made mandatory by regulators or governments. Additionally, regulators or governments may develop their own standards, which can differ from voluntary standards.

Overseas (or industry) standards	Standards developed by sovereign nations or industry groups without Australian or New Zealand input into the development process.
Performance-based standards	Standards that establish rules or principles to evaluate outcomes, products, or results.
Prescriptive-based standards	Standards that specify a detailed model or template to determine whether a product, service, or method meets acceptable criteria.
Trusted overseas standards	It refers to standards developed by reputable overseas standard-setting bodies, widely adopted, and accepted as authoritative by stakeholders in other comparable jurisdictions to Australia.
Voluntary standards	Documents that set out specifications, procedures and guidelines to ensure that products, services, and systems are safe, consistent, and reliable.

Executive summary

Aims

This report offers strategic guidance on best-practice regulatory approaches for adopting standards. Its aim is to promote the reduction of regulatory barriers in net-zero sectors and enhance regulatory alignment between Australia and New Zealand. It focuses on three main areas:

1. Determining when standards should be made mandatory by regulation.

2. Empowering regulators to adopt the most appropriate standards to meet the stated public policy objective.

3. Ensuring that when adopting standards, regulators and governments consider their impact on wider policy goals and other regulators' services.

Context

The transition to net zero will require a massive global reallocation of resources. Key factors of production—labour, capital, and land—will need to shift from carbon-intensive industries to greener sectors, necessitating reskilling and relocation of workers. Markets and standards will play a crucial role in facilitating this transition.

Voluntary standards influence many aspects of daily life and become mandatory when referenced in regulations. There are benefits and drawbacks of voluntary and regulatory standards, which impact their role in the net-zero transition.

This report develops an economic framework to guide governments and regulators in deciding whether to adopt regulatory standards. It emphasises the importance of assessing the impact of these standards on innovation, competition, market efficiency, consumers, and international trade.

Additionally, it highlights the need to evaluate their effects on incentives and potential unintended consequences. This framework complements existing guidelines and provides clear additional criteria for when standards should be adopted.

When a regulatory standard is deemed the best approach to achieving a public policy objective, guidance is needed on which standard to adopt and how to implement it. Government policy, aligned with international obligations under the WTO, advocates for adopting international standards unless specific local circumstances require deviations.

In practice, however, this report highlights examples of barriers to adopting international standards, and the duplicative and fragmented nature of the process of adopting regulatory standards.

Duplication refers to replicating the efforts of international or overseas standard-setting organisations, which cover much larger markets, to create bespoke standards for Australia and New Zealand. This duplication is costly—a burden ultimately borne by consumers. Additionally, as small, open economies, it risks limiting our access to new products and services and complicates our participation in global supply chains.

Fragmentation occurs when different jurisdictions or regulators impose distinct regulatory standards or interpret and implement common standards differently. As a result, businesses often need to comply with different standards or meet varying compliance regimes across jurisdictions. This creates unnecessary inefficiencies, raising costs for businesses and increasing prices for consumers.

This report places greater emphasis on regulatory barriers in Australia due to its federal system, which impedes interstate and trans-Tasman trade. In contrast, New Zealand adopts a more pragmatic approach to international and trusted overseas standards and is less affected by the fragmented regulatory standards development process seen in Australia.

Consequently, the recommendations in this report that aim to address fragmentation and to promote the adoption of international and trusted standards will enhance regulatory alignment and economic integration between Australia and New Zealand. Furthermore, the recommendations that focus on improving decision-making processes for adopting regulatory standards and on reducing duplication will uplift regulatory performance domestically in both countries.

Background on regulatory standards

This is not the first time that the adoption of best-practice regulatory approaches to setting standards has been considered. In 1994, the Committee on Regulatory Reform presented a report to the Council of Australian Governments (CoAG), highlighting the need for streamlined national standards to reduce complexity and costs for businesses.

CoAG established guidelines aimed to ensure that standards were minimal yet effective, addressing economic, environmental, health, and safety concerns without imposing unnecessary burdens on businesses. Compared to contemporaneous guidelines, CoAG guidelines uniquely emphasise assessing the incentives created by regulatory standards to ensure they drive desired behavioural changes and minimise unintended consequences.

While the CoAG guidelines have served us well, the net-zero transition presents new challenges. It demands significant resource reallocation and changes in consumption and production habits. Markets, firms, and consumers will play a crucial role in this transition, which requires well-functioning markets.

Standards are essential for enabling market transactions, supporting international trade, and achieving public policy goals. However, deviations from international standards can hinder the transition by increasing costs and reducing access to innovations.

This report advocates for performance-based standards that align with international norms to reduce costs and complexity. The key takeaway from the literature is that standards should be as minimal as necessary to achieve policy objectives. Stricter standards are warranted only when ex post liability mechanisms are weak or ineffective. This aligns with Australia and New Zealand's commitments under the WTO agreements.

The economics of standards

Understanding the benefits and costs associated with adopting standards across different dimensions is key for assessing their appropriateness:

International trade: Standards play a crucial role in reducing transaction costs and ensuring compatibility, quality, and consistency across countries. This is especially important for small, open economies like Australia and New Zealand. While bespoke national standards can limit consumer choice and negatively impact trade, harmonised international standards facilitate trade expansion and enhance market accessibility.

Innovation: Standards have opposing impacts on innovation—they can both support and hinder it. By codifying knowledge and reducing market uncertainty, standards provide a stable foundation for incremental innovation. However, they can also limit variety and discourage radical innovation. The impact of standards varies with market conditions: in low-uncertainty markets, regulatory standards can positively influence innovation, while in high-uncertainty markets, voluntary standards are more beneficial.

Competition: Standards can lower barriers to entry, thereby enhancing competition. However, incumbents can also manipulate them to limit competition. Firms may influence standards to raise rivals' costs, reinforcing their market position and hindering new entrants.

Network effects: Standards enable network effects, enhancing the value of technologies with large user bases.

Market efficiency: Standards reduce information asymmetry and transaction costs. This report also notes that governments and regulators need to recognise that adopting regulatory standards involves decisions that create winners and losers, leading to a political economy where certain firms may benefit from participation in the standard-setting process, while others, including consumers, may be excluded.

Moreover, it is crucial to ensure that regulatory standards, including compliance systems, create incentives for behaviour that aligns with public policy goals and to consider potential unintended consequences.

The standards setting process

Regulatory agencies and government departments may adopt voluntary standards developed by national organisations, such as Standards Australia (SA) and Standards New Zealand (SNZ), by international bodies like the International Electrotechnical Commission (IEC) and the International Organization for Standardization (ISO), or by overseas standards-setting organisations like the European Committee for Standardization (CEN), Japan Standards Association (JSA) or Underwriters Laboratories (UL), incorporating them as regulatory requirements. Alternatively, regulators may set their own standards, which could differ from established voluntary standards.

Standards development must adhere to World Trade Organization (WTO) principles such as non-discrimination, transparency, and the use of international standards. Conformity assessment ensures that products meet these standards, with certification bodies formally accredited.

Australia and New Zealand have extensive regulatory cooperation, particularly in food regulation, electrical safety, and building products. The Trans-Tasman Mutual Recognition Arrangement (TTMRA) allows goods legally sold in one country to be sold in the other, despite differing standards. This arrangement simplifies cross-border business operations and provides consumers with a wider range of goods and services. However, inconsistent implementation and increasing exclusions from the agreements' scope can undermine their benefits. The recommendations in this report aim to promote greater alignment, benefiting both Australians and New Zealanders.

Efficiency considerations

The report identifies inefficiencies in the current standards adoption process, such as the duplication of costs and the need to update standards. Developing bespoke regulatory standards, even when partly adopting international or trusted overseas standards, incurs significant fixed costs. This duplicates the costs incurred by international standards-setting organisations, and reputable overseas standards-setting organisations that cover much larger markets. In Australia, adopting standards across different jurisdictions involves repetitive impact assessments, and can lead to differences in interpretation and implementation, and in some instances, differences in the standards themselves.

The lengthy process required for updating standards creates inefficiencies and risks for businesses, highlighting the need for a more agile regulatory framework.

While the direct costs of developing or updating regulatory standards are high, the indirect costs are likely to be even greater. These indirect costs include higher consumer prices, lack of access to newer, safer, or higher-performing products and services, and regulatory uncertainty due to increased compliance costs when standards deviate from international benchmarks. For example, businesses importing products that meet updated international or trusted overseas standards may find them non-compliant with outdated local standards, leading to financial and non-financial burdens.

This report also finds that payments required for access to standards referenced in legislation undermine the benefits of standards, particularly for small businesses. Restricted access to standards can lead to

non-compliance, safety issues, and significant penalties.

The recommendations in this report aim to reduce duplication, ensure timely development and updates, harmonise standards across jurisdictions and regulators, and improve access to standards.

EV charging infrastructure and secondary batteries

SA undertook mapping projects covering EV charging infrastructure and secondary batteries, including reuse, repurposing, recycling, and end-user safety.

These projects identified gaps in existing standards. Some of these gaps are proposed to be addressed by adopting international standards, while others require the development of new bespoke national standards or updates to existing ones.

However, given the costly and time-consuming nature of developing or updating bespoke national standards, and the rapid pace of technological advancement in some domains, regulators should consider relying on international and trusted overseas standards. This approach is advocated in this report.

Importantly, during this review, we have observed a wide range of regulatory barriers unrelated to standards that are challenging the net-zero transformation. These barriers, some of which have been highlighted in this report, span different sectors and regulatory frameworks, presenting added challenges to the swift and effective adoption of carbon-neutral technologies and practices. To fully harness the potential of the net-zero transformation, it is imperative that governments consider further joint work to address these wider regulatory barriers. Such collaboration would unlock a wide range of opportunities, streamline processes, and significantly advance our shared decarbonisation goals.

Recommendations

The report presents recommendations around three main themes, providing reasons for each and suggesting implementation strategies. The recommendations, summarised in Figure 1, support the transition to a green economy and align with government priorities, including Australia's national electric vehicle (EV) and battery strategies.

The implementation pathways identified in this report are summarised as follows:

- **Development of national guidelines** based on the recommendations 1 to 6 by the responsible policy departments in Australia New Zealand. The widespread adoption across jurisdictions in Australia could be undertaken through the Council on Federal Financial Relations.

- The **Revitalised National Competition Policy (NCP)** could be the vehicle for commitment to reforms that require national coordination in the Australian context (Recommendations 1, 7, 8 and 12). The implementation of the reforms and coordination with the New Zealand Government could then occur across different areas (e.g., electrical safety) under the appropriate forum (e.g., the **Energy and Climate Change Ministerial Council**).

- **Trans-Tasman collaboration** through the 2+2 process could achieve coordination on the development of guidelines and on Recommendations 10 and 11.

Conclusion

This report underscores the importance of adopting best-practice regulatory approaches to support the net-zero transition and promote higher standards of living for Australians and New Zealanders by ensuring access to higher quality, safer, and less expensive goods and services. It calls for a more robust assessment of regulatory standards, a shift towards the automatic adoption of international and trusted overseas standards, improved coordination among regulators, making standards freely accessible to enhance market efficiency and consumer protection, and a more agile and

responsive approach to setting and updating regulatory standards.

An efficient process that adheres to international obligations and allows regulators to modify and adapt existing international norms when they cannot be adopted automatically, or facilitate the development of new ones when necessary, will enable Australian and New Zealand governments and regulators to better utilise standards. This will ensure greater public and industry engagement with net-zero technology, as safety and specification standards provide boundaries and assurance for industry innovation and consumer confidence.

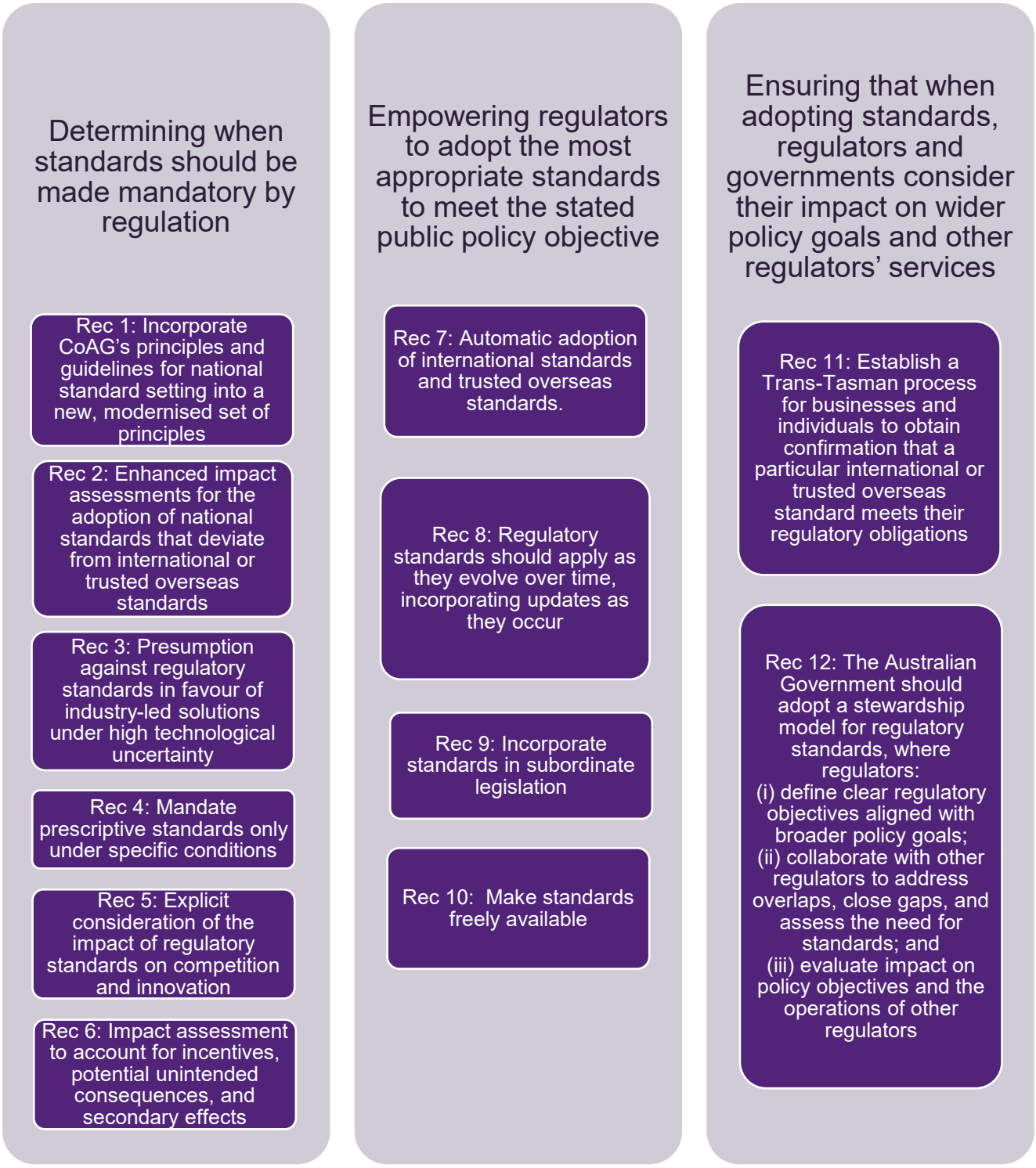

Figure 1: Summary of recommendations

These recommendations aim to reduce duplication, ensure timely development and updates, harmonise standards across jurisdictions and regulators, and improve access to standards.

1. Introduction

We have been engaged by the Australian Treasury to provide strategic advice to the Australian and New Zealand governments on best-practice regulatory approaches for adopting standards to support the transition to net zero. While there is a focus on the adoption and recognition of standards for secondary batteries and electric vehicle (EV) charging infrastructure, our findings and recommendations extend far beyond these specific areas.

The transition to net zero represents an unprecedented reallocation of resources on an almost unimaginable scale. As Olivier Blanchard recently emphasised[1], the net-zero transition is the most profound structural transformation in human history. This transformation is not only radical in its scope but also urgent in its timeline. To avert catastrophic climate outcomes, the share of carbon-neutral technologies in the global energy supply must increase from around 20% today to 80% by 2050.[2]

This immense and urgent resource reallocation encompasses the deployment of existing technologies, such as EV charging infrastructure and secondary batteries, as well as the introduction of new products and services. Many of these innovations will require the creation of new standards or the adoption of existing ones developed by international and trusted overseas organisations. For instance, Standards Australia (SA) estimates that the net-zero transition will demand over 4,000 new or significantly amended standards within the next decade.[3]

This report provides several recommendations to enhance the decision-making processes and to address the fragmented and duplicative nature of current regulatory frameworks for adopting standards. Addressing these shortcomings is essential. Without decisive action, the net-zero transition will be slower and more expensive, undermining efforts to achieve net zero and mitigate the effects of climate change.

1.1 Voluntary versus mandatory standards

Standards are defined by Australia's leading independent, non-governmental, not-for-profit standards organisation, SA, as:

> *'…voluntary documents that set out specifications, procedures and guidelines that aim to ensure that products, services, and systems are safe, consistent, and reliable.'*[4]

[1] Remarks during *Session 2: The Green Transformation* at the Peterson Institute for International Economics conference on "Rethinking economic policy: Steering structural change," April 2024. Available at https://www.piie.com/events/2024/rethinking-economic-policy-steering-structural-change.
[2] International Energy Agency (2023), "Net Zero Roadmap: 2023 Update. Available at https://www.iea.org/reports/net-zero-roadmap-a-global-pathway-to-keep-the-15-0c-goal-in-reach.
[3] Standards Australia (2022), "Iconic Nation Report". Available at https://www.standards.org.au/documents/j-1870-the-standards-australia-iconic-nation-report.
[4] https://www.standards.org.au/standards-development/what-is-standard.

Australia has over 9,000 voluntary standards that influence nearly every aspect of daily life.[5] Approximately one-third of these standards become mandatory when referenced in Australian, State, or Territory regulations. [6] These standards span diverse sectors, including agriculture, transport, health, information technology, and e-commerce, underpinning critical areas of the economy and ensuring safety, efficiency, and reliability.

It is important to distinguish between best practice approaches to setting voluntary standards by national and international standard bodies, and best practice approaches for governments and regulators to adopt voluntary standards as regulatory requirements, or to set their own standards, which may differ from voluntary standards.[7] While this report focuses on best practice approaches for regulators and governments to adopt standards, the process for setting voluntary standards will also play an important role in the net-zero transition.

Voluntary standards, even when not made mandatory by regulation, can assist society in managing complex information, promoting innovation, and ensuring that processes, products, and services are safe, efficient, and accessible. However, voluntary standards may also have negative consequences. They can increase barriers to entry, reduce variety and choice, and raise compliance costs. The potential impact will depend on the nature of the standard and may change if they become mandatory.

Understanding the potential benefits and drawbacks of voluntary standards is crucial for regulators when deciding whether to adopt a standard and which standards to choose. This is because voluntary and regulatory standards often serve distinct purposes. Voluntary standards typically aim to enhance product performance and reliability or address safety concerns, while regulatory standards aim to achieve specific public benefits, such as ensuring **minimum** quality or safety levels. Mandating a standard limits individual choice by only allowing products and services that meet these minimum requirements. Recognising this distinction is essential for identifying best-practice principles for the adoption of standards in regulatory frameworks.

1.2 The main themes

This report identifies and prioritises feasible, high-impact solutions to remove regulatory barriers related to standards in net-zero sectors across Australia and New Zealand and to promote trans-Tasman regulatory alignment. A central theme is the critical importance for small, open economies like Australia and New Zealand to adopt international standards and trusted overseas standards.

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[5] Standards Australia (2022), op. cit.

[6] Australian Government Department of Industry, Innovation and Science (2016), "Australia's Standards and Conformance Infrastructure." Available at https://www.industry.gov.au/sites/default/files/June%202018/document/pdf/australias-standards-and-conformance-infrastructure.pdf.

[7] The World Trade Organization Technical Barriers to Trade (WTO TBT) Agreement refers to these mandatory standards set by governments or regulatory agencies as technical regulation. in this report, the terms mandatory standards and regulatory standards are used interchangeably.

Such position is consistent with our obligations under the World Trade Organization (WTO) and adheres to widely accepted WTO principles and practices.

When introducing standards, regulators should presume the adoption of international standards and trusted overseas standards unless there are clear, specific reasons to deviate based on local circumstances. *International standards* are the voluntary standards developed by international standards-setting organisations. *Trusted overseas standards* refer to those developed by reputable overseas standard-setting bodies, widely adopted, and accepted as authoritative by stakeholders in other comparable jurisdictions to Australia.[8] This terminology is intended to be consistent with its use in Australian Government policy.

As examined later in this report, an important institutional design consideration is how this presumption is operationalised. For example, should regulators bear the burden of proving that international and/or trusted overseas standards are appropriate? Or, alternatively, should international and/or trusted overseas standards be automatically adopted unless regulators can demonstrate they are unsuitable in the local context? As discussed in this report, this choice matters for the efficiency of the regulatory standard setting process.

This report underscores the critical need to balance the benefits of mandatory standards—especially when they deviate from international or trusted overseas—against their associated costs. While mandatory standards can simplify markets and help achieve vital policy objectives, such as improving safety, they may also unintentionally reduce product variety. By favouring standardised products or prescriptive rules, mandatory standards can limit access to non-standardised alternatives or international markets that adhere to different standards. This reduction in variety can diminish consumer welfare, restrict choice, raise costs, and potentially counteract the very public policy objectives they aim to support.

The economics literature highlights the risks of overly prescriptive standards, which can lock industries into specific technologies or practices. This rigidity may hinder competition and innovation[9], ultimately impeding long-term economic growth.[10] By prioritising flexible, performance-based standards aligned with international or trusted overseas standards, regulators can mitigate

[8] See, for example, the criteria used by the ACCC for automatic adoption of international standards in the context of consumer products safety, available at https://www.productsafety.gov.au/system/files/ACCC%20policy%20principle%20-%20International%20standards%20for%20the%20safety%20of%20consumer%20products%20-%20criteria%20for%20acceptance.pdf. The ACCC's use of the term international standards seems to cover both international standards and trusted overseas standards, as defined in the Glossary.

[9] See, for example: Lerner, J. and Tirole, J. (2015), "Standard-essential patents," *Journal of Political Economy*, 123 (3), 547–586; Schmalensee, R. (2009), "Standard-setting, innovation specialists and competition policy," *Journal of Industrial Economics*, 57 (3), 526–552; and Llanes, G. and Poblete, J. (2014), "Ex ante agreements in standard setting and patent-pool formation," *Journal of Economics and Management Strategy*, 23 (1), 50–67.

[10] See, for example: David, P.A. (1985), "Clio and the economics of qwerty," *American Economic Review*, 75 (2), 332–337; Farrell, J. and Saloner, G. (1986), "Installed base and compatibility: innovation product preannouncements, and predation," *American Economic Review*, 76 (5), 940–955; and Farrell, J. and Saloner, G. (1985), "Standardization, compatibility, and innovation," *Rand Journal of Economics*, 16 (1), 70–83.

these risks while maximising both market efficiency and consumer benefits and achieving their policy objective.

That is, well-chosen regulatory standards can potentially achieve the same social objectives—such as ensuring consumer safety—without the adverse effects of standardisation highlighted in the literature.

In this report, we define *prescriptive regulatory standards* as those that specify a detailed model or template to determine whether a product, service, or method meets acceptable criteria. By contrast, *performance-based regulatory standards* establish rules or principles to evaluate outcomes, products, or results, offering greater flexibility.[11] By imposing fewer restrictions on the product and services that are permitted, performance-based standards create greater opportunities for innovation and competition.

When regulators and government departments consider adopting or establishing their own standards, whether they are prescriptive, or performance-based, it is crucial to evaluate their impact on incentives and potential unintended consequences. For example, introducing a performance-based regulatory standard that mandates the use of a minimum percentage of recycled materials in government-funded household batteries made in Australia could support the development of a recycling industry. However, this standard might unintentionally reduce the batteries' lifespan by limiting their secondary use (reuse). As discussed later in the report, this highlights the importance for regulators to consider unintended or secondary effects when adopting standards.

This report complements existing Australian guidelines such as the Department of Industry, Innovation, and Science's *Best practice guide to using standards and risk assessments in policy and regulation.*[12] It also complements the *How are standards used in policy and regulation*[13] guidance issued by New Zealand Standards and Worksafe Mahi Haumaru Aotearoa's *Referring to standards in regulation and guidance*.[14] While these guidelines focus on process, offering step-by-step direction for regulators and government departments, this report provides a broader policy perspective based on an economic framework.

It examines the economic conditions under which regulatory standards can effectively support the net-zero transition, including:

- **When** regulatory standards are warranted,

[11] For similar definitions, see Australian Government, Department of Industry, Innovation, and Science, DISS (2016), "Best practice guide to using standards and risk assessments in policy and regulation." Available at https://www.industry.gov.au/sites/default/files/2019-03/best-practice-guide-to-using-standards-and-risk-assessments-in-policy-and-regulation.pdf.

[12] https://www.industry.gov.au/sites/default/files/June%202018/document/extra/best-practice-guide-to-using-standards-and-risk-assessments-in-policy-and-regulation.pdf.

[13] https://www.standards.govt.nz/assets/documents/about/policy-and-legislation.pdf.

[14] https://www.worksafe.govt.nz/laws-and-regulations/operational-policy-framework/operational-policies/referring-to-standards-in-regulation-and-guidance/.

- **What** type of standards should be mandated (e.g., international vs. national, or prescriptive vs. performance-based), and

- **When** harmonising or coordinating regulatory standards across the Tasman and within Australian jurisdictions is likely to be beneficial. [15]

The net-zero transition amplifies the need for deeper economic integration across the Tasman and within Australia. Greater integration helps to address challenges such as the rapid pace of technological advancement, the overlapping roles of multiple standard-setting agencies or jurisdictions, the involvement of diverse stakeholders with conflicting goals, the need for global coordination, and the delicate balance between flexibility and consistency.

By removing regulatory barriers, harmonisation—or improved coordination and alignment—enables businesses to achieve scale efficiencies, fosters the entry and growth of new firms, and enhances market competitiveness. Resolving inconsistencies in regulations and standards is critical for fostering connections between jurisdictions and building a cohesive framework that drives sustainable innovation and economic growth.

Best-practice regulatory approaches to adopting standards extend beyond identifying appropriate principles. Once a regulatory standard is determined to be the best solution to a public policy concern, it is equally important to establish a robust process for setting those standards. This report not only provides economically grounded guidance on the "when" and "what" of standard adoption but also examines broader governance arrangements, addressing the critical question of **how** standards should be developed and implemented.

An efficient process that adheres to international obligations and allows regulators to modify and adapt existing international norms when they cannot be adopted automatically, or facilitate the development of new ones when necessary, will enable Australian and New Zealand governments and regulators to better utilise standards. This will ensure greater public and industry engagement with net-zero technology, as safety and specification standards provide boundaries and assurance for industry innovation and consumer confidence.

1.3 Inputs for this report

An important consideration was the standards mapping process undertaken by SA, designed to support Australia's National Battery Strategy[16] and National Electric Vehicle Strategy.[17] Inputs from New Zealand include general guidance such as *A Guide to New Zealand's Standards and*

[15] Harmonisation does not necessarily imply uniformity—although, in certain circumstances, this approach may be beneficial. Harmonisation will usually be best achieved through performance-based standards, which provide flexibility while aligning objectives.
[16] https://www.industry.gov.au/publications/national-battery-strategy.
[17] https://www.dcceew.gov.au/energy/transport/national-electric-vehicle-strategy.

Conformance System March 2018[18] and *Standards on Residential Electric Vehicle (EV) Charging*[19] developed by SNZ.

The completion of this report involved extensive consultation and followed several key steps:

- Observing the standards mapping work carried out by SA and its advisory committees, and reviewing key project deliverables such as plans, draft reports, and final outputs.
- Examining the current regulatory frameworks and practices in Australia and New Zealand related to standards, including in net-zero sectors, to identify gaps, barriers, and opportunities for alignment and harmonisation with international best practices.
- Engaging with stakeholders from government, industry, academia, civil society, and standards development organisations to gather insights and inform the advice provided.
- Reporting to relevant government stakeholders on recommendations for setting regulatory standards that foster market conditions conducive to the net-zero transition. These recommendations can enhance access to products and services, promote innovation and competition, and further develop the single economic market of Australia and New Zealand.

1.4 A greater focus on Australia

While we have been asked to give strategic advice to both the Australian and New Zealand governments about addressing standards-related regulatory barriers and improving trans-Tasman alignment, much of this report focuses on barriers that exist in Australia. This focus is due to several factors, including New Zealand's significant progress in lowering regulatory barriers to international trade. With a brief time to conduct this review, we tried to draw attention to the highest friction areas around regulatory interactions with standards in key net-zero sectors in both countries. From an early stage it was clear that much of this friction arises due to the fragmented regulatory settings across states/territories settings in Australia.

New Zealand, as a small open economy, has implemented policy settings to align with its closest trading partners, especially Australia. New Zealand has taken a more pragmatic approach to the adoption of international and trusted overseas standards in regulation, seeking to enhance outcomes for New Zealand consumers while also promoting global trade. Additionally, recent and proposed legislative measures, such as making a wider range of safe building products from overseas more readily available, as discussed in Section 4.5, further exemplify New Zealand's commitment to reducing barriers to adopting international and trusted overseas standards.

In contrast, Australia's federal system presents unique challenges that may unnecessarily hinder interstate and trans-Tasman trade. The division of regulatory authority between the federal and

[18] https://www.mbie.govt.nz/dmsdocument/6580-a-guide-to-nw-zealands-standards-and-conformance-system.
[19] https://www.standards.govt.nz/shop/snz-pas-60112023.

state/territory governments can lead to fragmentation and inconsistency, creating obstacles for businesses in other jurisdictions, including New Zealand. This complexity requires a more focused approach to finding and addressing regulatory barriers within Australia to ensure alignment with international best practices and to promote seamless trade across both national and trans-Tasman contexts. The recommendations in this report aimed at reducing fragmentation and inconsistency in Australia will improve outcomes for consumers and businesses in both countries. Furthermore, the recommendations that focus on improving decision-making processes for adopting regulatory standards and on promoting the adoption of international standards and trusted overseas standards will uplift regulatory performance domestically in both countries.

During this review, we have observed a wide range of regulatory barriers unrelated to standards that are challenging the net-zero transformation. These barriers, some of which are highlighted in this report, span various sectors and regulatory frameworks, presenting added challenges to the swift and effective adoption of carbon-neutral technologies and practices. To fully harness the potential of the net-zero transformation, it is imperative that governments consider further joint work to address these wider regulatory barriers. Such collaboration would unlock a wide range of opportunities, streamline processes, and significantly advance our shared decarbonisation goals.

1.5 How this report is organised

Section 2 offers an overview of existing guidance on setting regulatory standards, beginning with the microeconomic reforms of the 1990s. Section 3 reviews what we know about the impacts of voluntary and mandatory standards on international trade, innovation, competition, and market efficiency. It also considers the impact of incentives, unintended consequences and secondary effects of regulatory standards. This analysis addresses the critical “when” and “what” questions regarding the adoption of regulatory standards.

Section 4 investigates the roles of voluntary and mandatory standards in today’s economy, while Section 5 identifies challenges that hinder the efficiency and efficacy of the standard-setting process. These challenges inform institutional design recommendations with relevance beyond EV charging infrastructure and secondary batteries.

Section 6 describes the ongoing developments of EV charging infrastructure and secondary battery standards. Section 7 offers our recommendations.

2. Background

The adoption of best-practice regulatory approaches to setting standards has been scrutinised for decades. This section briefly reviews existing guidance on setting regulatory standards and advocates for a framework that facilitates the net-zero transition. Such a framework would ensure the deployment of critical technologies, promote access to global innovation, and incentivise international cooperation and investment.

2.1 The CoAG reforms

In February 1994, the Committee on Regulatory Reform presented a pivotal report to the Council of Australian Governments (CoAG), addressing pressing challenges in the development of national standards in Australia. This review was spurred by a September 1992 paper from leading business associations, which called for sweeping reforms to Australia's regulatory system. The paper argued that the existing framework was overly complex, causing delays, inconsistencies, and heightened costs for businesses. It also highlighted how these inefficiencies stifled innovation and discouraged risk-taking. In the face of an increasingly globalised economy, the urgency of reform was clear: Australia needed a streamlined, competitive regulatory system to attract foreign investment and thrive in a rapidly transforming world.[20]

These initial efforts led to the creation of a unified set of principles to guide Ministerial Councils and intergovernmental standard-setting bodies in crafting regulatory proposals. CoAG's guidelines established best practices for evaluating whether specific standards, along with their associated laws and regulations, represented the most effective regulatory approach. The goal was to ensure that standards were kept to the minimum necessary, avoiding excessive or unnecessary burdens on businesses while addressing the economic, environmental, health, and safety concerns of governments.

Once a Regulatory Impact Statement (RIS) established the need for regulation—with the burden of proof resting on the proponent—the principles of regulation outlined in Box 1 provided a framework for developing appropriate standards and regulations. The CoAG principles for good regulatory practice were applied broadly, shaping decisions not only by CoAG and Ministerial Councils but also by other intergovernmental bodies formed to address national regulatory challenges, whether these bodies were created through statutory or administrative processes.

[20] See CoAG (1995, 1997, 2004), "Principles and Guidelines for National Standard Setting and Regulatory Action." Available at https://www.pc.gov.au/research/supporting/national-standard-setting.

Box 1: Principles and guidelines for setting standards in Australia

CoAG (1995, 1997, 2004) **Principles**[21]	**DIIS (2016)** **Process**
• Minimising the impact of regulation • Minimising the impact on competition • Predictability of outcomes • Compatibility with International standards and practices whenever possible • Regulations should not restrict international trade • Regular review of regulation • Flexibility of standards and regulations • Standardise the exercise of bureaucratic discretion whenever possible **Features of good regulation** • Minimising regulatory burden on the public • Minimising administrative burden • Subject to a regulatory Impact Assessment, which quantifies costs and benefits. Incentive effects should be made explicit. • Policy-makers accountability • Compliance strategies and enforcement (including incentive effects) • Consideration of secondary effects • Inclusion of standards in current editions appendices rather than in the regulation • Performance-based regulation focusing on outcomes rather than inputs • Plan language drafting • Date of commencement set to allow transition to compliance • Advertising the introduction of standards and regulations • Public consultation	• To consider whether a there is a need to complete a Regulatory Impact Statement (RIS) to support the use of standards and risk assessments • The suitability of standards and/or risk assessments for achieving the policy objective • The selection of the most appropriate standard or risk assessment to support policy or program objectives • Evidence that specification of a standard or conduct of a risk assessment will support the achievement of policy or program objectives • The process of adopting the standard and/or risk assessment into the appropriate policy or program framework

2.2 Contemporaneous guidelines

Box 1 also lists more recent guidelines issued by the Department of Industry, Innovation and Science (DIIS). These two guidelines share several similarities, including a focus on risk-based regulation, regulatory impact statement requirements, and performance-based standards. However, a key difference lies in the depth of economic considerations each set includes.

For instance, unlike the DIIS document, the CoAG guidelines explicitly emphasise the importance of assessing the incentives created by regulatory standards. This assessment is crucial not only in the cost-benefit analysis but also in the design of the compliance framework. It involves evaluating whether the proposed regulatory standards will drive behavioural changes that help achieve

[21] For the full list of principles, including principles for setting voluntary standards, see CoAG (1995, 1997, 2004), op. cit.

regulatory objectives. Moreover, incentive-compatible compliance regimes—where it is in the best interest of those subject to the regulation to comply—typically result in reduced regulatory and administrative burdens.

The CoAG guidelines also highlight the need to consider potential unintended consequences. These include impacts on other markets or activities (secondary or general equilibrium effects) and unanticipated costs of overly restrictive interventions. For example, an overly restrictive standard that excessively increases the costs of sunscreen lotions may lead to consumers buying and using less sunscreen, thereby reducing overall sun protection. Identifying such unanticipated impacts is a crucial best-practice regulatory principle for setting standards.

While none of the guidelines explicitly consider institutional design, it is essential for regulators to be incentivised to set standards that balance the regulatory burden on society with the desired social goals, such as harm minimisation. Continuing with our sunscreen example, a regulator focused solely on the safety of the sunscreen lotion might overlook the broader impact of the standards on overall sun protection. We will return to this topic later in the report.

2.3 Guidance for the net-zero transition

While the CoAG guidelines reflected best regulatory practice for adopting standards at the time,[22] the net-zero transition entails new challenges and trade-offs. The transition to net zero will require an unprecedented reallocation of resources on a global scale. Billions of people will need to change their consumption habits, modes of travel, energy and water use, and waste management practices. At the same time, millions of businesses must transform their production processes—sometimes fundamentally altering what they produce—and reassess how they source inputs and deliver products.

This transformation will also involve the reallocation of key factors of production—labour, capital, and land—from carbon-intensive industries to greener sectors. Workers will need to reskill and relocate, while capital will shift both within and across industries and borders. The timeline for this transition is tight, with just two to three decades to avert catastrophic environmental consequences.

Markets will be critical in facilitating this massive resource reallocation and standards will play a key role in enabling market transactions by providing confidence for anonymous parties to engage in trade. Consumers depend on quality and safety standards when making purchasing decisions. International trade, as well as the necessary transport and communication infrastructure, is

[22] Assessments by the former Office of Regulatory Review primarily focused on compliance with the guidelines rather than evaluating their effectiveness. For an example, see the National Competition Council (2003), *Assessment of Governments' Progress in Implementing the National Competition Policy and Related Reforms: Volume One – Overview of the National Competition Policy and Related Reforms*, AusInfo, Canberra. Although there are no direct measures of the guidelines' effectiveness, substantial evidence indicates that microeconomic policy reforms were instrumental in driving Australia's productivity surge in the 1990s. For a summary of this evidence, see Parham, D. (2004), "Australia's 1990s Productivity Surge and Its Determinants", in T. Ito and A. K. Rose (Eds.), *Growth and Productivity in East Asia*, NBER-East Asia Seminar on Economics, 13, 41-68.

supported by global standards. Governments also rely on standards to achieve public policy goals, such as addressing safety and environmental issues.

However, standards can also become barriers when used to impose unnecessary regulations. This is especially relevant for small, open economies like Australia and New Zealand, where bespoke national standards that deviate from international norms can hinder the net-zero transition. Such deviations can unnecessarily increase compliance costs, delay the deployment of critical technologies, reduce access to global innovations, and create barriers to international cooperation and investment.

The best-practice regulatory approaches for standards adoption outlined in this report extend the principles established during the COAG reforms of the 1990s by considering the unique challenges posed by the net-zero transition. The objective should be to set the minimum necessary regulatory standards, ideally aligned with international standards, to ensure consistency across the Tasman and within Australian jurisdictions. These standards must balance economic, environmental, health, and safety priorities.

Given the rapid pace of technological change and the urgency of the net-zero transition, the standards-adoption process must be agile and forward-looking. Building on the principles of the COAG reforms, prioritising performance-based international standards and trusted overseas standards is essential. This approach allows for greater flexibility and innovation.

Equally important is minimising unnecessary societal costs, which arise from:

- Deviations from international standards or trusted overseas standards that are widely recognised and appropriate.
- Discrepancies across jurisdictions and regulators, which can create inefficiencies and inconsistencies and lead to broader impacts beyond the intended public policy goals for the adoption of the regulatory standard.

By addressing these challenges, the standards-adoption process can more effectively support the net-zero transition, align with international best practices, and reduce costs and complexity.

The Productivity Commission[23] recently illustrated the potential benefits of streamlining the adoption of international standards or trusted overseas standards through a case study approach. It reported estimates from the Australian Competition and Consumer Commission (ACCC) that making it easier for mandatory standards to recognise a wider range of voluntary overseas and Australian standards could deliver direct savings of $500 million annually for businesses in Australia. These savings would apply to over 40 mandatory standards under the ACCC's responsibility, covering products such as

[23] Productivity Commission (2024), "National Competition Policy: modelling proposed reforms", *Study report*, Canberra. Available at https://www.pc.gov.au/inquiries/completed/competition-analysis/report.

treadmills, quad bikes, and portable swimming pools. Furthermore, the Productivity Commission estimated a net present benefit of $2 billion from enabling Vehicle-to-Grid (VTG) technology. These benefits arise from substitution effects, as VTG technology reduces the need for costly grid-scale battery storage.

2.4 *Ex ante* versus *ex post* regulation

The preceding discussion assumes that regulatory standards are the sole tools available to achieve desired policy objectives such as ensuring minimum safety, performance or reliability. However, before examining the benefits and costs of standards, it is essential to first review the economic insights on the choice between *ex ante* and *ex post* regulation.

The economic literature on externalities extensively examines the most efficient regulatory instruments, focusing on the trade-offs between *ex ante* measures (e.g., safety standards or Pigouvian taxes) and *ex post* mechanisms (e.g., tort liability or fines and penalties for non-compliance). *Ex ante* regulation addresses potential harms before externalities arise, while *ex post* regulation seeks to address them after damage has occurred. The latter relies on the threat of liability—financial, legal, or criminal—to incentivise potential injurers to internalise the social costs of harm and adopt precautionary measures.

Traditionally, economists have viewed *ex ante* and *ex post* policies as substitutes. In practice, however, they often coexist. For instance, pharmaceutical regulation employs both approaches: manufacturers must conduct rigorous testing to meet Australia's Therapeutic Goods Administration (TGA) requirements (an *ex ante* approach) and are also subject to compliance and strict liability regimes after products enter the market (*ex post* regulation).[24]

Both approaches have limitations. Critics of *ex ante* regulation emphasise regulators' imperfect knowledge of accident costs and damages, leading to potential over-regulation of some activities and under-regulation of others.[25] Conversely, *ex post* regulation faces practical challenges, including inconsistent enforcement, bankruptcy risks, and uncertainty about legal standards, which can result in suboptimal precaution levels.

Research by Shavell (1984, 1987)[26] and Kolstad et al. (1990)[27] show, however, that *ex ante* and *ex post* regulation can complement one another. Their combined use can mitigate the inefficiencies associated with relying on either approach alone. For instance, in safety regulation, setting ex-ante standards at levels below the socially optimal threshold—when combined with *ex post* liability—can

[24] https://www.dlapiper.com/-/media/files/insights/publications/2021/03/2020-medicinal-product-regulation-and-product-liability-in-australia.pdf?rev=-1&hash=5EC9E07E3C525E6433B4992EA6F26174.

[25] See, for example, Baumol, W. J. and Oates, W. E. (1971), "The use of standards and prices for protection of the environment," *Swedish Journal of Economics*, 73, 42-54; Weitzman, M. L. (1974), "Prices Versus Quantities," *Review of Economic Studies*, 41, 477-491; and Shavell, S. (1984) "Liability for harm versus regulation of safety," *Journal of Legal Studies*, 13, 357-374.

[26] Shavell, S. (1984), "A Model of the optimal use of liability and safety regulation," *Rand Journal of Economics*, 15, 271-280.; and Shavell, S. (1990), *Economic analysis of accident law*, Cambridge, MA: Harvard University Press.

[27] Kolstad, C. D., Ullen, T. S., and Johnson, G. V. (1990), "Ex post liability for harm vs. ex ante safety regulation: Substitutes or complements?", *American Economic Review*, 80(4), 888-901.

create a more efficient outcome. By contrast, when *ex post* liability is absent or ineffective, *ex ante* standards must align with the socially optimal level, where the marginal cost of precaution equals the marginal benefit.

To better understand the mechanisms behind these findings, consider the example of a firm with limited assets engaging in an environmentally risky activity that could harm third parties. A regulator intervenes beforehand, enforcing a verifiable standard of preventive effort to reduce the likelihood of an accident. If an accident occurs, a judge may impose a fine on the firm. Optimal regulation sets a standard of care that balances the firm's marginal disutility with the expected damage. The judge's role is crucial, as it allows for the assessment of actual damage during a legal suit, thereby enhancing incentives based on this information and permitting a lower standard of preventive effort. In this scenario, fines imposed based on environmental damage serve the same purpose as the judge. Additionally, without ex-post liability, the ex-ante regulatory standard of preventive effort would need to be higher.

The key takeaway from the literature for policymakers to consider is that regulatory standards should be as minimal as necessary to achieve policy objectives. Stricter standards are warranted only when *ex post* liability mechanisms are weak or ineffective. By balancing the strengths of both approaches, regulators can optimise societal outcomes while minimising inefficiencies.

The next section explores the economics of standards in detail, focusing on when standards, whether designed by national or international standards organisations or by governments or regulators, should be adopted to promote societal welfare.

3. An economic framework for adopting regulatory standards

Standards—whether technical, safety, or environmental—play a critical role in shaping the economy. Both regulatory and voluntary standards serve key purposes, such as ensuring compatibility and interoperability across jurisdictions and industries, setting minimum requirements (e.g., safety, environmental), fostering economies of scale by reducing unnecessary variety, and defining the technical or measurement characteristics of products and services.[28]

However, as previously discussed, the adoption of standards also incurs significant costs. These include direct costs, such as the expense of developing and complying with standards, and indirect costs, particularly inefficiencies. Standards can unintentionally influence behaviour—for instance, firms may focus more on meeting regulatory requirements than on pursuing innovation or cost reduction. Resources may even shift to less-regulated sectors, undermining the original intent of the regulatory intervention.

In addition, standards can stifle competition by increasing barriers to entry, which lowers productivity, reduces employment, and drives up prices. They may also create perverse political economy incentives, where industries lobby regulators to design standards favouring incumbent firms, limiting competition further. Over-prescriptive national standards that diverge from international norms can delay the rollout of new products and services, harm export competitiveness, and encourage offshoring of operations.

This section explores the impacts of standard adoption on international trade, innovation, competition, and market efficiency. It also examines the political economy of setting standards and how regulatory standards influence incentives, including incentives for compliance, and the risks of unintended consequences or secondary effects, which may undermine broader public policy goals beyond the regulatory standard's original purpose.

By understanding these varied impacts—particularly in the context of the net-zero transition—we can establish principles to maximise positive outcomes while minimising drawbacks. The focus here is on identifying the economic factors that influence the adoption of regulatory standards aimed at achieving public policy objectives. These factors, which vary depending on the type of standard (e.g., prescriptive versus performance-based, national versus international), inform the impact analysis required for introducing a regulatory standard.

This section provides a framework to support the conduct of impact assessments on regulatory standards, focusing on the critical questions of *when* standards should be adopted and *what type* of

[28] See, for example, David, P.A. (1987), "Some new standards for the economics of standardisation in the information age", in P. Dasgupta and P. Stoneman (eds.) *Economic Policy and Technological Performance*, Cambridge: Cambridge University Press; and Swann, G.M.P. (2000), "The economics of standardization", *Report for Department of Trade and Industry*. Available at https://webarchive.nationalarchives.gov.uk/ukgwa/20070628230000/http://www.dti.gov.uk/files/file11312.pdf.

standards are most appropriate. In contrast, the next two sections shift their focus to the process of setting standards, operating under the assumption that their adoption has already been identified as the most effective approach for addressing a specific public policy objective.

3.1 Standards and international trade

For small, open economies like Australia and New Zealand, understanding the role of standards in international trade is critical. Economic literature shows that while bespoke national standards can hinder trade[29], the use of international standards by and large have a positive impact. Standards are crucial in reducing transaction costs, especially for complex components where compatibility is essential. They define product characteristics that ensure compatibility, quality, and consistency. Harmonised standards unify these characteristics across countries, reducing country-specific adaptation costs.

By adopting standards, companies can minimise these adaptation costs[30], making it more cost-effective to source specialised components from the market. This, in turn, improves market accessibility and broadens geographical reach. Numerous studies using aggregated, economy-wide data confirm the positive link between standards and trade growth.[31]

More recent research using firm-level data confirms that the release of harmonised product standards leads to trade expansion.[32] Firms adopt harmonised standards to generate scale effects. This research shows that, as predicted by theory, only the largest firms in the top range of the size distribution increase their export sales. These firms benefit from higher demand, charge higher prices, and sell larger volumes. It also shows that harmonised standards have contributed up to 13% of the growth in global trade.

3.2 Standards and innovation

There is a complex relationship between standards and innovation.[33] The impact of standards on innovation depends on their economic function and usage context. For example, standards can codify and share knowledge by facilitating access to information. That is, standards can support

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[29] See, for example, Lecraw, D. J. (1984), "Some economic effects of standards," *Applied Economics*, 16, 507–522 and Swann, G. (2010), "International Standards and Trade: A Review of the Empirical Literature", *OECD Trade Policy Papers*, No. 97, OECD Publishing, Paris. There is also theoretical research that shows how mostly large-country firms benefit from divergent national standards mostly due to being able to take advantage of economies of scale. See Ganslandt, M. and Markusen, J. R. (2001), "National standards and international trade", *IUI Working Paper, No. 547*, The Research Institute of Industrial Economics (IUI), Stockholm; and Ganslandt, M. and Markusen, J. R. (2001), "Standards and related regulations in international trade: A modelling approach," *NBER Working Paper 8346.*

[30] See, for example, den Butter, F. A. G., Groot, S.P.T. and Lazrak, F. (2007), "The transaction costs perspective on standards as a source of trade and productivity growth," *Tinbergen Institute Discussion Papers 07-090/3*, Tinbergen Institute.

[31] See, for example, Blind K. (2004) *The economics of standards: Theory, evidence and policy*, Cheltenham: Edward Elgar; Maskus, K.E., Otsuki, T. and Wilson, J.S. (2005). "An empirical framework for analyzing technical regulations and trade", in S. Henson and J.S. Wilson (eds.) *The WTO and Technical Barriers to Trade*, Cheltenham: Edward Elgar; and Wilson, J.S. and Otsuki, T. (2003), "Food safety and trade: winners and losers in a non-harmonised world," *Journal of Economic Integration*, 18(2), 266–287.

[32] See Schmidt, J. and Steingress, W. (2022), "No double standards: Quantifying the impact of standard harmonization on trade," *Journal of International Economics*, 135, 103619.

[33] See, for example, Blind, K. (2022), "Standards and innovation: What does the research say," *International Standards Organization Research and Innovation Papers*, available at https://www.iso.org/publication/PUB100466.html; and Blind, K. (2016), "The impact of standardisation and standards on innovation," Chapter. 14 in Edler, J., Cunningham, P., Gok, A. and Shapira P., eds., *Handbook of Innovation Policy Impact: Eu-SPRI Forum on Science, Technology and Innovation Policy series*, Elgar.

innovation by acting as a technology transfer channel, but this can potentially lead to unfair competition. Screening standards for information can be costly, especially for smaller firms with fewer resources.

As argued above, standards can lead to a reduction in variety. By limiting market options, they can drive economies of scale and incremental innovation but discourage radical innovation. By guaranteeing minimum quality, health, safety, and sustainability, standards can reduce market uncertainty from introducing new, marginally innovative products. However, implementation costs can reduce innovation by smaller, more innovative companies. Finally, while standards can promote innovation by enhancing the value of network-based technologies through positive network effects, they can also lead to market monopolies when they are based on proprietary intellectual property.

The discussion above does not differentiate between voluntary and regulatory standards, yet their impacts vary with market conditions. Empirical research based on the German Community Innovation Survey[34] shows that in markets with low technological uncertainty, such as those for basic consumer goods or traditional manufacturing, firms' innovation efficiency suffers more from voluntary standards as barriers to innovation, whereas regulations (including regulatory standards) have a positive influence.

This empirical result aligns with the view that the process of setting voluntary standards is more prone to regulatory capture in markets with low technological uncertainty. In mature markets, with stable technical infrastructure, a few dominant firms can influence technological paths, creating dependencies that impose high compliance and innovation costs on smaller firms, reducing their efficiency.

In contrast, regulation has a positive impact on innovation efficiency in low-uncertainty markets. This is likely due to regulations being less susceptible to regulatory capture and benefiting from reduced information asymmetry, which helps them align more effectively with existing technologies. In such markets, regulations provide transparent, non-discriminatory rules that support competition and enhance efficiency.

In contrast, in markets facing high technological uncertainty, such as in biotechnology or in renewable energy, the empirical effects reverse: regulations lower innovation efficiency, whereas voluntary standards boost it.

In these markets, regulations, due to their top-down legislative nature, can reduce innovation efficiency. This is because they may misalign with emerging technologies, increasing compliance costs. On the other hand, voluntary standards, developed through market-driven processes, have a positive effect on innovation by reducing uncertainty and guiding technological development. That is, voluntary standards encourage innovation, while regulations may hinder it.

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[34] Blind, K., Petersen, S. S. and Riillo, C. A. F. (2017), "The impact of standards and regulation on innovation in uncertain markets," *Research Policy*, 46, 249–264.

This research has an important implication for identifying principles to guide the establishment of regulatory standards in instances where there is high technological uncertainty, as is the case of secondary batteries and EV charging infrastructure. It suggests that voluntary standards, acting as a coordination device, are more likely to promote innovation than regulation when technological uncertainty is high.

3.3 The impact of standards on competition

Standards can play a key role in reducing barriers to entry that favour incumbents over new entrants and, therefore, enhancing competition.[35] When a product's or service's technological specifications are not defined by a standard, incumbents can leverage their accumulated tacit knowledge to meet market demand more efficiently, giving them a competitive advantage. In contrast, new entrants often must resort to reverse engineering or trial and error. However, when technological standards are established, incumbents lose this edge.

The economics literature highlights the risk that when a single entity gains excessive influence in the standards-setting process, it can manipulate standards to secure a competitive edge. [36]

This creates strong incentives for firms to actively engage in these processes, aiming to shape outcomes that favour their own interests. [37] Firms may push for more stringent standards, even if it imposes costs on them, knowing it will burden their competitors even more—a strategy known as "raising rivals' costs." [38]

This form of regulatory capture is particularly concerning because established companies often have more access and influence in these discussions than future entrants, who may lack a voice in shaping new standards or legislation. As a result, existing firms can reinforce their market position by supporting standards that limit competition from new players. It is essential for regulators and governments, when deciding to make certain standards mandatory or set their own standards, to ensure that these decisions do not hinder future, efficient market entry. Safeguarding the potential for competition is critical to ensuring that innovation and market dynamism are not stifled.

Furthermore, standards-setting can sometimes lead to the dominance of a single standard, creating the risk of market lock-in to an inferior option. [39] While there may be limited evidence of such lock-in effects[40], this risk is arguably higher when technological uncertainty is greater.

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[35] See, for example, Swann (2000), op. cit.; Veall, M. R. (1995), "On product standardization as competition policy," *Canadian Journal of Economics*, 18(2), 416–425; and Office of Technology Assessment (1992), "Global standards: Building blocks for the future," Congress of the United States, available at https://ota.fas.org/reports/9220.pdf.

[36] See, for example, Lerner, J. and Tirole, J. (2015), op. cit.; and Schmalensee, R. (2009), op. cit.

[37] See, for example, American National Standards Institute (2020), "National standards strategy for the United States". Washington, DC. available at https://share.ansi.org/Shared%20Documents/Standards%20Activities/NSSC/USSS-2020/USSS-2020-Edition.pdf.

[38] See, for example, Salop, S. C., and Scheffman, D. T. (1983), "Raising rivals' costs," *American Economic Review*, *73*(2), 267–271.

[39] David (1985), op. cit.

[40] See, for example, Liebowitz, S. J. and Margolis, S. E. (1990), "The fable of the keys," *Journal of Law and Economics*, 33, 1–25; and Liebowitz, S. J. and Margolis, S. E. (1994), "Network externality: an uncommon tragedy," *Journal of Economic Perspectives*, 8(2), 133–150.

To illustrate both the existence of the lock-in effect and its potential negative impact, it is instructive to revisit the deployment of second-generation (2G) wireless telecommunications in the 1990s. While the EU mandated a single standard, the US approach allowed for market competition among several competing, incompatible standards.[41]

It has been argued that government mandating a single standard creates a free-riding problem—an externality whereby the benefits from an individual firm's R&D efforts accrue to all firms. This, in turn, reduces marginal incentives to conduct R&D and innovate, potentially diminishing consumer and social welfare.[42]

This suggests that abstaining from mandating a standard, while imposing some costs associated with the existence of multiple standards, may be necessary to generate dynamic innovation-related benefits.

While the assessment of which approach—competition versus mandated standards—was most successful in the case of 2G deployment remains debated, the general point is that there is a potential trade-off between achieving efficient levels of consolidation through a mandated standard and promoting investment and innovation through dynamic competition.

In contrast to large economies, which may benefit from early adoption of a single standard[43], small, open economies face significant risks if they become locked into an inferior option. This lock-in can prevent access to superior products and services. Therefore, it is crucial for regulatory approaches to focus on minimum characteristics or attributes rather than specific technological specifications.

3.4 Network effects and market efficiency

A network technology in economics refers to one where its value to users is not just based on the technology's inherent qualities, but also on the size and nature of the network of other users. Network effects describe the additional benefits gained from a large and diverse user base. These effects are widespread, shaping industries such as finance, transportation, and especially the tech sector. Notably, an estimated 70% of global tech equity value stems from firms that rely on network effects.[44] However, for these benefits to materialise, there must be a high level of interoperability between participants, which necessitates the adoption of common, open standards.

In addition to enabling network effects, standards can significantly enhance market efficiency by mitigating asymmetric information. This is particularly relevant to the concept of adverse selection.[45]

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[41] For a review of the institutional background, See Gandal, N., Salant, D. and Waverman, L. (2003), "Standards in wireless telephone networks," Telecommunications Policy, 27, 325-332.

[42] See Cabral, L. and Salant, D. (2014), "Evolving technologies and standards regulation," International Journal of Industrial Organization, 36, 48-56.

[43] For example, the early setting of an American standard for colour TV contributed to both the deterioration of colour quality in the USA and the strengthening of the US's leading role in producing programs and films. This early adoption also provided the public with new technology at an early stage. See Farrell, J. and Shapiro, C. (1992), "Standard setting in high-definition television," *Brookings Papers: Microeconomics*, 1, 1-93.

[44] https://www.morganstanley.com/ideas/network-effects-global-tech-equity-value.

[45] See Akerlof, G. (1970), "The market for lemons," *Quarterly Journal of Economics*, 84(3), 488–500.

When a seller knows more about the quality of a product or service than the buyer, a low-quality seller can take advantage of this information asymmetry. Consequently, buyers may avoid transactions due to the risk of purchasing a low-quality product or service. Taking this to the limit, the existence of information asymmetry can lead to a market collapse, where high-quality sellers withdraw because they cannot distinguish themselves from low-quality sellers.

Standards can play an important role in reducing information asymmetry and its impact on market efficiency. When a high-quality seller can certify that a product meets a standard, customers can purchase with confidence, avoiding the risk of unintentionally buying a low-quality product. Moreover, if standards are clear and binding, sellers become accountable if their products fail to meet accepted standards. This role for open standards is well-understood in the economics literature.[46]

The importance of standards for market efficiency will continue to grow as products and manufacturing processes become increasingly complex. The "electrification of everything" required for the net-zero transition, coupled with the expanding role of international standards across the economy, makes common and open standards essential. These standards enable producers and sellers to meet societal expectations while allowing buyers to make confident purchasing decisions. As the importance of standards increases, so too will the significance of deciding when voluntary standards should be made mandatory.

3.5 The political economy of setting standards

Standard-setting processes frequently involve redistributive and normative decisions, often creating winners and losers depending on which standards are adopted.[47] These processes reflect the preferences and perspectives of the participants involved.[48]

However, despite efforts at consultation, as described in Section 4, the voices of many stakeholders—particularly consumers—are often underrepresented. This underrepresentation may stem from a lack of resources, limited technical knowledge, or both.

While extensive research has explored the societal benefits and costs of standards, as reviewed in earlier sections, relatively less attention has been given to the benefits of participating in the standard-setting process. Recent research attempts to further understand the drivers for participation in this process. For example, for some countries, there is strong correlation between research and standardisation and ISO's standardisation activities.[49] Moreover, there is also some

[46] See, for example, Boom, A. (1995), "Asymmetric international minimum quality standards and vertical differentiation," *Journal of Industrial Economics*, 43, 101–119; and Leland, H. E. (1979), "Quacks, lemons, and licensing: a theory of minimum quality standards," *Journal of Political Economy*, 87, 1328–1346.

[47] See, for example, Meyer, N. (2014), "The political economy of standards and standard-setting processes," *PIK - Praxis der Informationsverarbeitung und Kommunikation*, 37(3), 177-181.

[48] Many standards-setting organisations are self-governed, creating another political economy within the organisation that can influence standards. For instance, the objectives of potential member firms often differ and may even conflict: upstream innovators versus downstream implementers, or innovators with high-value technologies versus those with low-value technologies. See Fiedler, C., Larrain, M., and Prüfer, J. 2023), "Membership, governance, and lobbying in standard-setting organizations." Research Policy, 52(6), 104761.

[49] See Blind, K. and von Laer, M. (2022), "Paving the path: Driver of standardization participation at ISO," *The Journal of Technology Transfer*, 47, 1115-1134.

evidence indicating that higher levels of innovation within a company[50] or country[51] are strongly associated with increased participation in standard development.

However, this research is silent on the benefits for individual firms participating in the standard-setting process. A notable exception is a study examining German firms, which found a positive correlation between participation in standard-setting and firm performance in the manufacturing sector, though no such relationship was observed for the services sector. [52]

Questions of causality remain—for example, stronger-performing manufacturing firms may be more likely to engage in standard-setting rather than participation driving better performance. Nonetheless, the findings highlight the need for a deeper understanding of the political economy of standard-setting. For regulators, such insights are valuable in deciding whether to adopt a particular standard and which standard to choose. Specifically, understanding the role of incumbents in the process can shed light on potential impacts on competition, such as reduced market entry and diminished consumer choice.

3.6 Incentives, unintended consequences and secondary effects

Government intervention inevitably shapes the incentives faced by private decision-makers through a system of rewards and penalties. One common approach is the adoption of voluntary standards as mandatory regulatory requirements to promote public policy objectives, such as safety and environmental protection. For instance, road authorities mandate that cyclists wear helmets meeting specific voluntary standards to reduce injury risks in accidents.

However, regulatory standards can also produce unintended consequences, sometimes undermining the very goals they seek to achieve. As discussed in Section 2.2, an excessively stringent sunscreen standard could inadvertently reduce its effectiveness. Likewise, Section 4.5 highlights how requiring bike helmets to comply with bespoke national standards may raise costs for consumers and firms while unintentionally affecting broader public policy objectives.

Regulatory practice is rife with such examples, particularly in safety regulation. For instance, recent research on the National Football League's (NFL) "Crown-of-the-Helmet Rule" (CHR), which penalises players for initiating contact with the helmet, demonstrates this complexity. While the rule

[50] See Wakke, P., Blind, K., and De Vries, H. J. (2015), "Driving factors for service providers to participate in standardization: Insights from the Netherlands," *Industry and Innovation*, *22*(4), 299–320.
[51] See K. Blind, Lorenz, A. and Rauber, J. (2021), "Drivers for companies' entry into standard-setting organizations," *IEEE Transactions on Engineering Management*, 68(1), 33-44.
[52] Wakke, P., Blind, K. and. Ramel, F., (2016), "The impact of participation. Within formal standardization on firm performance," *Journal of Productivity Analysis*, 45, 317-330.

effectively reduced weekly concussion reports among defensive players by up to 34%, it simultaneously increased lower extremity injury reports for offensive players by a similar margin. [53]

Unintended consequences from regulation more broadly or from imposing too stringent regulatory standards are especially prevalent in rapidly evolving sectors. For example, cryptocurrency regulations, including the adoption of international standards, aimed at ensuring market stability and combating money laundry often impose high compliance costs that small startups cannot afford, inadvertently favouring large, established players. This reduces competition and innovation. [54]

Not all unintended consequences necessarily result in societal costs. For instance, green building codes adopting energy-efficient design standards may increase construction costs, which are passed on to property buyers. However, financial institutions can adjust mortgage models to account for higher upfront costs and lower long-term utility expenses, ultimately aligning incentives with societal benefits.

The crucial point here is that impact assessments for proposed regulatory standards must explicitly consider incentives, potential unintended consequences, and secondary effects. Furthermore, regulators should evaluate the incentives embedded within the compliance framework itself. Neglecting these considerations risks introducing standards that undermine their intended objectives and adversely affect other public policy goals.

Several principles of good regulation can mitigate such risks, including stakeholder consultation, ex-post assessments, and leveraging updated international or trusted overseas standards that achieve the desired public policy outcomes. By adopting these practices, regulators can better align incentives, minimise unintended consequences, and enhance the overall effectiveness of regulatory standards.

The recommendations made in Section 7 aim to strengthen the conduct of impact assessments for the adoption of regulatory standards. The next section shifts focus to the process of setting regulatory standards that have been supported by well-executed impact assessments.

[53] See Hanson, A., Jolly, N.A., and Peterson, J. (2017), "Safety regulation in professional football: Empirical evidence of intended and unintended consequences," *Journal of Health Economics*, 53, 87-99.

[54] See, for example, Sauce, L. (2022), "The unintended consequences of the regulation of cryptocurrencies," *Cambridge Journal of Economics*, 46, 57-71.

4. The role of standards and the standards setting process

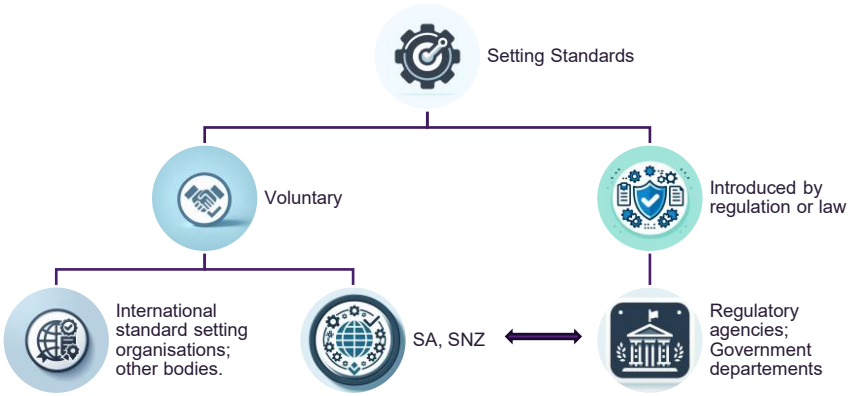
This section examines the processes through which standards are established. It analyses how both voluntary and regulatory standards are developed and identifies key challenges that affect the efficiency of the standard-setting process. These insights inform institutional design recommendations with implications that extend beyond EV charging infrastructure and secondary batteries.

4.1 Standards in the modern economy

Standards provide uniform solutions to complex coordination challenges, mitigate information imbalances between trading partners, and help achieve broader societal objectives. They are designed for widespread and consistent use. For example, food labelling and certification enable consumers to easily differentiate between high and low-quality products in their daily purchases. By reducing the effort required to verify product attributes, these standards lower search and transaction costs. Similarly, producers of highly technical products, such as electronics, can rely on technical standards rather than detailed product descriptions. As a result, standards benefit consumers, producers, and governments alike by enhancing trust, reducing uncertainty, and streamlining market transactions.

Standards can be public or private, voluntary or mandated by government departments or regulatory agencies, and may apply to products, services, systems, or processes. The relationship between standard-setting and regulation is complex. Regulatory agencies and government departments may adopt voluntary standards developed by national organisations, such as SA and Standards New SNZ, by international bodies like the International Electrotechnical Commission (IEC) and the International Organization for Standardization (ISO), or by overseas standards-setting organisations like the European Committee for Standardization (CEN), Japan Standards Association (JSA) or Underwriters Laboratories (UL), incorporating them as regulatory requirements (see Figure 2). Alternatively, regulators may set their own standards, which could differ from established voluntary standards.

Figure 2: Standards Setting



Annex 1 of the WTO Agreement on Technical Barriers to Trade (TBT) defines both technical regulations and standards.[55] While both specify product characteristics or related production methods and processes—including labelling, packaging, and marking—the key difference is in their enforcement. Technical regulations imposed by governments are mandatory, whereas voluntary standards developed by organisations like SA and SNZ are voluntary, with no legal consequences for non-compliance.

As noted previously, in this report, we will use the terms *regulatory or mandatory standards* to refer to what the WTO TBT defines as technical regulations. This terminology reflects the fact that regulatory standards are not always strictly technical and unlike technical regulations, apply not only to goods but also to services; for example, a requirement for EV charging stations to support multiple payment options.

4.2 Regulatory standards in Australia and New Zealand

Regulatory standards are set by regulators or governments to address market failures, such as when consumers lack awareness of critical product safety features. These standards are either adopted from existing voluntary ones or developed by regulators. In contrast, voluntary standards define product attributes valued by users and consumers, encouraging producers to adopt them. Compatibility standards—such as internet protocols and financial service standards—demonstrate how voluntary standards can enhance consumer welfare by creating network externalities and scale effects.

In many cases, voluntary standards become mandatory when incorporated into legislation or enforced by regulators. Across Australia and New Zealand, government agencies and

[55] https://www.wto.org/english/docs_e/legal_e/17-tbt_e.htm#annexI.

intergovernmental bodies at all levels frequently reference existing voluntary standards, such as those set by SA and SNZ, to support a wide range of regulations.

For example, in Australia, the Australian Building Codes Board (ABCB) includes voluntary standards in the National Construction Code (NCC), the Australian Competition and Consumer Commission (ACCC) uses them for consumer product safety, and the Australian Securities and Investments Commission (ASIC) applies them in financial risk management and corporate governance. State and territory government agencies, as well as local governments, also rely on existing standards when setting requirements for specific activities. In New Zealand, the Ministry of Business, Innovation and Employment (MBIE) incorporates voluntary standards in the Building Code through its Building System Performance team, while the Ministry for Primary Industries (MPI) uses them to manage risks associated with plant and animal sources.

When suitable voluntary standards, including international standards, do not exist, SA or SNZ may be asked to develop new ones. Additionally, some government agencies, such as Australia's Therapeutic Goods Administration (TGA), develop their own standards in-house, without the involvement of external standards organisations, for direct regulatory adoption.[56]

Complying with a standard often serves as evidence of meeting regulatory requirements. Box 2 illustrates how voluntary standards for bike and e-bike helmets are applied by road authorities across various Australian jurisdictions and in New Zealand. [57] It highlights not only differences in the adoption of standards but also fundamental contrasts. For example, unlike in Victoria, road user rules in New South Wales, New Zealand, and Queensland permit a range of overseas standards alongside AS/NZS 2063, effectively establishing a performance-based mandatory standard. As discussed later in this report, a best-practice regulatory approach would favour automatic adoption of international standards and trusted overseas standards, placing the burden of proof on regulators to demonstrate valid reasons for deviation.

Box 2 highlights the varied regulatory approaches to standards adoption across jurisdictions, which can result in unintended economic consequences. For example, while all reviewed jurisdictions accept bike helmets certified under AS/NZS 2063, Victoria may not allow e-bike helmets certified under the European Standard EN 1078:2012+A1:2012, which creates regulatory uncertainty for businesses selling bike helmets across different jurisdictions. Compounding this issue is the reliance on dated standards in some jurisdictions. As noted in Section 5.2, delays and costs associated with updating these standards can create inefficiencies, leaving products that meet newer, safer versions of a standard ineligible for sale.

[56] For a somewhat dated list of private sector, Commonwealth and intergovernmental writers of standards, codes and guides, see Productivity Commission (2006), "Standard setting and laboratory accreditation," *Research Report*, Canberra.
[57] In addition, under the Australian Consumer Law, there are multiple pathways for suppliers to demonstrate compliance with bike helmet safety. https://www.legislation.gov.au/F2024L00362/asmade/text

Box 2: Regulatory Standards for Bike Helmets

Consider the voluntary standard AS/NZS 2063 for construction and performance requirement for bicycle (including e-bikes) helmets. Different jurisdictions adopt different approaches for making AS/NZS 2063[58] mandatory. For example, under Queensland and Victorian road rules, a bicycle rider must wear a bicycle helmet that complies with AS 2063 or AS/NZS 2063.[59] In contrast, in New South Wales, an approved bicycle helmet must comply with one of the following Australian or trusted overseas standards:[60]

1. *Australian/New Zealand Standard AS/NZS 2063:2008 Bicycle helmets; or*
2. *Australian/New Zealand Standard AS/NZS 2063:2020, Helmets for use on bicycles and wheeled recreational devices; or*
3. *European Standard EN 1078:2012+A1:2012, Helmets for pedal cyclists and for users of skateboards and roller skates; or*
4. *Snell B-95, 1995 Bicycle Helmet Standard, 1998 revision Standard for Protective Headgear for Use in Bicycling; or*
5. *American Society for Testing and Materials Standard ASTM F1447:2018, Standard Specification for Helmets Used in Recreational Bicycling or Roller Skating; or*
6. *Consumer Product Safety Commission (16 C.F.R. Part 1203), Safety Standard for Bicycle Helmets*

In New Zealand, the Road User Rule 2004 defines the approved standards for safety helmets as:[61]

- *AS/NZS 2063, Pedal cycle helmets; or*
- *NZS 5439, Pedal cycle helmets; or*
- *AS 2063.2, Pedal cycle helmets; or*
- *any safety helmet manufactured to the Snell standard for protective headgear for use with bicycles; or*
- *any safety helmet manufactured to ASTM F1447; or*
- *any safety helmet manufactured to the Consumer Product Safety Commission Safety Standard for Bicycle Helmets (reference 16 CFR) Part 1203, complying with the CPSC certification process.*

Regulatory uncertainty surrounding the acceptance of trusted overseas standards and the reliance on dated standards increases costs for businesses and consumers. This can discourage activities

[58] A dated standard, such as *AS/NZS 2063:2008*, refers to a particular version of that standard. If a standard is undated, such as *AS/NZS 2063*, it refers to the latest version of the standard.

[59] https://www.qld.gov.au/transport/safety/rules/wheeled-devices/bicycle#helmets and https://transport.vic.gov.au/Road-rules-and-safety/Bicycles/Bicycle-helmets. Queensland allows executive direction from a defined public servant to declare equivalent or higher standards as acceptable. It seems that currently the following standards are allowed (in addition to AS 2063/AS/NZ 2063): EN 1078; CPSC 16; ASTM F1447; and Snell B-95.

[60] Reproduced from https://www.transport.nsw.gov.au/roadsafety/bicycle-riders/road-rules-for-bicycle-riders#Helmet_safety.

[61] Reproduced from https://www.nzta.govt.nz/assets/resources/rules/docs/road-user-2004.pdf.

like e-bike usage, potentially undermining broader societal goals such as environmental sustainability and public health. The example illustrates how overly restrictive standards can have far-reaching negative consequences, emphasising the need for regulators to carefully consider unintended and secondary effects when setting standards.

Regulatory complexity increases even further when consumer product safety regulations, overseen by the ACCC, are considered. For example, only recently has the ACCC recommended that bicycle helmets meeting the European standard, or several U.S. standards, be deemed compliant with the Australian standard.[62] This is part of a broader strategy to amend the Australian Competition Law to make it easier to recognise standards set by international and overseas standards-setting organisations. (See Box 3).

The inconsistency between product safety regulation and jurisdictional road authorities creates a troubling possibility: a helmet that meets the standards set by the product safety regulator may still be unsellable in a specific jurisdiction if it fails to comply with local road rules. In such cases, the purpose and effectiveness of consumer product safety regulation become highly questionable.

As noted in Section 4.6 below, such inconsistencies jeopardise the economic integration between Australia and New Zealand.

The lack of coordination among regulators and jurisdictions risks undermining fundamental purposes of standards: enabling businesses to leverage economies of scale and scope in production or supply, and minimising transaction costs (e.g., avoiding suppliers having to undertake multiple tests), ultimately benefiting consumers. A best-practice approach to regulatory standards would emphasise collaboration among regulators to eliminate inconsistencies across jurisdictions, ensuring a cohesive and efficient framework.

[62] https://bicyclenetwork.com.au/newsroom/2024/03/27/new-bicycle-helmet-safety-standard-for-australia/.

Box 3: Australia's Product safety regulation and proposed amendments[63]

Under the Australian Consumer Law (ACL), part of the Competition and Consumer Act 2010, Australia maintains a national product safety regime. This regime is administered jointly by Commonwealth, state, and territory agencies. For consumer goods[64], the ACCC accepts and records reports about unsafe products and takes enforcement action if required. It consults and makes recommendations to the relevant Commonwealth minister on mandatory standards and product bans. State and territory agencies ensure compliance and promote the safe use of consumer goods.

The ACCC can issue safety warning notices and enforce mandatory safety standards under the ACL. For example, bunk beds sold in Australia must have a safety railing at least 250mm above the mattress. Some products have information standards requiring certain information to be provided to consumers, such as care instructions on clothing labels. Currently, there are 48 mandatory standards regulating various product categories, including infant and nursery products, children's toys, recreational equipment, and household goods. [65]

Bans and mandatory standards are only implemented when evidence shows a risk of serious injury, illness, or death related to a product. The relevant Commonwealth minister can create mandatory safety or information standards to regulate product performance, composition, design, and labelling. Powers include making safety standards to prevent injuries (s 104) and declaring voluntary standards developed by Standards Australia or certain associations as mandatory (s 105).

Declaring voluntary standards as mandatory is quicker than creating new standards but is limited to those developed by Standards Australia due to the absence of overseas organisations in the regulations. Developing a new mandatory standard is a resource-intensive process requiring public consultation and impact assessments, typically taking 18–36 months. Additionally, mandatory standards often reference outdated versions of voluntary standards.

The ACL's product safety framework ensures robust consumer protection but faces challenges in maintaining agility and alignment with modern industry practices. This highlights the need for streamlined processes and greater flexibility in adopting updated, international or trusted overseas standards.

The amendments to the ACL, proposed in the 2024 Decision Regulation Impact Statement (RIS) and recently approved by the Australian Parliament, enable the relevant Commonwealth Minister to recognise international or trusted overseas product safety standards alongside Australian standards when establishing or revising mandatory safety or information standards. Upon recommendation from the ACCC, the Minister can now declare a standard from any reputable standards-making body. These changes are expected to enhance the accessibility and transparency of mandatory standards, simplifying compliance for businesses.

Additionally, the amended ACL facilitates alignment with the latest Australian, international, and trusted overseas standards as they are updated, ensuring mandatory standards remain current and relevant.

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[63] See Commonwealth of Australia, Treasury (2024), "Decision regulation impact statement: Supporting business through improvements to mandatory standards regulation under the Australian Consumer Law,' available at https://treasury.gov.au/sites/default/files/2024-10/p2024-582678.pdf.

[64] Other types of products, such as food, medicine and medical devices, chemicals, agriculture, electrical goods and gas appliances are regulated by other government agencies, some at the federal level and some at the state and territory level. Local governments also play a role in some sectors such as food.

[65] See Appendix B in Treasury (2024), op. cit.

4.3 The standards development process

As WTO members, Australian and New Zealand bodies that make standards mandatory are required to observe the five key principles set out in the TBT Agreement: non-discrimination, avoidance of unnecessary barriers to trade, the use of international standards, technical assistance and special and differential treatment for developing countries, and transparency.[66]

The development of voluntary standards by organisations like SA and SNZ is crucial for the net-zero transition, both through their direct economy-wide impacts and through government regulations that may make certain standards mandatory. These organisations follow Annex 3 of the WTO's *Code of Good Practice for the Preparation, Adoption and Application of Standards*, which promotes key principles such as transparency, openness, impartiality, consensus, effectiveness, relevance, and coherence.

In addition to setting the actual standards, the process for developing voluntary standards includes three additional and crucial dimensions that also need to work well. First, confidence in measurement is vital for enforcing government regulations, codes, and protecting consumers. Measurement standards ensure the precise measurement of quantities such as length, weight, volume, temperature, and time, though these aspects fall outside the scope of this discussion. In Australia, the National Measurement Institute (a division of the Department of Industry, Science and Resources) and New Zealand's Measurement Standards Laboratory (a crown entity reporting to the Minister of Science and Innovation) ensure that measurements are accurate and reliable.

Second, as defined in Annex 1 of the TBT Agreement, conformity assessment is used to verify whether products meet the requirements set out in voluntary or regulatory standards. When such regulations impose specific product requirements, a third party may certify compliance, which can be carried out by either public or private certification bodies. For instance, the BSI Group (Australia and New Zealand) Pty Ltd is accredited to certify compliance with various standards, including AZ/NZS 2063.

Third, entities that certify compliance are accredited by accreditation bodies, which are authorised by their respective governments to grant accreditation. In Australia, NATA (National Association of Testing Authority)[67] and JAS-ANZ (Joint Accreditation System of Australian and New Zealand)[68] serve as accreditation bodies, while in New Zealand, IANZ (International Accreditation New Zealand)[69] and JAS-ANZ perform this role. For example, JAS-ANZ has accredited the BSI Group to certify that bicycle helmets meet the AZ/NZS 2063 standard.

Conformity assessment processes illustrate an important regulatory principle: institutional design should consider incentives. By separating standards setting from compliance and accreditation, each

[66] https://www.wto.org/english/docs_e/legal_e/17-tbt_e.htm.
[67] https://nata.com.au/about-us/.
[68] https://www.jasanz.org/.
[69] https://www.ianz.govt.nz/.

party is incentivised to maximise the benefits of standards. Standards-setting organisations are motivated to design standards that meet specific societal goals, while accreditation and certification organisations are driven to ensure that conformity to standards is credibly achieved.

More broadly, institutional design should consider which parties are best placed to adopt or create standards and ensure compliance. For example, a national regulator is best suited to introduce standards when coordination is needed to minimise transaction costs, promote economies of scale, or ensure access to critical technology, especially when there is no specific reason for different standards across jurisdictions. Conversely, conformance is typically best managed at the jurisdictional level. States and territories often have a better understanding of local conditions and can address emerging issues more quickly and effectively.

The example of bike helmets highlights the inefficiencies stemming from an institutional design in which jurisdictional regulators fail to harmonise safety standards. When different road authorities establish varying requirements, it unnecessarily increases costs for businesses and drives up prices for consumers, without delivering safety outcomes beyond those set by the ACCC. To address this, Section 7 recommends that regulators and governments, when adopting regulatory standards, consider the broader implications of their decisions on the operations of other regulators.

4.4 Differences between the voluntary standards development processes of Australia and New Zealand

There are notable differences between the voluntary standards development processes of Australia and New Zealand. SNZ is a statutory body governed by a Board of Directors appointed and overseen by the Ministry of Business, Innovation, and Employment (MBIE).[70] In contrast, SA is an independent, not-for-profit organisation. Its members elect a board of directors to oversee its operations, made up of representatives from industry, government, and consumer groups. The Australian Government recognises SA's role as the peak non-governmental national standards body through a memorandum of understanding.[71]

SNZ has a 'user pays' full cost recovery model. Its funding comes from businesses, industry bodies and government agencies commissioning standards development work. It also charges a fee to access standards through retail, subscription and licencing arrangements.

SA receives funding from the Australian Government to support its international standards development work. SA also receives funding from Australian industry participants. In contrast to SNZ, SA does not charge for the development of individual standards.

[70] https://www.standards.govt.nz/.
[71] https://www.standards.org.au.

4.5 Trans-Tasman regulatory alignment

New Zealand and Australia share a deep, unique and long-standing trade and economic relationship underpinned by the Australia-New Zealand Closer Economic Relations Trade Agreement (ANZCERTA).[72] There is extensive formal and informal regulatory cooperation, or similarity across several sectors. In addition to a mutual recognition agreement, which will be covered in the next subsection, other notable examples include food, electrical safety, and building products.

Food sector

Australia and New Zealand cooperate closely in food regulation. There is an overarching treaty between the two countries which creates the foundations for a joint food standards architecture.[73]

Funded by both governments, Food Standards Australia New Zealand (FSANZ) maintains the Australia New Zealand Food Standards Code. This code sets out compositional, labelling, and safety requirements for food sold in both countries. FSANZ assesses applications to amend the Code and prepares proposals to vary existing standards or develop new ones. Each jurisdiction (including individual Australian states and territories) can have its own unique requirements applicable to food products.

The mutual recognition agreement, described in the next subsection, allows most food and food products to be sold across the Tasman, even if there are differences in standards or requirements between jurisdictions.

The is an ongoing review into the FSANZ Act which will focus on the effectiveness of the regulation, and the operations and responsibilities of FSANZ. The review is aiming to address 4 clearly identified policy challenges:[74]

- The purpose and objectives of FSANZ are not clear
- Legislated processes and decision-making arrangements for food standards are cumbersome and inflexible
- Elements of FSANZ's operations are inefficient
- Gaps and duplication of efforts challenge system agility

There is also a separate but related initiative to reform the Australian food regulation system, which will focus on:[75]

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[72] https://www.dfat.gov.au/trade/agreements/in-force/anzcerta/australia-new-zealand-closer-economic-relations-trade-agreement.
[73] https://www.foodregulation.gov.au/.
[74] https://consultations.health.gov.au/chronic-disease-and-food-policy-branch/fsanz-act-review-consultation-on-impact-analysis/supporting_documents/FSANZ%20Act%20Review%20%20Engagement%20%20Public%20Consultation%20%20Impact%20Analysis%20for%20Public%20Consultation%20%2015Feb24%20PDF.pdf.
[75] https://www.foodregulation.gov.au/activities-committees/activities/review-food-regulation-agreement-fra.

- Reviewing the Food Regulation Agreement with a view to creating a new foundational document to underpin the joint food regulation system
- Increasing consistency across jurisdictions
- Reviewing how the system of food regulation operates

Electrical safety

Each individual Australian state and territory, and New Zealand, separately regulate electrical safety, including equipment safety, and electrical licensing. Current holders of a licence issued by an Australian state or territory, or New Zealand, can apply for an electrical work licence in another jurisdiction based on mutual recognition. But there are different processes to work in Queensland and New Zealand as they are not members of the Automatic Mutual Recognition (AMR) scheme running in most Australian jurisdictions.

Regulators in New Zealand and Australia require adherence to AS/NZS 3000 (*Wiring Rules*), which provides a unified set of regulations for electrical installations. It aims to ensure that electrical work carried out in either country meets the same safety and performance criteria. The Wiring Rules reference other voluntary standards that must be followed and certified to in electrical applications (for example, AS/NZS 5033 covering *installation and safety requirements for photovoltaic arrays*).

It worth noting that the New Zealand Government has recently agreed to update more than 400 references to international standards in its Electricity and Gas Safety Regulations, including in respect of the Wiring Rules. Changes are expected to be Gazetted by the end of May 2025. The New Zealand Government is also progressing the Regulatory Systems (Immigration and Workforce) Amendment Bill through the house, which is set to be passed in 2025. This bill will amend relevant legislation to allow WorkSafe to update standards references through ministerial agreement, rather than regulatory changes, ensuring they can be kept up to date more efficiently and easily in the future.

Furthermore, the Electrical Equipment Safety Scheme (EESS) is a regulatory framework aimed at increasing consumer safety when interacting with household electrical equipment. The EESS outlines the safety requirements for registration of Responsible Suppliers[76] and equipment in a centralised national database (National Register).[77]

The EESS commenced in Queensland on 1 March 2013. By 2019 the EESS Intergovernmental Governance Agreement had been signed by Queensland, Victoria, Western Australia and Tasmania. New Zealand is establishing the legislative framework to join the EESS.[78]

[76] http://www.eess.gov.au/responsible-supplier/manufacturers-and-importers-responsible-suppliers/.
[77] http://www.eess.gov.au/registration/eess-registration-database/.
[78] https://www.erac.gov.au/equipment/equipment-safety-in-australia-and-new-zealand/.

New South Wales (NSW) is not part of the EESS and has its own regulatory framework around electrical equipment safety. This can impose increased regulatory and compliance burdens on businesses operating across jurisdictions. A 2023 statutory review in NSW recommended the NSW government provide in-principle support to join the EESS.[79]

New Zealand is also part of the Electrical Regulatory Authorities Council (ERAC), which alongside Australian state and territory electrical regulators, works to:

- Maintain a policy framework that encourages and provides for coordinated regulatory development in each jurisdiction.
- Coordinate individual state/territory/New Zealand program objectives and activities to ensure uniformity wherever possible.
- Represent ERAC's agreed policies at the national level for the purpose of securing support from Governments, industry and the public.
- Participate in policy and technical committees of organisations such as SA and SNZ to ensure that the content of national technical standards is consistent with regulatory directions and requirements.

Building products

Both Australia and New Zealand use a performance-based standards system to oversee their respective building sectors. These minimum performance standards are set out in the National Construction Code (NCC) in Australia, and the New Zealand Building Code (NZBC) in New Zealand.

Both the NCC and NZBC reference joint Australian and New Zealand voluntary standards as minimum performance requirements. Each code also has additional requirements including country specific standards, as well as specific requirements written into the code (that is, not referring to an external voluntary standard).

In Box 4, we describe the recent proposed reforms to standards recognition in the context of NZBC. Notably, many of the recommendations in Section 7 align well with the Building (Product Certification) Amendment Bill. [80]

[79] Support was subject to conditions around funding, recognition, and oversight being met. See https://www.parliament.nsw.gov.au/tp/files/84447/Report%20on%20Statutory%20Review%20of%20the%20Gas%20and%20Electricity%20Consumer%20Safety%20Act%202017.pdf.

[80] https://www.parliament.nz/en/pb/sc/make-a-submission/document/54SCTIN_SCF_B4D9BBC3-C823-4130-0608-08DCCD28B5EC/building-overseas-building-products-standards-and-certification.

Box 4: Regulatory reform to building product standard recognition in New Zealand

In December 2022, the New Zealand Commerce Commission published its Final Report for its market study into residential building supplies. The study found:[81]

- The building regulatory system incentivised designers, builders and building consent authorities to favour familiar building products over new or competing products. In particular, the system was too slow, costly and uncertain to get new and innovative products accepted for use.

- Quantity-forcing rebates that reward merchants for purchasing greater volumes through a single supplier deterred merchants from stocking competing products, raising barriers for new or smaller suppliers to access distribution networks and become established in the market.

The Final Report made several recommendations to enhance the regulatory system to improve competition for key building supplies, including creating clear compliance pathways for a broader range of products, and establishing improved governance and decision-making structures within regulatory structures.

Since then, the New Zealand government has introduced legislation to increase competition in the building materials market by enabling the use of building materials from trusted overseas jurisdictions. The Building (Product Certification) Amendment Bill will:

- Recognise building product standards from trusted overseas jurisdictions removing the need for designers or builders to verify standards.

- Require Building Consent Authorities to accept the use of products that comply with specific overseas standards that are equivalent to or higher than those in New Zealand.

- Approve the use of building products certified through reputable certification schemes overseas.

4.6 The Trans-Tasman Mutual Recognition Arrangement (TTMRA)

The TTMRA[82] allows goods legally sold in either Australia or New Zealand to be sold in the other country, despite differing standards or regulatory requirements. The TTMRA is globally unique due to its extensive scope and coverage, simplifying cross-border business operations and providing consumers with a wider, more competitive range of goods and services.

Given Australia's federal structure, the TTMRA is an agreement between the Australian signatories of the Mutual Recognition Agreement (MRA) [83] and the Government of New Zealand. Goods can be exempt from the MRA and TTMRA with mutual agreement from all parties. [84]

[81] https://comcom.govt.nz/about-us/our-role/competition-studies/market-study-into-residential-building-supplies.
[82] https://www.dfat.gov.au/sites/default/files/ttmra.pdf.
[83] https://www.legislation.gov.au/C2004A04489/latest/text.
[84] Both agreements also provide for the recognition of occupations across different jurisdictions.

Notably, the MRA and TTMRA do not apply to laws governing the use, manner of sale, transport, storage, handling, or inspection of goods.[85] This implies that the concern highlighted in the example of bike helmets (Box 2) is also relevant for the TTMRA. Goods that are legally sold in one jurisdiction might still be unusable in another due to legislation governing their use.

In its 2015 review of the MRA and TTMRA, the Productivity Commission found that while the agreements were functioning well for covered goods, there were significant risks to their benefits. These risks included regulators not consistently implementing mutual recognition as required, weak oversight, and an increasing number of goods and related laws being permanently excluded from the agreements' scope.[86]

In some cases, it may not be desirable to allow the use of a product in one jurisdiction that is permitted in another, due to factors like climatic conditions. However, the disconnect between the legal framework provided by the MRA and TTMRA and the regulatory regimes governing usage can increase business costs, raise prices, and limit consumer choices. This disconnect creates unnecessary regulatory uncertainty.

While past attempts at regulatory coordination, such as establishing a trans-Tasman regime for therapeutic goods, have failed, the net-zero transition has heightened the benefits of such coordination. In other words, the costs of failing to coordinate have increased significantly.

In the context of the net-zero transition, better coordination between distinct regulatory regimes is crucial so that governments can leverage regulatory standards to facilitate the efficient deployment and use of infrastructure. As electrification becomes more pervasive, electricity will play a greater role in our daily lives, much of it mediated through technology. This makes standards increasingly critical, and the relationship between standard setting, government regulation, and policy even more essential.

[85] See, for example, Productivity Commission (2015), "Mutual recognition schemes," *Research Report*, Canberra. (Box 1.1, p. 30).
[86] Productivity Commission (2015), op. cit.

5. Efficiency considerations in regulatory standards development

Building on the previous exploration of the factors influencing when regulatory standards serve as the most effective tools for achieving specific policy objectives, it is equally critical to assess the efficiency of the processes involved in their development and updating. The earlier discussion highlighted several issues tied to the cost-effectiveness of these processes, which we now examine in greater depth.

Examining the efficiency of regulatory standards-setting is valuable in its own right, given their critical role in the modern economy.[87] However, this analysis takes on greater urgency in the context of the net-zero transition, which will require significant shifts in consumption, production, and investment patterns—from carbon-intensive industries to greener products and services. As discussed earlier, standards, both voluntary and mandatory, will be central to facilitating this transformation.

This section focuses on the efficiency of the regulatory standards-setting process. The development and updating of bespoke national voluntary standards are considered here only when these standards become mandatory upon adoption by regulators. As discussed in Section 3, voluntary standards play an important role in society, and their benefits are not in question.

The key issue identified is the inefficiency of developing bespoke national voluntary standards when suitable international and trusted overseas standards already exist. As discussed later, automatically recognising such standards allows regulators to focus on identifying any necessary deviations rather than duplicating the work of established international or overseas standards organizations.

When no suitable international and trusted overseas standards are available for automatic adoption, regulators or government agencies have two main options. They can develop their own standards, provided they have or can procure the necessary technical expertise, or they can collaborate with SA or SNZ through the standard development process outlined in Section 4.3. This process includes assessing whether any international and trusted overseas standards may be relevant.

Government agencies and regulators with the necessary expertise can also modify or adapt existing international and trusted overseas standards to better align with domestic regulatory objectives. This approach enables them to benefit from the technical rigor and global best practices embedded in these standards while tailoring them to local conditions. Automatic recognition incentivises regulators to focus on the differences that are necessary to adjust to local conditions.

[87] For example, the Productivity Commission undertook an assessment of the governance arrangements for developing standards as part of their research report on standard setting and accreditation. See Productivity Commission (2006), "Standard setting and laboratory accreditation," Canberra. Available at https://www.pc.gov.au/inquiries/completed/standards/report/standards.pdf.

For instance, an electrical standard developed in Europe is typically designed to accommodate the specific characteristics of European grids, voltage levels, and technological infrastructure. Instead of developing an entirely new standard from the ground up—a process that is both time-consuming and resource-intensive—Australian and New Zealand regulators can use the European standard as a foundation. They can then make targeted adjustments to account for differences in energy infrastructure, environmental conditions, regulatory framework, and industry practices.

5.1 Duplication of direct costs of developing standards

As a motivating example for our analysis, we revisit the case of regulatory standards for bike helmets. For this example, we assume that the varying standards across regulators (e.g., the ACCC versus jurisdictional road authorities) and jurisdictions provide comparable levels of safety.

This assumption is reasonable: if a bike helmet meets the standards of the safety regulator, it should logically be deemed safe for use on public roads or bike lanes. Similarly, if a helmet is approved for use in Victoria, it is difficult to imagine a scenario where it would be unsafe for use in Queensland.

By assuming that the different voluntary standards, which have been adopted by different regulators to demonstrate compliance with regulatory requirements, yield equivalent safety benefits, we can focus on the cost efficiency of the standards-setting process. First, we examine the direct costs, which include the fixed costs of developing or updating domestic standards even when international standards and trusted overseas standards already exist.

For example, the European and American bike helmet standards, now recommended by the ACCC as compliant with the Australian safety standard, were developed at significant expense by European and US bodies. Despite this, Australia has incurred additional fixed costs by updating its own standards, with the last update published in 2022. This duplication can extend further, with the potential of repetitive impact assessments carried out across jurisdictions.

5.2 The need to update standards

When voluntary standards that have been adopted by regulators are dated, inefficiencies also arise due to the lengthy and costly processes required to update them. The process for making or updating a voluntary standard is resource intensive[88] and it takes time. For example, amendments to the Food Standards code takes 12 to 15 months.[89]

A notable example involves the mandatory standard for bunk beds in Australia, referred to in Box 3, which was established in 2003. This standard references a voluntary Australian standard from 1994, despite the latter being updated in 2010. As a result, businesses importing or supplying bunk beds

[88] https://www.standards.org.au/standards-development/developing-standards/process.
[89] https://www.foodstandards.gov.au/food-standards-code/changing-the-code/application-and-proposal-process.

in Australia that adhere to the specifications in the 2010 voluntary standard may technically be in non-compliance with the outdated mandatory standard.[90]

This delay in updating dated standards creates the risk of penalties for businesses, even in cases where the updated voluntary standard offers improved safety outcomes for consumers. The situation highlights the urgent need for a more agile regulatory framework that can seamlessly incorporate updates to voluntary standards into mandatory ones, ensuring both compliance and the adoption of best practices as we propose in Section 7.

Concerns about the timely updating of dated documents are widespread. For instance, earlier this year, the Australian Building Code Board conducted consultations on proposed changes to allow the use of newer editions of already-referenced documents, including Australian Standards, to demonstrate compliance with the National Construction Code within its three-year amendment cycle.[91] This concern with timely updating of standards is also evidenced by the New Zealand Government's recent decision, as mentioned in section 4.5 above, to update more than 400 references to international standards in its Electricity and Gas Safety Regulations.

5.3 The indirect costs of duplication

The fixed costs of adopting or updating regulatory standards—often duplicating the efforts of international and trusted standards-setting organisations—are significant. However, the indirect costs are likely far greater. Indirect costs of duplication include higher consumer prices driven by increased compliance costs, particularly when standards deviate from trusted benchmarks around the globe.

Additionally, regulatory uncertainty imposes risks for businesses. For instance, a company might import a product that meets updated international standards or trusted overseas standards, offering greater safety, performance, and reliability, only to find it non-compliant with outdated local regulatory standards.

These indirect costs can be financial, such as legal fees and compliance expenses, or non-financial, such as delays in introducing new products to the market. In highly competitive markets, where cost pass-through rates approach 100%, the financial burdens associated with compliance costs are largely borne by consumers. In more concentrated markets, the burden is shared between consumers and suppliers, while in oligopolistic markets, pass-through rates can even exceed 100%.[92]

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[90] Treasury (2024), op. cit.
[91] https://www.abcb.gov.au/pcd/pcd-2025-alternative-referenced-documents.
[92] See, for example, RBB Economics (2014), "Cost pass-through: theory, measurement, and policy implications." Report prepared for the Office of Fair Trading. Available at https://assets.publishing.service.gov.uk/media/5a74a3a940f0b619c86593b8/Cost_Pass-Through_Report.pdf.

When costs are passed on to consumers, they may be discouraged from adopting desirable behaviours, such as wearing bike helmets or transitioning to e-bikes. This, in turn, undermines broader public policy objectives aimed at improving safety, sustainability, and public health.

5.4 The funding of standards development

The inefficiencies stemming from duplicating costs already incurred by international standards organisations and trusted overseas standards making associations, combined with the indirect costs of discouraging desirable behaviours when these costs are passed on to consumers and producers, are exacerbated by how these direct costs are recovered. Under the current distribution and licensing policy, payments are required for access to standards referenced in legislation.[93]

This policy directly undermines one of the key benefits of standards: addressing asymmetric information. Standards provide consumers and suppliers with the specifications, procedures, and guidelines needed to ensure that products are safe, consistent, and reliable. As the ACCC has noted, without access to Australian standards, consumers and businesses may lack a clear understanding of the legal requirements governing many goods and services.[94]

This is particularly detrimental to small businesses, which may inadvertently supply goods and services that are non-compliant, unsafe, or fail to meet required specifications. Compounding the issue, consumers often cannot readily identify instances of non-compliance in the absence of published standards. The consequences of non-compliance due to restricted access to standards can be severe. For public safety, breaches of the law can lead to significant financial penalties and even criminal charges.

5.5 The lack of harmonisation and deviations from international standards

The bike helmet example highlights how fragmented regulatory standards across jurisdictions and regulators could lead to higher compliance costs, regulatory uncertainty, reduced consumer choice, and higher prices. Box 5 further demonstrates that inefficiencies from a lack of harmonisation are often exacerbated by features of the regulatory standards adoption process. For instance, bespoke Australian and New Zealand standards are frequently misunderstood by international vendors, resulting in additional costs and delays to ensure compatibility and compliance.

While the extra costs associated with bespoke national standards may be warranted for addressing specific local needs, inconsistencies in how these standards are interpreted and applied across jurisdictions are harder to justify. Table 5 also reveals another source of inefficiency: differing

[93] In August 2023, Standards Australia launched the Reader Room platform (https://readerroom.standards.org.au), offering three free read-only accesses per year to Australian Standards' publications for non-commercial use (personal, domestic, or household). While this initiative enhances access for consumers, it does not cover small businesses or consumers who wish to access more than three standards annually.

[94] ACCC (2019), "Submission to Standards Australia's discussion paper on the Distribution and Licencing Policy Framework." Available at https://www.accc.gov.au/system/files/ACCC%20submission%20to%20Standards%20Australia.pdf.

interpretations and implementation of legislation by local governments (e.g. councils or shires), which complicates the nationwide rollout of infrastructure critical for the net-zero transition.

The example in Box 5 also underscores the advantages of adopting international standards and trusted overseas standards, as they can enhance harmonisation, reduce regulatory uncertainty, and lower business costs.

Box 5: Lessons learned from Australian Renewable Energy Agency (ARENA)'s Advancing Renewables Program[95]

We report below the lessons learned from Viva Energy Australia's New Energies Service Station Project[96] funded by ARENA that are relevant for considering best-practice regulatory approaches for adopting standards.

Viva Energy is building and will operate the New Energies Service Station in Geelong, Victoria. This public, commercial-scale station will provide hydrogen refuelling and electric vehicle recharging for heavy Fuel Cell Electric Vehicles. It will feature a 2.5MW PEM electrolyser, producing around 1,000kg of hydrogen daily using recycled water and renewable electricity.

Lack of harmonisation across councils

The first instance of lack of harmonisation was identified during the planning approvals process. There was a discrepancy between jurisdictions in assessing hydrogen planning development applications under the Victorian Planning Framework. Some councils, like Geelong, classified the project as 'industry,' while others classified it as 'service station use.'

Although the Victorian Planning Provisions were amended in August 2023 to centralise approval with the Victoria Ministry for Planning, local councils across different states and territories still vary in their ability to address technical issues and interpret legislation. This inconsistency will add costs and barriers to the national rollout of infrastructure. This issue will be revisited in Section 6 regarding EV charging stations.

Benefits of adopting appropriate international standards and trusted overseas standards

Standards Australia recently adopted ISO 19880-1 as standard *AS 19880.1:2023* for gaseous hydrogen fuelling stations, which sets minimum safety and performance requirements for both public and non-public stations.

This standard guided the definition of separation distances and equipment layout. *AS 19880.1* mandates a risk-informed approach to safety distances, such as a Qualitative Risk Assessment (QRA), or adherence to regulations. However, there is no prescriptive state or national guidance on separation distances. Consequently, an iterative process was used to design the layout and ensure risks met acceptance criteria at each step.

Viva noted that adopting more prescriptive separation distances, like those in the US National Fire Protection Association Hydrogen Technologies Code 2, arguably a trusted overseas standard, would reduce the time and cost of facility design. Viva's statement emphasises the benefits of empowering regulators to adopt the most suitable trusted overseas standards or adapt international standards to local needs while meeting WTO obligations.

The costs of deviations from international and trusted overseas standards are compounded by lack of harmonisation across jurisdictions

Hydrogen equipment for the New Energies service station, including the electrolyser, storage vessels, and dispensers, was sourced internationally due to the lack of viable Australian options.

[95] https://arena.gov.au/funding/advancing-renewables-program/.
[96] Viva Australia (2023), "Lessons learn report no. 1." Available at https://arena.gov.au/assets/2024/01/Viva-New-Energies-Service-Station-Geelong-Demonstration-Project-Lessons-Learned-Report-1.pdf.

While largely compatible with Australian standards, a gap analysis by VIVA identified minor discrepancies, except for *AS/NZS 3000:2018* ("Wiring Rules"), a uniquely Australian and New Zealand standard for electrical installations mandated by state and territory laws. Overseas suppliers unfamiliar with these requirements risk regulatory non-compliance, delaying equipment energisation.

Significant effort was required during project design to address Wiring Rules compliance for the hydrogen equipment. These deviations from international standards, while sometimes necessary, impose additional costs and must be justified.

A further challenge arose with containerised hydrogen equipment, commonly used for its modularity. Viva reported the existence of regulatory ambiguity across jurisdictions regarding whether such systems fall under the Wiring Rules for "fixed electrical installations" or *AS/NZS4024.1204:2019* for "machinery." While the Wiring Rules may be necessary deviation from international standards to account for differences in energy infrastructure, environmental conditions, regulatory framework, and industry practices, it is harder to justify inconsistences in their interpretation across jurisdictions. This inconsistency increases costs, delays, and uncertainty. Harmonising standards and clarifying their application across jurisdictions would streamline compliance, reduce costs, and better support public safety objectives.

Further costly deviations from international and trusted overseas standards

The Wiring Rules also mandate compliance with AS/NZS 60079 for hazardous area management, requiring overseas equipment to meet standards for the design, selection, and installation of electrical systems in explosive atmospheres. While Australia accepts equipment with International Electrotechnical Commission Explosive (IECEx) certification, it does not accept Atmosphere Explosible (ATEX) certification without additional assessment by a qualified assessor.

VIVA noted that this requirement adds cost and delays, as ATEX certification is widely accepted outside Australia, particularly in Europe. This creates challenges for vendors accustomed to ATEX standards to also meet IECEx requirements, increasing the effort needed to assess component suitability for local projects.

Missing regulatory standards that create regulatory uncertainty

The Federal Department of Climate Change, Energy, the Environment, and Water regulates petrol and diesel quality in Australia under the Fuel Quality Standards Act (2000) and related regulations, with specific determinations for various fuels. However, no equivalent legislation exists for hydrogen gas, despite the critical need for purity in hydrogen used in fuel cells to prevent contamination.

Australian Standards relevant to hydrogen fuel quality, including *AS ISO 19880.8:2021 (Fuel quality control)* and *AS ISO 14687:2020 (Hydrogen fuel quality specification)*, are being adopted at the New Energies Service Station. These standards require a minimum hydrogen purity of 99.97% for Fuel Cell Electric Vehicles. While vehicle OEMs confirmed the suitability of AS ISO 14687, inconsistent understanding of the standard within the industry creates confusion for transport operators and highlights the need to access local testing capabilities for compliance.

Establishing a legislated Hydrogen Fuel Quality Standard would ensure uniformity across the transport industry. Such a standard would facilitate supply agreements by providing clear terms, including quality guarantees, remedies for off-spec product, warranties, liability limitations, and protocols for addressing supply interruptions. Consistent specifications would reduce uncertainty and support investment in hydrogen mobility.

In the example in Box 5, the costs of bespoke national standards that deviate from international standards and trusted overseas standards mainly took the form of higher compliance costs and delays. However, there are potentially more significant costs, as illustrated in the example in Box 6.

Box 6: Rooftop DC isolators mandate for Solar photovoltaic (PV) systems in Australia

In 2012, Australia mandated the installation of rooftop DC isolators for solar PV systems. This occurred because it was a requirement under AS/NZS 5033 *Installation and safety requirements for photovoltaic arrays.* This standard is referenced in AS/NZS 3000 (Wiring Rules).

This standard required a DC isolator to be installed on the roof near the solar panels and a second DC isolator to be installed on a wall adjacent to the inverter if the inverter was not in the same location as the solar panels. Over time the mandate faced criticism from industry participants because it made the installation process more complex and increased the risk of solar-related fires due to environmental exposure and degradation. Failures with DC isolators were found to be a major source of conventional DC solar system failures.[97]

In 2021, there was a revision to AS/NZS 5033 that removed the explicit requirement to use DC isolators for all systems. The updated version of the standard allowed for alternative methods aimed at ensuring safety, such as disconnection points.[98]

In Section 7, we make several recommendations to mitigate the inefficiencies identified in this section: the fragmented and duplicative nature of regulatory standards adoption and updating approaches, the potential costs from deviating from international standards and trusted overseas standards, and the cost recovery methods used by national standards agencies. Addressing these inefficiencies is crucial to reducing unnecessary regulatory burdens, lifting productivity, promoting economic integration, and enhancing national prosperity.[99]

[97] For example, the Alternative Technology Association (now Renew Australia Inc) collated a variety of sources linking DC isolators to solar-related fires in Australia. See https://renew.org.au/wp-content/uploads/2018/08/ATA_Policy_Position_DC_Isolators.pdf.

[98] See https://www.standards.org.au/news/australian-solar-standard-as-nzs-5033-revised-to-support-growing-solar-industry,

[99] For example, in the context of the amendments to the ACL described in Box 3, Treasury (2024, op. cit.) estimates that implementing them across all 48 existing standards will save Australian businesses at least $136 million annually.

6. EV charging infrastructure and secondary batteries

This section examines the landscapes of EV charging infrastructure and secondary batteries, focusing on identifying and reviewing existing regulatory approaches to standards adoption and recognition.

A key input to this section comes from three standards mapping projects undertaken by SA and the Department of Finance through the Clean Energy Transition Standards Working Group (CETSWG). These projects focused on mapping voluntary standards for EV charging infrastructure and for secondary batteries, covering their reuse, repurposing, and recycling, and end-user safety.

CETSWG was established to ensure that Australia's net-zero transition is underpinned by a strategic and well-considered approach to standards-setting. The working group facilitates collaboration between Commonwealth policy areas and SA, to enable effective analysis, planning, and procurement of standards development to support the clean energy transition. CETSWG operates under the guidance of the Department of Industry, Science and Resources (DISR), the Australian Government's lead organisation for standards and conformance policy issues.

Given the urgency of addressing the climate emergency, several intergovernmental initiatives have emerged to set regulatory standards for EV charging infrastructure and secondary batteries. For example, the Consumer Energy Resources (CER) Working Group developed the *CER Roadmap*[100] at the request of the Energy and Climate Change Ministerial Council. As discussed below, the Roadmap outlines specific measures and timelines to implement national reforms, covering four workstreams – consumers, technology, markets and power system operations, to enable the efficient and effective integration of CER.

The revitalised National Competition Policy (NCP) [101] includes a reform theme aimed at leveraging the benefits of competition in the net-zero transformation. As recommended in this report, the revitalised NCP can play a crucial role in Australia by promoting harmonisation across jurisdictions and regulators, ensuring consistent and coordinated approaches to setting regulatory standards. Additionally, the revitalised NCP can build on previous NCP work, such as the CoAG's Principles and Guidelines for National Standard Setting, to develop and commit to a modernised guideline for setting regulatory standards for the net-zero transition, as outlined in Section 7.

As detailed below, the rapid pace of technological change in the EV charging infrastructure and secondary battery sectors inherently creates gaps in regulatory standards. These standards are critical to ensuring the safe deployment, performance, reliability, and interoperability of both existing and emerging infrastructure. Efficient regulatory approaches to addressing these gaps are essential for enabling the energy transition.

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[100] https://www.energy.gov.au/sites/default/files/2024-07/national-consumer-energy-resources-roadmap.pdf.
[101] https://treasury.gov.au/sites/default/files/2024-08/c2024-557133-cp.pdf.

In contrast, reliance on lengthy and costly processes to address these gaps—often duplicating the efforts of international and trusted overseas standards-setting organisations—risks delaying the transition and increasing its costs.

Moreover, a lack of harmonisation across jurisdictions, and even among regulators and government agencies, exacerbates these delays and inefficiencies. Consultations with academia, industry, government agencies, and regulators have highlighted numerous instances where these challenges have materialised.

Below, we summarise the key findings from the SA mapping projects on secondary batteries and EV charging infrastructure. Our goal is to highlight the existing gaps in standards identified through their recommendations, covering both policy and technical aspects. Additionally, we review other current regulatory processes, emphasising the fragmented and duplicative nature of the regulatory frameworks for adopting standards.

6.1 Secondary batteries: Reuse-repurpose-recycle

SA's *Secondary batteries: Reuse-repurpose-recycle* report from October 2024 highlights that although global demand for lithium-ion batteries is rapidly increasing, Australia faces significant challenges in recycling these batteries. These challenges include limited feedstock, safety risks, and high operational costs, with all black mass currently being exported for further refinement. The report underscores the critical need for developing and adopting robust standards to ensure safety, foster global harmonisation, and maintain consistency across the industry.

Additionally, the report identifies critical needs and challenges faced by the industry in advancing lithium-ion battery recycling and management. Key among these is the establishment of consistent national standards and regulations across the entire supply chain to ensure uniformity and efficiency. Equally important is raising awareness among consumers and industry stakeholders about proper disposal and recycling practices to support a sustainable system. Addressing safety concerns, particularly the fire risks associated with lithium-ion batteries, requires the development of comprehensive safety guidelines. Furthermore, implementing robust labelling standards is essential to enhance battery identification and traceability, ensuring better oversight and management throughout the lifecycle of these batteries.

The report's recommendations can be summarised as follows:

1. **Update AS 4681:2000: The storage and handling of Class 9 (miscellaneous) Dangerous Goods and Articles:** Revise the standard to better address battery storage and handling, reflecting the specific risks associated with batteries.[102]

[102] Updating AS 4681:2000 would be contingent upon amending the Dangerous Goods Act to reclassify batteries. An alternative is developing a new, dedicated standard or best practice guide specifically for batteries, distinct from other miscellaneous dangerous goods.

2. **Develop testing standards**: Create a new standard for testing the suitability of used batteries for reuse, repurposing, or recycling.

3. **Adopt UL 1974: Evaluation for repurposing or remanufacturing batteries:** Implement this standard for assessing the viability of repurposing or remanufacturing used batteries.

4. **Adopt J17152: battery terminology**: Standardise terminology to enhance clarity and consistency across the industry.

5. **Develop safety standards for discharging batteries**: Establish guidelines for safely discharging batteries before storage and disposal.

6. **Adopt international handling standards**: Implement international standards for the safe handling of batteries, tailored to local conditions.

7. **Monitor emerging standards**: Keep track of and consider adopting new international standards under development including IEC 62635 ED1 *Guidelines for end-of-life information provided by manufacturers and recyclers and for recyclability rate calculation of electrical and electronic equipment*, IEC 63338 ED1 *General guidance on reuse and repurposing of secondary cells and batteries*, and IEC 63330-1 ED1 *Repurposing of secondary batteries - Part 1: General requirements.*

8. **Develop easy-to-recycle battery designs**: Create standards for battery designs that facilitate recycling.

9. **Participate in IEC battery working groups**: Engage in international working groups to influence the development of key standards.

10. **Participate in IEC battery technical committee**: Engage either as a participant or observer in IEC Technical Committee 35 (TC 35) on *Primary Cells and Batteries*, and actively engage in Working Group JMT 18, which focuses on the safety of primary and secondary lithium batteries during transport.

11. **Promote circular economy principles**: Amend existing standards to embed circular economy principles.

12. **Uniform disposal guidance**: Establish comprehensive and uniform guidance on battery disposal pathways.

The recommendations identified several gaps in national standards, impacting the harmonisation of regulation and policy across jurisdictions. The report references numerous existing and developing international and overseas standards, sometimes recommending their adaptation to local conditions. However, the reasons for deviating from these international standards are not always explicitly discussed. The report also notes the lack of standardised international testing procedures for

assessing the suitability of used batteries for reuse, repurposing, or recycling. This gap increases the risk of unsafe reuse, ineffective repurposing, and inefficient recycling, potentially undermining safety, sustainability, and resource efficiency.

The automatic adoption of international standards and trusted overseas standards by regulators, as recommended in Section 7, will enable them to focus on bridging the gaps between these standards, when these exist, and specific local conditions that may necessitate deviations.

The recommendations from SA's report also include policy-oriented suggestions, such as greater participation in international standards setting, the promotion of circular economy principles, and the development of national standards to ensure batteries are designed with end-of-life management in mind. However, this latter recommendation may contradict the general principle that, as a small, open economy, we should avoid standards that risk locking us out of international markets, delaying or impeding the introduction of new products, or breaching our WTO obligations.

Industry consultations have identified several regulatory barriers, some unrelated to standards, that challenge the sector. These include:

- A lack of definition and consistency across all parts of the supply chain, despite the presence of international standards.
- The duplicative and inconsistent nature of rules across jurisdictions for the transport of dangerous goods unnecessarily increasing the cost of transporting batteries.

6.2 Secondary batteries: End user safety

SA's *Secondary Batteries: End User Safety* report from July 2024 points out that secondary batteries are essential for renewable energy storage, grid stability, and powering electric devices. While Australia is a significant producer of raw materials like lithium, it has little domestic battery manufacturing. To address this shortfall, the National Battery Strategy aims to boost domestic manufacturing to support the net-zero transition and economic growth. The report emphasises the need for comprehensive standards to ensure the safe and efficient use of secondary batteries in Australia. By improving current standards and aligning with international practices, Australia can enhance its battery manufacturing capabilities and support a sustainable energy future.

The report also notes several challenges faced by the industry. Safety concerns, such as fire risks, electrical hazards, and issues with overcharging or overdischarging, are significant. There is a need for robust standards in battery management systems to prevent failures and ensure compatibility. The quality and safety of batteries in e-mobility devices vary widely, underscoring the need for better testing and regulatory oversight. Additionally, alternative chemistries like flow batteries require specific standards due to their unique properties. In addition, the report stresses the need for local testing facilities to reduce reliance on overseas labs and support innovation.

The report's recommendations can be summarised as follows:

Safety

1. **Battery Management Systems (BMS)**: revise existing Australian standards for BMSs to detail minimum functional requirements.

2. **E-Mobility device safety**: Adopt trusted overseas standards to enhance safety, including UL 2849, *Electrical Systems for eBikes;* UL 2271, ANSI/CAN/UL/ULC *Standard for Batteries for Use in Light Electric Vehicle (LEV) Applications;* and UL 2272, *Electrical Systems for Personal E-Mobility Devices; or the European Standard EN 17128, Light motorized vehicles for the transportation of persons and goods and related facilities and not subject to type-approval for on-road use - Personal light electric vehicles (PLEV) - Requirements and test methods.*

3. **Charging and storage infrastructure**: Develop standards for secure external charging stations in residential buildings.

4. **Guidelines for Safe Usage and Maintenance of E-mobility Devices**: Educate on safe usage and maintenance of e-mobility devices.

5. **Standardised charging equipment for E-mobility devices**: Implement standards for charging cables to prevent compatibility issues.

6. **Flow battery safety**: Develop specific standards for flow batteries, including handling, storage, and recycling.

7. **Cybersecurity for BMS**: Align standards with emerging domestic guidelines to protect against remote tampering and unauthorised alternations of critical functions, particularly for Distributed Energy Resources.

8. **Rigorous testing for E-Mobility batteries**: Develop enhanced testing standards to simulate real-world usage.

Reliability

9. Adopt IEC 61508 Functional safety of electrical/electronic/programmable electronic safety-related systems for BMS: Adopt this standard enhance battery safety against overcharging and discharge hazards.

Performance

10. **Enhance local battery testing capabilities**: Expand and improve local battery testing facilities to reduce reliance on overseas testing and position Australia as a leading battery testing hub.

Deployment

11. **Develop comprehensive testing standards**: Create standards for testing assembled battery systems to ensure safety and compatibility, including protocols for battery management systems and inverter integration.

12. **Revise AS/NZS 5139:2019 electrical installations: Safety of battery systems for use with power conversion equipment**: Propose revision to include include a requirement for the Power Conversion System to communicate effectively with the BMS.

13. **Expand and revised AS/NZS 5139:2019 electrical installations**: **Safety of battery systems for use with power conversion equipment:** Propose update and extension to cover component and system-level testing requirements.

14. **Implement education and training programs**: Develop and implement training programs focusing on the latest standards and best practices for battery assembly and testing.

15. **Utilise Australian testing facilities**: Promote strategies to use local testing facilities, supporting local infrastructure and reducing costs and logistical challenges associated with overseas testing.

The recommendations highlight gaps identified in national standards. Some of these gaps are proposed to be addressed by adopting international and trusted overseas standards, while others require the development of new bespoke national standards or updates to existing ones. However, the rationale behind these different approaches remains unclear. Given the costly and time-consuming nature of developing or updating bespoke national standards, and the rapid pace of technological advancement in some domains, regulators who have demonstrated that adopting regulatory standards is the most effective way to achieve public policy objectives should consider instead relying on international and trusted overseas standards, as discussed in Section 7.

The recommendations in SA's report also include policy-oriented suggestions, such as enhancing local battery testing capabilities and greater utilisation of Australian testing facilities. However, it is unclear what public policy objectives these recommendations aim to address. For example, the establishment of local testing facilities may lower barriers for overseas original equipment manufacturers (OEMs) for testing, integration, compliance and certification. However, this approach also risks creating a political economy where testing standards are developed to favour specific firms, such as incumbents, potentially leading to higher prices for consumers and delaying or obstructing the importation of safer, higher-performance products.

Stakeholder consultations confirmed gaps in standards but highlighted the existence of international and trusted overseas standards. This underscores the need for regulators to be empowered to adopt these standards, as discussed in Section 7.

Stakeholder consultations raised concerns about the inadequate coverage of extra-low voltage (ELV) products with lithium-ion batteries. This was addressed in the National Electricity Safety Taskforce's review, concluded in July 2024. The review's priorities included:

- Increasing international standards uptake to maintain safety.

- National adoption of the Electrical Equipment Safety System to reduce regulatory burdens.
- Achieving appropriate regulatory coverage of ELV products.

Treasurers at the Council on Federal Financial Relations (CFFR) meeting in November 2024 agreed to harmonise regulations for household electrical products. A National Meeting of Consumer Electrical Safety Ministers will oversee the implementation of the proposed reforms, including risk-based regulation of ELV products.[103]

The recommendations in Section 7 emphasise the need for a more robust impact assessment when adopting bespoke national standards that deviate from international and trusted overseas standards. They also advocate for empowering regulators to automatically adopt these international and trusted overseas standards. Additionally, the recommendations stress the importance of regulators considering the wider impacts of their decisions, which promotes harmonisation and alignment between regulators and jurisdictions. The recommendations in Section 7 will be able to assist the implementation of the reforms proposed by the National Electricity Safety Taskforce and agreed by the CFFR.

6.3 EV charging infrastructure

SA's *EV charging infrastructure essentials* report from October 2024 notes that the global push for decarbonising road transport is gaining momentum, with over 14 million electric vehicles sold worldwide in 2023. In Australia, the National Electric Vehicle Strategy seeks to position the country as a competitive EV market by expanding charging infrastructure and fostering a domestic EV industry. Central to this effort is the adoption and implementation of key standards, which are essential for ensuring the safety, reliability, and interoperability of EV charging infrastructure.

The report finds that existing standards, such as AS/NZS 3000:2018 (Wiring Rules) are well-established but require updates to fully support the growing demands of EV infrastructure. For EV chargers and their installation, the adoption of international standards and the development of new technical specifications are critical to ensure safety and efficiency.

Grid connection protocols, including *AS/NZS 4777.1:2024 Grid connection of energy systems via inverters Installation requirements* and *AS/NZS 4777.2:2020 Grid connection of energy systems via inverters—Inverter requirements* are found to play a vital role in integrating EVs with the electricity grid. (See Box 7). Additionally, the report argues that international standards like *IEC 63584 (OCPP)* are essential for enabling smart charging solutions and ensuring interoperability across different systems.

Moreover, the future of EV infrastructure includes advancements like inductive charging, an emerging technology that will require the development of specific standards to ensure safe and

[103] https://www.productsafety.gov.au/about-us/product-safety-news/news/review-of-the-regulatory-framework-for-the-safety-of-household-electrical-products.

effective implementation. Additionally, the report points out that increasing consumer awareness through clear guidelines and labelling standards is essential to inform buyers about EV capabilities, promote transparency, and support informed decision-making in the transition to electric mobility.

The report's recommendations can be summarised as follows:

1. **Strengthen electrical safety standards**: Update standards like *AS/NZS 3000:2018* to include specific requirements for EV supply equipment.

2. **Adopt IEC 61851-1:2017: Electric vehicle conductive charging system – Part 1: General requirements**: Modify this standard to include heat and fire resistance requirements from *AS/NZS 60335.1:2020 Household and similar electrical appliances — Safety, Part 1: General requirements*, Clause 30.2.

3. **Develop guidelines**: Create informative documents to raise awareness about existing EV charging and vehicle-to-grid standards.

4. **Labelling standard for V2G/V2H**: Propose development of an international labelling regulation to classify EVs with vehicle-to-grid or vehicle-to-home capabilities.

5. **Harmonise Distribution Network Service Provider (DNSP) connection requirements**: Standardise service and installation rules across Australian states and territories.

6. **Support international representation**: Increase Australia's participation in international standards committees.

7. **Align with National CER Roadmap**: Ensure EV infrastructure standards align with the National Consumer Energy Resources Roadmap.

8. **Increase participation in IEC TC 69 working groups**: Enhance involvement in international standardisation projects related to EVs.

9. **Adopt IEC 63584, Open Charge Point Protocol (OCPP) (Fast track)**: Consider adopting the OCCP for communication between EVs and charging management systems, when published.

Similar to the other SA reports reviewed, this report identifies existing gaps in standards, recommending these be addressed either by updating bespoke Australian and New Zealand standards or by adopting modified international standards. As highlighted in Box 5, deviations from international standards can increase costs for international vendors. Furthermore, inconsistent interpretation of the Wiring Rules across jurisdictions is likely to hinder the nationwide rollout of EV infrastructure.

Harmonising DNSP connection requirements across Australian jurisdictions and aligning the development of V2G and device interoperability standards with the CER Roadmap are critical policy

recommendations. These measures are essential for ensuring the efficient rollout of EV charging infrastructure.

Box 7 below summarises relevant lessons from several EV charging infrastructure projects funded by ARENA. The lessons learned from these projects echo many of the concerns raised in previous sections and highlighted in the SA report, providing further support for the recommendations in Section 7.

Box 7 documents several key issues: the existence of gaps in standards, the higher compliance costs due to outdated bespoke national standards, and the benefits of industry-led solutions that adopt international and trusted overseas standards. Additionally, it identifies various regulatory barriers unrelated to standards, such as the lack of harmonisation in grid connection rules (as noted in the SA report) and network tariffs that are not fit for purpose. These barriers are hindering the net-zero transformation.

Box 7: ***Lessons Learned from ARENA EV-related projects***

Intellihub received funding from ARENA to install 50 light pole EV chargers across eight local council areas in NSW. [104] Their report highlights several regulatory barriers, not directly related to standards, that are challenging the net-zero transformation:

- Complex Approval Processes: The dual process with local councils and the DNSP led to many initially selected sites being rejected during the 10-15 sequential stages of the approval process. This forced Intellihub to select 2-4 times as many sites as planned, resulting in higher costs.
- Lack of Coordination: The lack of coordination between councils and the DNSP is evident. Due to the nature of the project, where power is brought down from the top of the pole, there is inherent flood resilience compared to EV chargers supplied by underground connections. However, council requests for installation design alterations were sometimes incompatible with DNSP requirements, such as height adjustments.
- Regional Differences: Based on previous experience, council approval processes differ significantly between NSW and Victoria.
- Unfavourable Contractual Terms: The DNSP's facilities access agreement transfers significant risk and liability to the vendor, with little room for negotiation. This led to several leading international and local trade players declining to participate in the project due to the unfavourable terms.

Intellihub' s report noted that industry-led solutions can bridge gaps in standards. As the pilot was the first of its kind in Australia, there was no standard for an integrated AC charger with metering, communications, and protection. Therefore, a custom solution was developed, consisting of two units: the EV charger and the main switchboard. This illustrates the benefits of standardisation, whenever possible, given that bespoke solutions are typically more expensive.

Energeia worked alongside ARENA as part of the Future Fuels Fund's knowledge-sharing program was responsible for reviewing the lessons learnt reports from the Future Fuels Fund Round 1

[104] See Intellihub (2024) "Simplify your energy transition", *Lessons Learnt Report – Street Light Pole EV Charger*. Available at https://arena.gov.au/assets/2024/12/Intellihub-Intellihub-Street-Power-Pole-EV-Charger-with-Grid-Integration-Lessons-Learnt-Report-3.pdf.

projects.[105] The review covered eight projects, which commenced in June 2021, with lead organisations Ampol, Chargefox, Electric Highway Tasmania, ENGIE, Evie and Jolt delivering public fast and ultrafast charging.

Similar to Intellihub' s report, Energeia's report identifies regulatory barriers not directly related to standards:

- High Network Costs: EV charging network costs include a fixed daily charge, a per-unit charge for energy consumption, and a per-unit charge for maximum demand. High maximum demand billing is common due to the intermittent nature of fast charging and high-power usage. For instance, Evie found that network costs from Ausgrid made up 72% of their total 63c/kWh electricity costs, indicating that network tariffs are not fit for purpose.

- Complex Engagement with Networks: Effective engagement with electricity networks required significant time and resources to navigate regulatory hurdles and ensure compliance with local standards.

- Fragmented Regulatory Regime: Public perception of lithium-ion battery fires has negatively impacted views on EVs and charging, despite a lack of supporting evidence. The Australian Fire Authority Council (AFAC) labels EVs as a 'special hazard,' recommending structural and fire protection measures in buildings with EVs. QLD Fire and Emergency Services suggests smoke management systems, adding costs to installations. Fire Rescue NSW supports AFAC, advocating for outdoor-only EV charging, limiting site options. Some site hosts reported insurers charging higher premiums for buildings with EVs, discouraging installations. This is an example where (quasi) regulators do not fully consider the impact of their decisions and recommendations on broader policy goals.

In 2022, the National Construction Code (NCC) introduced mandatory requirements for various building classes to include EV charging provisions as a sustainability initiative. However, Evie has identified an issue: these requirements were based on slow AC charging, while developers prefer faster DC chargers. Evie found that the power supply provisions were unsuitable for public DC fast charging, delaying development. As noted in Section 5.2, the NCC's three-year update cycle may cause delays and unintended consequences as consumer preferences and technologies evolve.

Energeia also highlighted gaps and ambiguities in standards. Ampol and Evie noted deficiencies in fast-charging equipment standards. Ampol found Australian compliance standards ambiguous, leading them to rely on overseas certifications from bodies like Underwriters Laboratories (UL) and Conformité Européenne (CE), and to partner with suppliers with proven domestic compliance. Evie pointed out the absence of standards for testing EV charging interoperability between manufacturers. We note, however, that the National Measurement Institute is working on standards for electrical measurement of chargers, where the provision of electricity is based on the power delivered.[106]

Energeia's review noted that the lack of nationally consistent standards for power connections caused delays. ENGIE highlighted the absence of a unified charging station metering standard in Australia, which doesn't require a national metering identifier (NMI) pattern meter. To address this, ENGIE installed their sites to meet European measuring instruments directive (MID) metering standards, anticipating these would guide future NMI standards. They also installed NMI pattern meters upstream to future-proof the sites. This demonstrates how industry-led solutions, using trusted overseas standards, can bridge gaps in domestic standards.

[105] See Energeia (2024), "Insights from ARENA's public charging projects." Available at https://arena.gov.au/assets/2024/07/Energeia-Insights-from-ARENAs-Public-Charging-Projects.pdf.
[106] As per information provided by DCCEEW.

Finally, ARENA's Realising Electric Vehicle-to-grid (V2G) Services project demonstrated V2G technology with 51 Nissan Leafs in Canberra, focusing on certifying the Wallbox Quasar charger to Australian standard AS477.2:2020.[107] Although the charger was already certified against similar overseas standards, compliance with AS/NZS 4777.2:2020 required hardware and software changes, making it the first bidirectional charger certified to this standard.

The primary challenge was that AS/NZS 4777.2:2020 categorised bidirectional chargers as multiple mode inverters connected to a stationary battery, which presumes an earthing point. However, EVs do not provide an electrical route to earth due to their rubber tyres. This misalignment required the manufacturer to modify the charger to provide an earthing connection through the charger.

After these modifications, the charger failed the Electromagnetic Compatibility (EMC) test due to high-frequency noise emissions exceeding allowable limits. To address this, the vendor added external ferrite inductors to the input and output sides of the charger, increasing installation complexity and reducing visual appeal. This issue is specific to the Australian standard and not present in overseas standards like UK G99.

Although the standard was recently updated with AS/NZS 4777.2:2020 Amendment 2:2024, published in August 2024, this example illustrates the potential costs of deviating from established international norms. However, this does not mean there are no benefits to doing so.

As discussed earlier, differences in energy infrastructure, environmental conditions, regulatory frameworks, and industry practices may justify AS/NZS standards that diverge from those of the European Union or North America. The key point, however, is that when regulators choose to adopt bespoke national standards, they should do so with a clear focus on minimising unnecessary deviations. This requires explicitly weighing the net benefits of existing international and trusted overseas standards (Recommendation 3) and prioritising their automatic adoption where feasible (Recommendation 7).

Many of the issues highlighted in Box 7, such as discrepancies between voluntary standards and regulatory environments, misalignment of multiple standards for a single product, and the need for jurisdiction-specific variations, were also raised during our stakeholder consultations and identified by the CER Roadmap. The CER Roadmap aims to provide a national approach to reforms, unlocking the full potential of consumer energy resources (CER) like electric vehicles (EVs) and batteries, while also meeting emissions and renewable energy commitments.

The development of CER interoperability standards and a regulatory framework to implement them are key priorities under the Roadmap. Table 1 below outlines the priorities, projects, and timelines directly relevant to this report. In this table, 'T' represents the technology workstream of the Roadmap, while 'P' denotes the power system operations workstream. The Federal Government is collaborating with states and territories to expedite the delivery of these Roadmap projects.

Key projects listed in Table 1 include drafting national regulatory standards for CER devices, which will be released for consultation in early 2025. Other projects involve developing faster connection

[107] See Md Mejbaul Haque, Laura Jones, Björn Sturmberg and Kathryn Lucas-Healey (2002), "Certification and performance of charger against AS4777.2:2022 standard: Insights from the Realising Electric Vehicle-to-grid Services (REVS) trial.' Available at https://arena.gov.au/assets/2022/05/realising-electric-vehicle-to-grid-services-lessons-learnt-2.pdf.

options for CER devices and EV charging stations, updating AS4777 to facilitate bi-directional EV charging, and identifying options to harmonize service and installation rules.

As shown in Table 1, the establishment of a technical regulator to set and enforce standards for CER is envisaged. Setting aside the merits and challenges of creating a new regulator, there is a clear need for setting and harmonising CER standards. Harmonisation is essential to ensure reliable and secure energy delivery and to mitigate the need for grid-scale investment.[108]

Priority	Project	Timeline
T.1 Nationally consistent standards, including electric vehicle to grid	CER device cyber standards developed	Start 2024 complete 2026
T.1 Nationally consistent standards, including electric vehicle to grid	AS4777 updated to remove V2G barriers	Start 2024 complete 2024
T.1 Nationally consistent standards, including electric vehicle to grid	Define EV supply equipment (EVSE) minimum technical standards for power system security	Start 2024 complete 2027
T.1 Nationally consistent standards, including electric vehicle to grid	Review of minimum operating standards for government support public EVSE	Start 2025 complete 2025
T.2 National regulatory framework for CER to set and enforce standards	Options agreed by Energy Ministers	Start 2024 complete 2025
T.2 National regulatory framework for CER to set and enforce standards	Draft legislation	Start 2025 complete 2026
T.2 National regulatory framework for CER to set and enforce standards	Regulator established	Start 2026 complete 2026
P.2 Faster, harmonised CER connection processes, including for EV chargers	Identify harmonised SIRs relating to EVSE	Start 2024 complete 2024

[108] See, for example, La Nauze, A. and Menezes, F. (2024), "Challenges in the consumer-side of the energy transition". *The Australian Economic Review*.

Table 1: CER Roadmap

In this context, it is crucial to consider which standards to set and how to set them. For example, the CER taskforce contracted the ANU to develop a recommended interoperability standards ecosystem. The ANU report made recommendations for device interoperability across solar/batteries, EV supply equipment (EVSE), and flexible load.[109] While many of the recommended standards were set by international organisations or trusted overseas standards-setting organisations, in some instances, there were choices between AS or AS/NZS standards or standards such as OpenADR, which are openly accessible and usable by anyone.[110]

The decision to update or develop bespoke national standards versus adopting international standards, trusted overseas standards, or standards like OpenADR can significantly influence the uptake of CER. An efficient regulatory standards-setting process is crucial, as international and trusted overseas standards may need modifications to fit the specific characteristics of domestic grids, voltage levels, and technological infrastructure. In some cases, developing domestic standards may be necessary. Empowering regulators to adopt the most appropriate standards can lower costs and accelerate the integration of CER. Shifting to a regime that automatically recognises international or trusted overseas standards, when available, allows regulators to focus on making targeted adjustments for differences in energy infrastructure, environmental conditions, regulatory frameworks, and industry practices

The development of standards extends beyond EV infrastructure and secondary batteries, becoming increasingly crucial as highlighted in the introduction. For instance, the Greenhouse and Energy Minimum Standards (GEMS) Program references approximately 100 standards for testing the energy performance of appliances and equipment. These standards are typically AS/NZS standards, but they may also include ISO or IEC standards, either directly or through AS or AS/NZS standards. Additionally, US (SHRAE) and European (EN) standards may be referenced.[111]

As regulatory standards become increasingly important, a successful energy transition requires best-practice approaches for adopting them. The recommendations in Section 7 are designed to address the key barriers identified in this report, including:

- Duplicating efforts of international and trusted overseas standards-setting organisations.
- Delays and costly processes for developing and updating bespoke national standards.
- Deviations from international standards or trusted overseas standards that increase costs, reduce access to products and services, and raise prices for consumers.

[109] Moore, T. (2024), "CER technical standards." Not publicly available.
[110] See https://www.openadr.org/.
[111] DCCEEW, private communication.

- Unnecessary lack of harmonisation across jurisdictions and regulators, resulting in higher compliance costs.

- Regulators (or quasi-regulators) making policy and regulatory decisions without fully considering their impact on broader policy objectives or on the operations of other relevant regulators.

6.4 Regulatory barriers beyond standards

This report contains several examples of regulatory barriers unrelated to standards that are hindering the net-zero transformation. These barriers include complex approval processes involving both councils and DNSPs, regional differences, and the regulatory framework for developing and applying network tariffs.

Many of these barriers are addressed in the Roadmap and are the focus of ongoing work. For instance, a recent report commissioned by DCCEEW[112] emphasised the need for greater transparency in DNSPs' connection times, more information on network capacity availability, and potential incentives for DNSPs to reduce the time required to connect and energise EV supply equipment and CER.

To fully harness the potential of the net-zero transformation, it is crucial for governments to consider further collaborative efforts to address these broader regulatory barriers. Such cooperation would unlock numerous opportunities, streamline processes, and significantly advance our shared decarbonisation goals.

[112] Oakley Greenwood (2024), "Streamlining the connection of Electric Vehicle Supply Equipment (EVSE) and large Consumer Energy Resources (CER)." Available at https://storage.googleapis.com/files-au-climate/climate-au/p/prj300997d42db40c11ee4f5/page/Streamlining_the_connection_of_EVSE_and_large_CER_Options_Paper.pdf.

7. Conclusion and recommendations

Below, we present recommendations around three themes, providing the reasons for each recommendation and suggesting a way forward for implementation.

The first set of recommendations focuses on improving the rigor and effectiveness of impact assessments for adopting regulatory standards. The second addresses the process for setting regulatory standards, empowering regulators and governments to adopt the most appropriate standards, including international standards and trusted overseas standards, to meet stated public policy objectives. The third aims to ensure that when adopting standards, regulators and governments consider their impact on broader policy goals and the services of other regulators.

The proposed recommendations support the transition to a green economy and align with other government priorities, including Australia's national EV and battery strategies.

The inability of businesses to adopt international standards and trusted overseas standards, combined with inconsistent regulatory approaches across jurisdictions and delays in updates, increases compliance costs and reduces trade opportunities. This, in turn, increases prices for consumers, limits consumer choice, and delays or impedes the introduction of new products into domestic markets. As shown in the previous section, these barriers are negatively impacting the rollout of EV charging infrastructure and distorting decisions by individuals and businesses regarding the lifecycle of secondary batteries.

The recommendations below are hardly radical, and many are not new. For example, the Productivity Commission's 5-year *Productivity Inquiry: Advancing Prosperity (2023)*[113] recommended greater recognition of international standards and trusted overseas standards. It stated that Australia should increasingly accept product standards adopted in other leading economies as 'deemed to comply,' provided that a transparent review could be undertaken if the Australian Government identified a significant safety risk.

The need for harmonisation is a long-standing issue identified by the Productivity Commission in the context of the ACL[114], by the House of Representatives Standing Committee on Economics in its 2019 *Report on the inquiry into impediments to business investment*[115], and by the Harper Review.[116] These reviews found that the adoption or referencing of standards in law or regulation can create unnecessarily high or varying requirements for goods and services, which reduces competition and creates barriers to market entry and innovation.

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[113] Available at https://www.pc.gov.au/inquiries/completed/productivity/report/productivity-advancing-prosperity-all-volumes.pdf.
[114] Productivity Commission 2017, "Consumer law enforcement and administration", *Research Report*, Canberra. Available at https://www.pc.gov.au/inquiries/completed/consumer-law/report/consumer-law-overview.pdf.
[115] Available at https://nla.gov.au/nla.obj-2861659030/view.
[116] Harper, I., Anderson, P. McCluskey, S. and O'Bryan, M. (2015), "Competition policy review," *Final Report*. Available at https://treasury.gov.au/publication/p2015-cpr-final-report.

While the recommendations below that aim to address fragmentation are more directed at Australian governments, they will enhance regulatory alignment and economic integration between Australia and New Zealand. Additionally, the recommendations that focus on improving decision-making processes for adopting regulatory standards and on reducing duplication will uplift regulatory performance domestically in both countries.

7.1 Determining when standards should be made mandatory by regulation

1. **Recommitting to CoAG principles**: *Incorporate CoAG's principles and guidelines for national standard setting into a new, modernised set of principles available to both Australian and New Zealand regulators and government agencies.*

   The economics underpinning the CoAG principles and guidelines remain as relevant today as they were in the 1990s. Recommitting to them is not merely a symbolic exercise. The examples provided in this report illustrate the fragmented and duplicative nature of the regulatory adoption process, clearly showing that the considered application of CoAG's guidance has eroded over time. Reduced compliance has been reported for over two decades. [117]

   A recommitment to CoAG's guidance on setting standards is necessary to reduce the cost of the net-zero transition by supporting markets to operate efficiently, facilitating the extensive reallocation of resources from carbon-intensive industries to greener sectors. Such a recommitment will improve the federation for the benefit of the Australian population. Moreover, incorporating the CoAG's guidance into a new, modernised set of regulatory principles will improve decision-making on adopting standards in Australia and New Zealand, leading to greater economic integration to the benefit of both countries.

   The recommendations that follow build on CoAG's guidance by incorporating what we have learned over the last 30 years about the economic impact of standards and the standards-setting process.

2. ***Identifying the net benefits of bespoke national standards****: Impact assessments for introducing bespoke national standards should explicitly evaluate the additional net benefits—such as additional improvements in safety, health, environmental protection, consumer protection, or national security and additional costs —compared to existing international and trusted overseas standards.*

   There is an obligation to favour international standards over national standards, except in special circumstances. This obligation is embedded in the guidance for regulators on standard adoption by both the Australian and New Zealand governments. When appropriate international

[117] See, National Competition Council (2003), op. cit., Chapter 6.

standards do not exist, existing trusted overseas standards should be used to assess the net benefits of introducing bespoke national standards.

Beyond compliance with our international obligations under the WTO, there are strong economic reasons for favouring international standards and trusted overseas standards. Economic literature shows that while unique national standards can hinder trade, international and trusted overseas standards have a positive impact. Mandating national standards that deviate from international norms can delay the adoption of new products and services, reduce competition and choice, and lead to higher prices for businesses and consumers.

Requiring regulators to explicitly account for the net benefits of adopting a bespoke national standard over an international standard and appropriate trusted overseas standards will promote an efficient regulatory standards-setting process. Current guidance in Australia already requires that if any of the proposed options involve establishing or amending standards in areas where international standards already apply, the Regulatory Impact Statement (RIS) should document whether (and why) the standards being proposed differ from the international standard. Similarly, New Zealand guidance requires that relevant international standards are identified, if any, and that the reasons for any divergences are considered. However, there is no explicit requirement for establishing net benefits from deviations from international norms.

Requiring regulators to explicitly assess the net benefits of adopting a bespoke national standard over international and trusted overseas standards will enhance the efficiency of regulatory standard-setting. In Australia, current guidance mandates that when proposing or amending standards in areas where international standards apply, the RIS must document any differences and their justification.[118] Similarly, New Zealand's guidance requires identifying relevant international standards and considering reasons for any deviations.[119] However, neither country explicitly requires demonstrating net benefits from departing from international norms.

Explicitly requiring regulators to identify net benefits from deviations from international standards—and extending this requirement to trusted overseas standards—will sharpen their focus on these differences.

3. ***Favouring industry-led solutions****: Under conditions of high technological uncertainty, there should be a presumption against regulatory standards in favour of voluntary standards. International standards and trusted overseas standards may fill gaps identified as needing regulatory intervention.*

[118] See Commonwealth of Australia, Department of the Prime Minister and Cabinet (2023), *Regulatory Impact Analysis Guide for Ministers' Meetings and National Standard Setting Bodies*. Available at https://oia.pmc.gov.au/sites/default/files/2024-09/regulatory-impact-analysis-guide-for-ministers-meetings-and-national-standard-setting-bodies.pdf.

[119] New Zealand Cabinet Office Circular CO (24) 7, *Impact Analysis Requirements*. Available at https://www.dpmc.govt.nz/sites/default/files/2024-12/co-24-7-impact-analysis-requirements.pdf.

When firms face higher costs for complying with regulatory standards compared to voluntary ones, they may divert resources from innovation to compliance activities. Although voluntary standards carry the risk of capture, regulatory standards are often misaligned with rapidly evolving technologies due to information asymmetries. In environments of high technological uncertainty, the inefficiencies caused by these information gaps in regulatory standards outweigh the risks of voluntary standards being overly influenced by individual firms.

When gaps necessitate the introduction of regulatory standards, adopting appropriate international standards and trusted overseas standards, that favour minimum characteristics or attributes, rather than specific technological specifications, reduces compliance costs and has a less negative effect on innovation. Moreover, for small, open economies, there is a significant cost associated with locking into an inferior option through the adoption of a regulatory standard, as it risks limiting access to superior products and services. This cost increases with higher technological uncertainty.

The example described in Box 7 where Intellihub developed a customised solution to address the lack of standards for integrated AC charging with metering, communications, and protection demonstrates the advantages of industry-led approaches. Voluntary standards may then be developed once there is sufficient industry consensus on best-practice approaches, and governments and regulators then can make such standards mandatory if they are the best alternative to fulfilling a specific public policy objective.

4. ***Prescriptive standards only under special conditions****: Standardisation through the adoption of a single prescriptive standard should be mandated by regulation only when consumer demand for product or service variety is minimal, significant economies of scale and network effects can be achieved through widespread adoption, and the impact on competition is negligible. The adoption of prescriptive standards by regulators may also be desirable for safety reasons. Any proposed prescriptive standard must undergo an impact assessment that explicitly evaluates its net benefits compared to a performance-based standard.*

   This recommendation underscores the importance of impact assessments in demonstrating that a prescriptive standard is the most effective approach to achieving the stated public policy objective. Such assessments must show that the benefits of standardisation—such as economies of scale and network effects—outweigh the potential drawbacks, including reduced consumer choice and diminished competition. However, in most cases, standardisation through performance-based standards is expected to deliver greater net benefits compared to prescriptive standards.

   For example, standardising vehicle safety thresholds across jurisdictions—such as requiring seat belts and airbags to meet specific performance criteria—saves lives and reduces injuries. Because these thresholds are performance-based, they allow manufacturers flexibility in meeting safety requirements, preserving consumer choice while focusing on functionality.

Additionally, significant network effects arise as the widespread adoption of these safety measures improves road safety for everyone, including across jurisdictions. Moreover, when these standards align with international standards or trusted overseas standard, they have no adverse impact on competition, reflecting the global nature of the market for airbags and seat belts. [120]

In contrast, instances where a single prescriptive standard is the optimal approach to achieving a public policy objective are relatively rare. A commonly cited example is the European regulator's introduction of the Global System for Mobile Communications (GSM) standard for 2G mobile telecommunications. As discussed in Section 3.3, while debates persist over whether the EU's regulatory standardisation approach or the US model of competing industry standards was more effective for 2G deployment, the adoption of GSM is widely regarded as having delivered significant economies of scale and network externalities without compromising competition or consumer choice. [121]

By mandating the GSM standard, the European Union ensured all mobile operators and manufacturers adhered to a single technology, thereby creating a large, unified market. GSM's success in Europe further spurred its adoption globally, solidifying its status as the global benchmark for mobile communications and amplifying network externalities. Importantly, while the core communication technology was standardised, manufacturers and service providers retained the freedom to innovate in areas such as handset design, network services, and value-added features. This harmonisation lowered barriers to entry for new operators and manufacturers, fostering robust competition and market growth.

5. ***Accounting for the impact on competition and innovation****: When regulators and governments decide to make certain standards mandatory or establish their own standards, they should ensure these decisions do not hinder future, efficient market entry and exit, and innovation.*

   Safeguarding the potential for competition is critical to ensuring that innovation and market dynamism are not stifled. A sharp focus on the potential impact on competition requires following several good principles of regulation, including explicit consideration of competition impacts in the impact assessment, appropriate engagement with stakeholders, alignment with international standards or trusted overseas standards, and ex-post monitoring and evaluation. Competition considerations also reinforce the need for regulatory approaches that favour minimum characteristics or attributes, rather than specific technological specifications.

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[120] Safety considerations, however, may justify the adoption of more prescriptive standards, for example, such as for automotive lighting, signalling and reflective devices. The standards prescribe the exact design, placement, and performance criteria for headlights, taillights, brake lights, turn signals, and reflectors to ensure they meet safety requirement.

[121] See, for example, Bach, D. (2000), International cooperation and the logic of networks: Europe and the Global System for Mobile Communications (GSM)," BRIE Working Paper 139, Berkeley. Available at https://brie.berkeley.edu/sites/default/files/wp139.pdf.

The CoAG guidelines provided valuable recommendations for assessing the impact of regulation on competition. They implied that regulatory standards should not restrict competition unless it can be demonstrated that the benefits to the community from such restrictions outweigh the associated costs, including any negative impact on safety, and that the public policy objective cannot be achieved through less restrictive means. This principle reinforces the presumption in favour of adopting international standards and trusted overseas standards over bespoke national ones, as international norms are generally less likely to reduce competition.

6. ***Accounting for incentives and unintended or secondary effects****: Impact assessments for proposed regulatory standards must explicitly account for incentives, potential unintended consequences, and secondary effects. Additionally, regulators should evaluate the incentives embedded within the compliance framework to ensure alignment with the intended public policy objectives.*

   Government interventions through regulatory standards are meant to create incentives to align behaviour with public policy goals, such as safety or environmental protection. However, these standards can also lead to unintended consequences or secondary effects, potentially undermining their objectives or impacting other policy goals.

7.2 Empowering regulators to adopt the most appropriate standards to meet the stated public policy objective

7. ***Automatic adoption of international standards and trusted overseas standards****: Regulators and governments should automatically adopt existing international standards and trusted overseas standards, unless they can demonstrate that these standards are unsuitable for the local context.*

   Default adoption of existing international standards and trusted overseas standards will immediately expand choice and competition. It will enhance market efficiency by reducing informational barriers for businesses and consumers. Additionally, it will benefit supply chains by providing quicker access to new products and services, potentially leading to a more innovative economy.

   By adopting international standards and trusted overseas standards, regulators can shift their focus from duplicating the efforts of established standards organisations to identifying gaps in coverage. This approach helps avoid expending resources on reviewing low-value risks typically addressed by these standards. Gaps may arise due to factors such as differences in societal attitudes towards risk, infrastructure availability, environmental conditions, or the specific characteristics of the Australian and New Zealand populations. Automatic recognition will incentivise regulators to actively participate in the development of, and stay informed about, the latest international and trusted overseas standards and processes.

Automatic recognition does not diminish the role or importance of Australian governments, regulators, or standard-setting bodies. Regulators can still deviate from international or trusted overseas standards and compliance processes if necessary to protect Australians or New Zealanders. When deviations from international standards or trusted overseas standards are required, following Recommendation 2 above will ensure that these deviations are the minimum necessary to achieve the stated objective.

We recognise that the complexity of automatically recognising standards can vary significantly across domains. For example, road vehicle design standards for safety and emissions involve inherent trade-offs—such as balancing vehicle weight, safety during accidents, and emissions—making the recognition process more complex. In contrast, adopting international standards or trusted overseas standards for bicycle helmets may be relatively more straightforward. Regulators would have more flexibility to allocate resources from reviewing low-value risks intrinsic in most international standards and trusted overseas standards towards more complex tasks.

We also note that this recommendation aligns with New Zealand's Building (Product Certification) Amendment Bill, which aims to recognise building product standards from trusted overseas jurisdictions. This eliminates the need for designers or builders to verify these standards themselves. Additionally, the bill proposes streamlining the citation of international standards, allowing them to be used with acceptable solutions and verification methods to comply with the building code.

Finally, we offer a high-level description of a potential process for implementing automatic recognition. This description is necessarily broad, as details will vary based on the complexity of the regulatory task at hand and on the sector. The process begins with identifying appropriate international standards and trusted overseas standards that meet the desired regulatory requirements. This identification can be conducted internally if the regulator or government agency has the necessary expertise, or it can be procured externally.

In more complex cases, the applicability and compatibility of international standards may vary. For example, ISO standards for electrical devices sometimes include compromises to achieve consensus, which may necessitate modifications to ensure quality or safety. Additionally, there may be incompatibilities between trusted overseas standards. While electrical devices made to EU, Japanese, or US standards are likely effective and safe, combining components designed to different national standards does not guarantee that a larger electric circuit will operate effectively and safely.

In such cases, consulting the relevant SA or NZS technical committee can be beneficial. This consultation does not necessarily need to lead to the development of bespoke national standards but can streamline the current SA and NZS processes for adopting international or trusted overseas standards, similar to the standards mapping exercise discussed in Section 6.

This approach ensures that the adoption process is efficient without bypassing it altogether in more complex scenarios.

Other elements of the automatic recognition process would include consultation, allowing stakeholders the opportunity to raise concerns, and a transition period for implementation.

8. ***Timely updating of regulatory standards****: In line with the recent amendments to the ACL, standards should apply as they evolve over time, incorporating updates as they occur. To account for industry adjustments, a defined transition period—varying by context—should allow businesses to comply with either the older or updated standard during this time. Businesses must also retain the option to demonstrate compliance with the essential safety and performance requirements of the updated standard through alternative methods.*

   Regulators should bear the burden of justification if dated standards are necessary. For instance, this may apply in scenarios where updated standards could inadvertently lower safety or performance levels, necessitating a fixed reference to a specific version.

   This approach ensures businesses can confidently adopt the latest voluntary national standards or their equivalent international or overseas counterparts without the risk of non-compliance or penalties. It is especially critical for industries undergoing rapid technological advancement, such as those central to the net-zero transition, where standards can quickly become outdated, as illustrated in Box 7.

   Additionally, this recommendation enhances regulatory consistency across the Tasman by aligning standard versions, thereby fostering deeper economic integration between Australia and New Zealand.

9. ***Regulatory standards in subordinate regulation****: Consideration should be given to whether regulatory standards should be introduced in subordinate legislation, such as regulations and legislative instruments, and to the circumstances under which policymakers could delegate to regulatory agencies or public servants the authority to declare equivalent or higher standards.*

   Including regulatory standards in subordinate legislation or allowing policymakers to delegate the authority to declare standards, provides more flexibility and enables timely updates to incorporate new standards as they are developed. This approach ensures that regulations remain current and relevant, reducing the lag between the development of new standards and their implementation. Additionally, it can streamline the process, making it easier for businesses to comply with the latest requirements and maintain consistency across jurisdictions.

   There are many examples internationally of regulatory standards embedded in subordinate legislation. In the UK, the Ecodesign for Energy-Related Products Regulations incorporate international and overseas standards to ensure energy efficiency and environmental protection,

allowing for timely updates and alignment with global standards.[122] In the US, the Occupational Safety and Health Administration (OSHA) incorporates standards from organisations like the American National Standards Institute (ANSI) into its regulations, helping maintain consistency and ensuring that regulations are based on the latest safety and health standards. [123]

As highlighted in Box 3, the recent amendments to the Australian Consumer Law (ACL) approved by the Australian Parliament empower the relevant Commonwealth Minister to recognise international or trusted overseas product safety standards alongside Australian standards when establishing or revising mandatory safety or information standards. Additionally, there are instances in Australia where governmental staff are authorised to make decisions on standards. For example, as discussed in Box 2, in Queensland, a designated public servant has the executive power to declare that equivalent or higher standards for bike helmets are acceptable.

Similarly, the New Zealand Government has recently decided to amend the Energy Efficiency and Conservation Act 2000. The proposed changes will delegate the authority to set technical requirements for minimum energy performance standards, demand flexibility, testing, and labelling to the Minister for Energy. These requirements will be established through secondary legislation. This shift is expected to create a more effective energy efficiency regulatory regime, enabling quicker responses to technological advancements.[124]

The tentative nature of this recommendation underscores the concern that relinquishing democratic control over the introduction of regulatory standards should only occur under special circumstances. These include instances where new or updated standards are equivalent to or exceed existing standards and fully meet the desired public policy objectives.

Furthermore, the flexibility provided by subordinate legislation will be particularly advantageous during the net-zero transition, as we navigate rapid technological changes. Industry and voluntary standards will be developed and updated to reflect improvements in reliability, performance, and safety. It is important to note that whether regulatory standards are introduced through subordinate legislation or not, they will still follow the high-level process outlined in Recommendation 7. This includes consultation requirements, in line with our WTO obligations, and the involvement of technical expertise.

10. ***Making standards freely available****: Standards referenced in legislation or regulation should be freely available whenever possible, with their text replicated in the relevant legislative*

[122] https://www.gov.uk/guidance/placing-energy-related-products-on-the-uk-market.
[123] https://www.osha.gov/laws-regs/mou/2001-01-19.
[124] https://www.mbie.govt.nz/dmsdocument/29832-delivering-a-more-effective-energy-efficiency-regulatory-regime-coversheet-proactiverelease-pdf.

instruments. This necessitates developing new funding models for the national standards organisations to make high public good value voluntary standards freely available.

Making standards freely available supports the dissemination of best practices and the knowledge generated by innovative businesses, not-for-profits, universities, and government organisations. Importantly, as emphasised by the ACCC, requiring businesses to purchase standards mandated by law contradicts a fundamental principle of democracy: everyone should have free access to the laws that govern them. In the context of mandatory safety requirements, compliance should be guided by the imperative to protect public safety, not by commercial gain.[125]

The theoretical case for making standards available to potential users at zero marginal cost is based on a straightforward allocative efficiency argument. However, this argument does not address the dynamic efficiency consideration: how will standards-setting organisations recover their costs?

It may be possible to consider a subscription model, licensing arrangements, or some form of price discrimination to allow national standards organisations to recover their costs. A more challenging issue is how to make ISO or IEC standards freely available when they are referenced in legislative instruments. Since international standards are global club goods—non-rivalrous but excludable—subscription approaches might partially address this issue. [126] There is potential for Australia and New Zealand to lead the way in developing alternative funding models for standards organisations that can increase access.

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7.3 Ensuring that when adopting standards, regulators and governments consider their impact on wider policy goals and other regulators' services.

11. ***Providing regulatory certainty****: Consider establishing a Trans-Tasman process for businesses and individuals to obtain confirmation from the appropriate regulator that a particular international or trusted overseas standard meets their regulatory obligations.*

    The proposed mechanism aims to provide regulatory certainty, enabling businesses to confidently invest in and introduce products and services that have been proven safe and effective overseas and adhere to international standards or trusted overseas standards. Similar to Recommendation 7, this process would require regulators to address gaps in international standards or trusted overseas standards rather than duplicate efforts already undertaken by international and overseas standards organisations. It would also require regulators to engage

[125] ACCC (2019), op. cit.
[126] See, also, Swann (2010), op. cit.

with current international and overseas standards and processes, and to coordinate and collaborate with other regulators across sectors and jurisdictions.

As with Recommendation 7, the regulator would have to prove that the international standard or a trusted overseas standard does not meet their regulatory obligations. This process would involve the same steps as previously outlined, including stakeholder consultation, to ensure transparency and support compliance by interested parties and competitors.

This recommendation is tentative, acknowledging the practical challenges in designing and implementing such a process. While the proposed mechanism may work for straightforward, simpler standards, there is a risk that a poorly designed process for more complex cases could increase bureaucracy rather than reduce regulatory uncertainty. In complex cases, standards often link to other standards—such as the AS/NZS3000 Wiring Rules, which reference various other standards depending on the electrical system's design characteristics. These linkages can be specific to the application, making it difficult for an external body to accurately assess them.

We also note that the proposed process would be more narrowly focused than the Regulatory Standards Board proposed by the New Zealand government in its consultation on the Regulatory Standards Bill.[127] Moreover, additional complexities arise in Australia due to its federal system, where responsibilities are distributed across various levels of government and jurisdictions.

12. ***Broadening regulators' accountability****: The Australian governments should introduce a stewardship model for the adoption of regulatory standards where regulators: (i) define regulatory objectives and their contribution to broader policy goals; (ii) identify and collaborate with other regulators, addressing overlaps and gaps that may require regulatory standards; and (ii) assess the impact of their standards on wider policy goals and other regulators' services.*

Introducing regulatory stewardship obligations would enhance coordination between regulators and across jurisdictions. This improved coordination would increase the efficiency and effectiveness of adopting regulatory standards by minimising duplication and ensuring that regulators consider incentives, unintended consequences, and secondary effects on broader policy goals. Clearly defining regulatory objectives aligns with best practice principles, such as using clear language and facilitating policy-maker accountability.

This recommendation targets Australian governments, considering that New Zealand already employs a regulatory stewardship model. Under the New Zealand Public Service Act, public service chief executives or boards are tasked with upholding five public service principles,

[127] Under the proposal, the Board would assess complaints about existing regulation that is inconsistent with the principles for good regulation set by the proposed act. The Board would issue non-binding recommendations and public reports. See https://www.regulation.govt.nz/assets/Ministry-for-Regulation-files/RSB-/Have-your-say-on-the-proposed-Regulatory-Standards-Bill-final.pdf?vid=3.

including stewardship.[128] The proposed Regulatory Standards Bill further elaborates on these principles, focusing on empowering regulators to address and solve problems effectively.

As with the previous recommendation, implementing this recommendation within Australia's federal system is not a trivial exercise. It is likely best addressed in the context of the revitalised NCP agreement.

7.4 The way forward

This report underscores the importance of adopting best-practice regulatory approaches to support the net-zero transition and promote higher standards of living for Australians and New Zealanders by ensuring access to higher quality, safer, and less expensive goods and services. It calls for a more robust assessment of regulatory standards, a shift towards the automatic adoption of international standards and trusted overseas standards, improved coordination among regulators, making standards freely accessible to enhance market efficiency and consumer protection, and a more agile and responsive approach to setting and updating regulatory standards.

The recommendations are wide-ranging, covering both the decision on whether to adopt a regulatory standard to achieve a stated public policy objective (Recommendations 1 to 6) and the efficiency and effectiveness of the process of adopting regulatory standards (Recommendations 7 to 12). Given the different nature of these recommendations, the pathways to implementation will vary.

Some recommendations, such as those aimed at providing a more robust impact assessment (Recommendations 1 to 6), along with Recommendation 9, which highlights the desirability of defining regulatory standards in subordinate legislation, can be incorporated into guidance issued by the Department of Finance in Australia and the Ministry for Regulation, as the government agencies with regulatory policy responsibility. Securing the widespread adoption of a revised guideline that incorporates CoAG guidance across Australian jurisdictions would require a vehicle for national coordination, such as the Council on Federal Financial Relations. A coordinated approach to adopting the guidelines between Australia and New Zealand could be achieved through the 2+2 process.

Coordination with the New Zealand government on recommendations 7 and 8 could occur across different areas (e.g., electrical safety) under the appropriate forum (e.g., the Energy and Climate Change Ministerial Council). Within the Australian context, recommitting to CoAG's Principles and Guidelines for National Standard Setting (Recommendation 1) could occur within the broader framework of the revitalised NCP, agreed upon by the Australian, state, and territory governments under an intergovernmental agreement signed on 29 November 2024. The NCP could also provide a vehicle for Australian jurisdictions to commit to Recommendations 7, 8, and 12, which require national coordination. While the NCP cannot fully resolve the challenges presented by federalism, it

[128] https://www.treasury.govt.nz/information-and-services/regulation/regulatory-stewardship.

can play a crucial role by ensuring that national competition principles apply beyond government business and legislation that limits competition.

The implementation of Recommendation 10 is a matter for the Australian and New Zealand governments. For the New Zealand government, it is a policy decision. For the Australian government, it is a matter for agreement with SA. Finally, Recommendation 11 could be pursued through the 2+2 process.

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