IMPROVED ENERGY EFFICIENCY STANDARDS FOR APPLIANCES PROGRAM

PROCESS AND OUTCOMES EVALUATION

NSW DEPARTMENT OF PLANNING AND ENVIRONMENT

NOVEMBER 2022

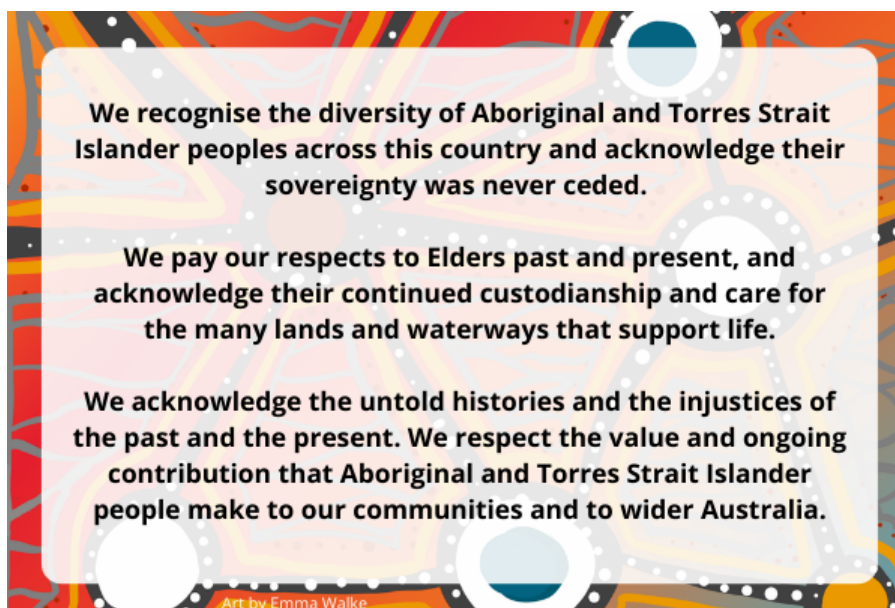EVALUATION REPORT

ACKNOWLEDGMENTS

We recognise the diversity of Aboriginal and Torres Strait Islander peoples across this country and acknowledge their sovereignty was never ceded.

We pay our respects to Elders past and present, and acknowledge their continued custodianship and care for the many lands and waterways that support life.

We acknowledge the untold histories and the injustices of the past and the present. We respect the value and ongoing contribution that Aboriginal and Torres Strait Islander people make to our communities and to wider Australia.

Art by Emma Walke

CONTENTS

TABLES AND FIGURES

TABLES

FIGURES

ACRONYMS

CCF	Climate Change Fund
CO_2	Carbon dioxide emissions
COAG	Council of Australian Governments(former)
CRIS	Consultation Regulation Impact Statement
DRIS	Decision Regulation Impact Statement
E3	Equipment Energy Efficiency
E3RC	E3 Review Committee
EC	Energy Council (COAG) (former) – replaced by the Energy Ministers' Meeting
EEAT	Energy Efficiency Advisory Team (EC) (former) – replaced by the Energy Technology Working Group (ETWG) in November 2021. This report largely references the EEAT throughout as that was the relevant body for the majority of the program's life.
EMM	Energy Ministers' Meeting
EOI	Expressions of Interest
ETWG	Energy Technology Working Group, the body that replaced the Energy Efficiency Advisory Team (EEAT) in November 2021
GEMS	Greenhouse and Energy Minimum Standards
GWh	Gigawatt hours
KEQ	Key evaluation question
kt	Kiloton; a unit of weight or capacity equal to 1,000 metric tons
MEPS	Minimum Energy Performance Standards
MER	Monitoring, Evaluation and Reporting
NAFES	National Association of Food Equipment Suppliers
NSW	New South Wales
NZ	New Zealand
OBPR	Office of Best Practice Regulation
RIS	Regulation Impact Statement
RFQ	Request for Quotation
SCO	Senior Committee of Officials (EC) (former) – replaced by the Energy Senior Officials Meeting
ToR	Terms of Reference
TWh	Terawatt-hour
US	United States
yr	Year
$m	Million dollars

EVALUATION OF THE IMPROVED ENERGY EFFICIENCY STANDARDS FOR APPLIANCES PROGRAM

METHODS

Reviewed **150** documents

Conducted **29** interviews, with **30** stakeholders

KEY FINDINGS

Products were selected based on a combination of factors, which in summary are:

- **'Bang for buck'**: generate considerable energy, greenhouse gas and bills savings from standards development.
- **'Low-hanging fruit'**: easiest products to regulate (that were not already regulated) or were already being investigated by other jurisdictions
- **'Fill the gaps'**: Some product selections were lower on the E3 prioritisation list, so the Department opted to work on these products while other teams worked on higher-priority products.

3 product streams produced draft Consultation Regulatory Impact Statements
Commercial ice makers, domestic cooking appliances and commercial catering equipment

0 product streams made it past the CRIS development stage of the product review process

STAKEHOLDER CONSULTATIONS

- The Department had **completed a lot of work** despite barriers to implementation.
- Stakeholder **consultation was thorough and done with integrity**
- **Stakeholders were satisfied** about the timeliness and appropriateness of engagement.
- **Discrete Choice Experimen**t was used to survey consumers preferences and was described as **robust and best practice.**
- Relationship with the **EEAT** was described as valuable and with little political interference
- There was no formal arrangement between the Department and the **office of the GEMS Regulator**, but it was ultimately mutually beneficial

BARRIERS

Many interviewees spoke to the idea of **heroic assumptions**—that the program design expectation that multiple activities could be conducted in parallel throughout the program was highly **aspirational.**

Many interviewees felt that one of the main barriers was the program's four-year **timeframe**, which was described as **overly ambitious** to achieve standards development for all selected products/ product streams.

These ambitious expectations extended into the delivery plan. This issue was made more problematic by the **relatively small team** with initially limited technical expertise and experience in standards development.

The Department applied **adaptive management strategies** to help overcome these barriers, including **adapting test methods** in response to emerging feasibility issues, **adapting procurement approaches** in response to a limited pool of technical consultants, and **adjusting data collection methods** to better capture high quality product performance data.

ELECTRICITY, GAS, EMISSIONS AND UNDISCOUNTED BILL SAVINGS ESTIMATES MADE IN 2022

Savings	2025	2030	2035	2040	2050
Total electricity savings (GWh/yr)	153	930			
Total gas savings (GWh/yr)	122	748			
Agg. annual emissions savings (kt CO2-e)		2,958		11,069	14,324

Total undiscounted bill savings ($m)
2035 - $3,228.62
2040 - $5,291.59

CRTD
CONSULTANTS

EXECUTIVE SUMMARY

CONTEXT AND BACKGROUND

The NSW Department of Planning and Environment (the Department) engaged ARTD Consultants to conduct an independent process and outcomes evaluation of its Improved Energy Efficiency Standards for Household and Business Appliances (Appliance Standards) program.

The purpose of the Appliance Standards program is to 'accelerate the processes used by E3 to add new products to the [E3] program.' The Equipment Energy Efficiency (E3) Program is a cross jurisdictional program through which the Australian government, state and territory governments and the New Zealand government collaborate to develop single and integrated energy efficiency equipment standards and energy labelling for energy-using products.

The program had two main foci:

1. To develop energy efficiency standards for selected products within the four-year timeframe
2. To understand if and how the process to develop energy efficiency standards can be accelerated/ streamlined

The former hinges upon the latter—i.e., energy efficiency standards can only be developed in the four-year timeframe *if* processes can be accelerated/ streamlined. These foci sought to contribute towards the ultimate goals of saving energy and greenhouse gas emissions by improving the products available to consumers.

The four product streams that the NSW Appliance Standards program focused on were:

- Space heating (also known as residential heating)
- Hot water systems
- Commercial catering equipment
- Products already subject to international energy efficiency requirements/ regulations

The evaluation sought to answer the following key evaluation questions (KEQs):

P1   How well has the program overcome barriers to successful delivery? To what extent has the program been able to apply adaptive management measures?

P2.1   To what extent were the right stakeholders engaged in an appropriate and timely way in the design and delivery of the program?

P2.2   To what extent did consultation inform decisions?

P3   How well has the program collaborated with the Commonwealth Energy Efficiency Advisory Team (EEAT) and the office of the GEMS Regulator in delivering this program? To what extent has this contributed to effective and efficient program delivery?

O1   To what extent does the program expect to achieve energy, greenhouse gas and bill savings? How does this compare with initial forecasts?

O2.1   To what extent has the program streamlined the development process? What are the key success factors and challenges?

O2.2   To what extent did the initial product stream selections lead to regulation? To what extent did these products meet requirements of sufficient sales volumes, energy usage and energy efficiency potential to develop Minimum Energy Performance Standards (MEPS) or labelling?

O2.3   To what extent has the program increased the capacity for regulatory development work? To what extent is this capacity likely to provide future benefit for NSW?

In this evaluation ARTD used the following data sources:

- **150 documents** reviewed, including but not limited to meeting minutes, progress reports, CRIS documents, assessment letters, prioritisation plans, policy frameworks, and energy and GHG savings estimates.
- **29 interviews**, with 30 stakeholders including but not limited to delivery and support staff from the Department, staff from the Commonwealth E3 program, GEMS staff, external consultants, industry stakeholders and staff from other jurisdictions.

KEY FINDINGS

Three products/ product streams have produced draft Consultation Regulatory Impact Statements (CRIS): commercial ice makers, domestic cooking appliances and commercial catering equipment. No products/ product streams made it past the CRIS development stage of the product review process[1], suggesting that the goal to '*develop energy efficiency standards for selected products within the four-year timeframe*' was not achieved.

PRODUCT SELECTION

The consensus among interviewees was that products were selected based on a combination of factors. These can be summarised as:

- *'Bang for buck':* Product selections would generate considerable energy, greenhouse gas and bills savings from standards development.
- *'Low-hanging fruit':* Some product selections were considered the easiest products to regulate (that were not already regulated) or were already being investigated by other jurisdictions (as was the case with hot water systems in New Zealand).
- *'Fill the gaps':* Some product selections were lower on the E3 prioritisation list, so the Department opted to work on these products while other teams worked on higher-priority products.

BARRIERS

The program faced many barriers to implementation. Many interviewees spoke to the idea of heroic assumptions—that the program design expectation that multiple activities could be conducted in parallel throughout the program was highly aspirational. Many interviewees felt that one of the main barriers was the program's four-year timeframe itself, which was

---

[1] The product review process is outlined in Appendix 1.

described as overly ambitious to achieve standards development for all selected products/ product streams. These ambitious expectations extended into the delivery plan.

This issue was made more problematic by the relatively small team which, at least at the program's onset, had limited technical expertise and experience in standards development. This meant that a significant portion of the program's infancy was spent building the program team's knowledge and expertise, and that the program had to rely on external technical consultants to do much of the work. This reliance on technical consultants was described as a risk by some or as beneficial by others.

The Department did apply adaptive management strategies to help overcome these barriers. Some of these strategies included adapting test methods in response to emerging feasibility issues, adapting procurement approaches in response to a limited pool of technical consultants, and adjusting data collection methods to better capture high quality product performance data.

STAKEHOLDER CONSULTATION

Stakeholder consultation was reportedly thorough and done with integrity, with industry stakeholders (those who represent appliance manufacturers, suppliers, and retailers) mostly satisfied about the timeliness and appropriateness of their engagement. Having good relationships with industry peak bodies and access to product import data were key enabling factors to effective and efficient stakeholder engagement. There were some concerns that stakeholder feedback was not always incorporated into the program's decision-making, but this is expected given the diverse range of competing stakeholder interests in energy efficiency standards.

The Department used an approach called a Discrete Choice Experiment to survey consumers' preferences and how much more they are willing to pay for a more energy efficient product, providing evidence for setting precise. This approach was described as robust and best practice.

The program team regularly presented papers at the EEAT meetings, which interviewees described as a valuable opportunity to discuss compliance and registration implications, review proposals, and talk frankly and deeply about technical issues with little political interference. Some Department staff explained that there was not a formal arrangement between the Department and the office of the GEMS Regulator, at least not for all product streams. While the Department's engagement with the office of the GEMS Regulator was more ad hoc, it ultimately evolved into a mutually beneficial exchange of ideas, particularly towards the end of the program.

ENERGY, GREENHOUSE GAS AND BILL SAVINGS

Projected electricity savings were substantially lower in 2022 compared to the 2018 forecast estimates, while gas savings were substantially higher in 2022 compared to the 2018 forecast estimates. The reduction in electricity savings estimates also meant that 2022 estimates for greenhouse gas savings were also lower than estimates made in 2018. Based on current estimates, the Appliance Standards program results in larger bill savings for household

products than for commercial products, and total electricity bill savings are about half what was modelled in 2018 due to the reduction of products.

The major reason for reductions in total estimated energy savings is the reduction of the number of products being considered for regulation and that energy savings data became more accurate as the program team conducted more research into the benefits of regulating each product. However, we cannot explain with certainty the primary reasons for the changes in estimates between 2018, 2020 and 2021 for certain product streams like commercial catering, as it was difficult to locate sufficient documentation that described how energy, greenhouse gas and bills savings estimates were made, including modelling inputs.

STREAMLINING THE STANDARDS DEVELOPMENT PROCESS

There was some concern among internal and external stakeholders that the goal of streamlining/ accelerating the product review process was ambitious at best and unrealistic at worst. It was difficult to definitively prove that the Department had achieved CRIS' faster than the Commonwealth normally would, but stakeholder consultation suggested that the Department had completed a lot of work despite the tight timeframe and the barriers to implementation.

Clearly documenting innovations in streamlining processes—through a register or some other means—would benefit all jurisdictions participating in the E3 program, supporting a collaborative and transparent approach to innovation. This may also help any future evaluations better determine the extent to which the Department has streamlined processes and support the development of business cases for future programs.

CONCLUSION

At the end of the program, the Department has produced a solid foundation for the Commonwealth or other jurisdictions to build on and key staff members have increased their capacity for regulatory development work. Should the Department seek to further develop energy efficiency standards for appliances, it should ensure this capacity is retained in the Department and successful adaptive management and streamlining processes are documented and shared with new program team.

RECOMMENDATIONS

ARTD has provided the following ten recommendations in response to this evaluation's findings. While this evaluation is commissioned for the Department's use, the following recommendations may have value for other stakeholders.

Recommendation	Rationale	Benefit
1. When designing programs, incorporate time and resources for coordinated overlap/ handover between the program design and program delivery teams.	There appeared to be a disconnect between the product stream selection decisions and the program delivery team. Without a clear linkage/ handover period, staff may struggle to understand the program's rationale and priorities.	Having this overlap would allow for those who selected product streams (policy team) to explain their rationale, providing clarity to the program delivery and management/ oversight staff.
2. When designing programs, incorporate time and resources for recruitment, including an allowance for contingency should there be delays in approvals.	The time spent recruiting the program team resulted in a delayed start, making it more difficult to achieve the program's desired outcomes in the four-year timeframe.	Building in a dedicated portion of time and resources for recruitment at the program design stage would provide the program team with a buffer to recruit a sufficient number of skilled staff. Discussion with NSW government staff revealed that new programs build in a 12-month recruitment period, and the funding cycle for CCF-funded programs was recently extended to 8 years (as opposed to 4), allowing programs more contingency if recruitment takes longer than expected.

Recommendation	Rationale	Benefit
3. Clearly define governance structures and responsibilities between the Commonwealth and NSW Government from the outset.	There was some confusion among interviewees around the various responsibilities between jurisdictions and who was responsible for making the final decisions, and some concern that the Department was constrained by the Commonwealth's process requirements, limiting their ability to achieve standards development within the four-year timeframe.	Articulating what should be embedded knowledge would allow the program team to better understand how to work within/ to Commonwealth structures. Defining the expectations between both the NSW and Commonwealth governments may expedite the product review stage from draft CRIS development to consultation to DRIS development and so on.
4. Consider establishing a secondment arrangement, where a NSW government employee works in the Commonwealth E3 program team and/or vice versa.		Having a NSW government staff member work in the Commonwealth would provide program delivery staff with a better understanding of the Commonwealth's culture and how to navigate the Commonwealth's processes and governance structure. Following the secondment, program delivery staff may also have stronger connections with Commonwealth staff, helping to progress priority actions. Having a Commonwealth staff member work in the NSW government would enable the Commonwealth staff to gain a deeper understanding of the complexities of program implementation at the state/ territory level. Ultimately, a secondment arrangement and clear governance arrangements between the Commonwealth and NSW government will likely make collaboration easier.
5. Ensure decisions around changes to program scope, such as product stream selection or decisions not to pursue standards development, are clearly communicated to stakeholders in line with E3 guidelines.	One industry member was very dissatisfied that they were not informed when products they represented were dropped from the international package. One of the key success factors for streamlining stakeholder communication and data access was having good relationships with industry peak bodies.	Ensuring a continuum of communication will help maintain positive relationships with industry peak bodies, therefore securing a vital success factor. This recommendation acknowledges that only the E3 program has the authority to make decisions about product stream selection and so communication may occur through the E3 program.

Recommendation	Rationale	Benefit
6. Formally establish regular collaborative arrangements with all key collaboration partners. These may be as formal as developing an MoU and establishing Terms of Reference, or as informal as instating half-hour catch-up meetings.	Some Department staff explained that there was not a formal arrangement between the Department and the office of the GEMS Regulator, at least not for all product streams. While the Department's engagement with the office of the GEMS Regulator was more ad hoc, it ultimately evolved into a mutually beneficial exchange of ideas, particularly towards the end of the program.	Formalising regular arrangements with key collaboration partners would ensure that the benefits of collaboration (i.e., mutually beneficial exchange of ideas, learnings, implications of regulation/ program findings) are gained from the outset.
7. Costs and benefits modelling should document the sources of the data, relevant assumptions and methodologies, and any research justifying the assumptions, parameters, and inclusions or exclusions of different components. Where there are data limitations, there should be a written explanation of those limitations, the reasons for them, and how they have been addressed, etc. Documentation should be kept in a central place, referred to in the modelling spreadsheet, and should be communicated to new team members as team turnover occurs.	During this evaluation, it was difficult to locate sufficient documentation that described how energy, greenhouse gas and bills savings estimates were made. Without clear proof of the savings modelling inputs, it was difficult to explain with certainty the primary reasons for the changes in estimates between 2018, 2020 and 2021, especially in relation to the commercial catering product stream.	Ensuring that inputs into costs and benefits modelling are archived and are easily accessible will enable the Department to better communicate how and why savings estimates change. This will better enable accountability and will improve messaging to key stakeholders, such as industry peak bodies (see recommendation 8 below).

Recommendation	Rationale	Benefit
8. Ensure that the uncertainty and limitations regarding energy, greenhouse gas and bill savings modelling are clearly communicated to key stakeholders, including industry peak bodies and the general public.	As a result of the program's investigations to develop regulations and understand the costs and benefits of potential policy options, models became more accurate over time, and appliances may be removed from product streams or form their own product streams. There was some concern among industry members that energy savings estimates are used to promise good outcomes and get programs funded/ regulate more products but are not representative of the actual savings generated from standards development. It is possible that these views are related to industry stakeholders feeling overregulated by government.	Clearly communicating the limitations and uncertainty of energy, greenhouse and bills savings models will help manage stakeholder expectations.
9. Develop or improve systems for skills transfer and maintenance, succession planning and handover to provide opportunities to better maintain expertise within the Department when a program ends.	As a consequence of funding ending, many interviewees were concerned that staff capacity for regulatory development would be lost as staff move on to other programs. Many felt it would be a shame to lose this expertise. Interviewees reflected on how some program team members left during the program due to the length of their temporary contracts, leaving a temporary gap of expertise and capacity.	Should the Department wish to continue its work to date under the E3 program or implement similar standards development projects, it is vital that the internal expertise developed during this program is retained or, at a minimum, shared with other staff. Improving or developing systems to maximise skills transfer, enable succession planning and handover should staff leave would enable expertise to be indirectly maintained.

Recommendation	Rationale	Benefit
10. Maximise benefits to governments by ensuring that key lessons and innovations—including any innovations applied to streamline/ accelerate processes or novel approaches—are shared with relevant government bodies. Consider the use of an innovations/ streamlining register.	Despite only three products reaching CRIS stage, many felt that the groundwork completed by NSW was valuable for the Commonwealth and/or other jurisdictions to build on. The Department used an approach called Discrete Choice Experiment (DCE) during consultations to understand the impact that various energy efficiency information provision scenarios would have on the uptake of different water heater types. This approach was described as robust and best practice, and interviewees commented that all E3 projects should use this approach. It will be important for the Department to share its work, including any learnings and novel testing/ consultation approaches, with other jurisdictions who wish to carry on this work. From the document review it was unclear the extent to which streamlining processes were documented. It was difficult for ARTD Consultants to definitively assess whether the Department had achieved CRIS faster than the Commonwealth normally would, and which strategies were responsible for this streamlining.	By improving internal knowledge capture and sharing systems, the Department will be better able to continue standards development programs should staff with expertise change roles or leave. Sharing any novel approaches and best practice will benefit all jurisdictions participating in the E3 program. This would also help reduce the duplication of effort among participating E3 jurisdictions. Clearly documenting innovations in streamlining processes—through a register or some other means—would benefit all jurisdictions participating in the E3 program, supporting a collaborative and transparent approach to innovation. This may also help any future evaluations better determine the extent to which the Department has streamlined processes and support the development of business cases for future programs.

1.   IMPROVED ENERGY EFFICIENCY STANDARDS FOR APPLIANCES PROGRAM

The NSW Government's Improved Energy Efficiency Standards for Household and Business Appliances (Appliance Standards) program builds from the work of the cross jurisdictional Commonwealth-led Equipment Energy Efficiency (E3) Program to progress four key areas: space heating, hot water systems, commercial catering equipment[2] and products already subject to international energy efficiency requirements/ regulations. These areas were previously not progressed under the E3 program due to lack of resources and the need to conduct additional work. Funding for the Appliance Standards program was allocated under the NSW Climate Change Fund (CCF). The NSW Minister for Energy has strategic oversight of the CCF under the Fund's enabling legislation,[3] including the responsibility for funding programs.

The Appliance Standards program was initially delivered by the NSW Office of Environment and Heritage (2018 – 2019). As a result of machinery-of-government changes, this area of the organisation became part of the NSW Department of Planning, Industry and Environment (2019 – 2021), NSW Department of Planning and Environment (2021 – 2022) and then the Office of Energy and Climate Change within NSW Treasury (April 2022 – program close). In this report, references to 'the Department' refer to the agency responsible for the Appliance Standards program at that time.

1.1   THE EQUIPMENT ENERGY EFFICIENCY (E3) PROGRAM

The E3 Program is a cross jurisdictional program through which the Australian government, state and territory governments and New Zealand government collaborate to develop single and integrated energy efficiency equipment standards and energy labelling for energy-using products.[4]

The E3 Program was implemented by the former Council of Australian Governments (COAG) Energy Council. It now continues through the Commonwealth Energy Ministers' Meeting.[5] The framework for national cooperation between the Commonwealth and Australian states and territories is provided through an Inter-Governmental Agreement known as the *Inter-Governmental Agreement for the Greenhouse and Energy Minimum Standards (GEMS)*

---

[2] Commercial catering equipment stream includes: deep fryers, commercial ovens (incl pizza ovens), hot food holding and display cabinets, and dishwashers.

[3] *Energy and Utilities Administration Act 1987* (NSW), Part 6A, Div 2.

[4] NSW Government Department of Planning and Environment, *Appliance Standards Program (GEMS) – evaluation plan*, Climate Change Fund, p.1

[5] The Energy Ministers' Meeting is a Ministerial forum for the Commonwealth, Australian states and territories, and New Zealand to work together on priority issues of national significance and key reforms in the energy sector. Australian Government Energy Rating, *The E3 Program*, https://www.energyrating.gov.au/about-e3-program; Australian Department of Climate Change, Energy, the Environment and Water, *Energy Ministers,* https://www.energy.gov.au/government-priorities/energy-ministers

Legislative Scheme (henceforth known as the GEMS Inter-Governmental Agreement).[6] New Zealand participates in the E3 Program through a trans-Tasman Policy Framework and Funding Arrangement with the Commonwealth Minister of Energy and Resources. [7]

In Australia, the program is underpinned by the *Greenhouse and Energy Minimum Standards (GEMS) Act 2012* that came into effect on 1 October 2012.[8] The sole party responsible for administering the legislation in Australia is the Greenhouse and Energy Minimum Standards (GEMS) Regulator which is based in the Commonwealth Department of Industry, Science, Energy and Resources.[9]

In New Zealand, the program is underpinned by the *Energy Efficiency (Energy Using Products) Regulations 2002[10]* and administered by the Energy Efficiency and Conservation Authority (EECA).

The key objectives of the E3 Program are to:

- Reduce energy bills for households and businesses in a cost-effective way by driving improvements to the energy efficiency of new appliances and equipment sold
- Improve the energy efficiency of new appliances and equipment that use energy and to also improve the energy performance of products that have an impact on energy consumption
- Reduce appliance and equipment related greenhouse gas emissions through a process which complements other actions by jurisdictions.

1.1.1   GOVERNANCE AND DECISION-MAKING FOR THE E3 PROGRAM

GEMS INTER-GOVERNMENTAL AGREEMENT

The relationship between the NSW and the Commonwealth governments for the purposes of the E3 program is governed by the GEMS Inter-Governmental Agreement. The Agreement sets out the principles and processes for cooperation between the parties to the agreement (which includes all states and territories and the Commonwealth government) undertaking the administration of the national legislation implementing greenhouse and energy minimum standards (GEMS).[11] The 'scheme' articulated by the Agreement aims to ensure the involvement of all parties in policy development, decision-making, and funding of GEMS requirements, and in the delivery of appropriate regulatory functions.[12] This is governed by a

---

[6] Australian Government Energy Rating, *Inter-Governmental Agreement for the Greenhouse and Energy Minimum Standards (GEMS) Legislative Scheme*, https://www.energyrating.gov.au/node/1339
[7] https://www.eeca.govt.nz/regulations/equipment-energy-efficiency/about-the-e3-programme/
[8] Australian Government Energy Rating, *About the E3 Program*, https://www.energyrating.gov.au/about-e3-program
[9] Effective 1st July 2022, the GEMS Regulator sits within the Department of Climate Change, Energy, the Environment and Water.
[10] New Zealand Parliamentary Counsel Office, *Energy Efficiency (Energy Using Products) Regulations 2002*, https://www.legislation.govt.nz/regulation/public/2002/0009/latest/DLM108774.html
[11] Inter-Governmental Agreement for the Greenhouse and Energy Minimum Standards (GEMS) Legislative Scheme, Part 1.
[12] Ibid, clause 2(ii).

ministerial council made up of energy Ministers of each party's jurisdiction (this is the Energy Ministers' Meeting (EMM), formerly known as the Energy Council).

The EMM is responsible for approving new product determinations, major updates to existing determinations, and any legislation amendments to the GEMS Act which emerge from parties' investigations into imposing standards on specific energy-using products. The EMM maintains an inter-jurisdictional advisory committee, the Energy Senior Officials Meeting (ESOM), which the Energy Technology Working Group (ETWG) reports to. The ETWG provides advice and technical input, and is responsible for the national development and implementation of new or revised GEMS requirements with support from the E3 sub-group.

ENERGY EFFICIENCY ADVISORY TEAM / ENERGY TECHNOLOGY WORKING GROUP

Administrative arrangements under the EMM facilitate jurisdictions' participation on committees responsible for oversight of the work. Under the former Energy Council arrangements, the Energy Efficiency Advisory Team (EEAT) oversaw the E3 program and recommended actions through the ESOM and then the EMM for decisions.

In November 2021, the EEAT was replaced by the Energy Technology Working Group (ETWG), which is a sub-committee of the ESOM. For the E3 program specifically, the ETWG ensures the program is administered effectively in accordance with the GEMS Inter-Governmental Agreement. The governance framework is set out in Figure 1 below.

NSW is a jurisdiction member of the ETWG and was a member of the former EEAT. The ETWG is chaired by the GEMS Regulator and its membership is made up of nominated representatives of jurisdiction parties to the GEMS Inter-Governmental Agreement. The ETWG makes decisions on the advice of members to achieve the priorities and goals of the EMM. Decision-making occurs on a consensus basis (agreement by all jurisdictions), informed by evidence including Commonwealth, State and territory reports, as well as analysis and recommendations from the E3 Prioritisation Plan and any other relevant policy documents.[13]

The EEAT was the body responsible for the E3 program for the majority of the life of the program, so this report largely references the EEAT throughout.

---

[13] Energy Technology Working Group Terms of Reference (draft), 2021.

FIGURE 1.   GOVERNANCE FRAMEWORK FOR E3 PROGRAM
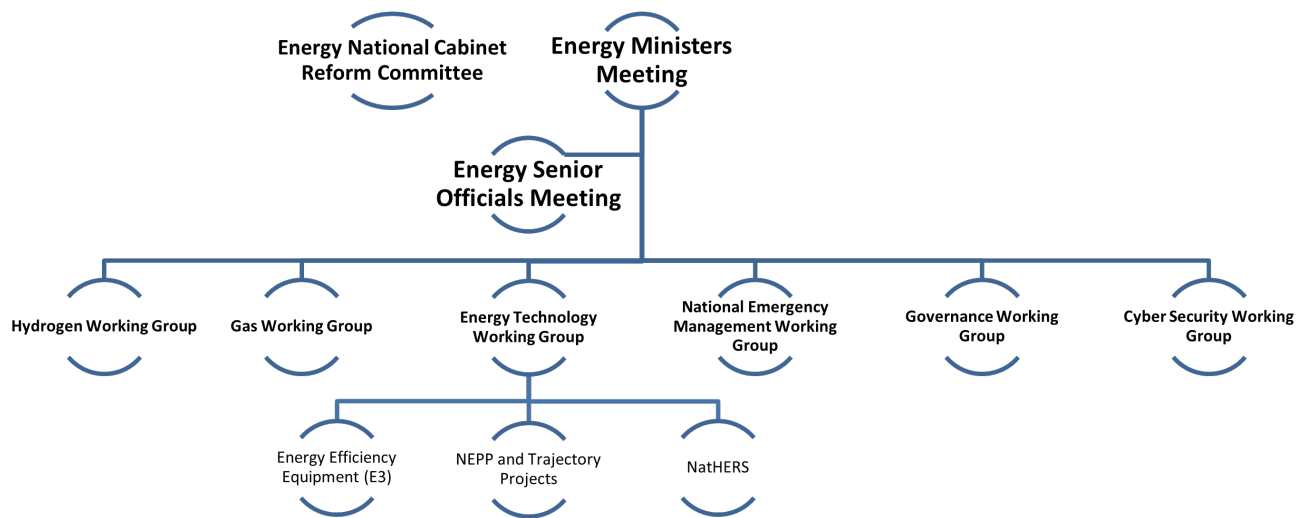
Source: Energy Technology Working Group Terms of Reference.

E3 REVIEW COMMITTEE

The E3 Review Committee (E3RC) is a formal advisory group that the E3 program consults with on issues that affect industry and consumers. Its members are key E3 program stakeholders including Australian and New Zealand manufacturers, importers and distributors of products currently regulated and those proposed for regulation, industry groups and associations, consumer advocacy groups and various state, territory, Commonwealth and New Zealand government agencies. The E3RC is a mechanism for consultation on work priorities, timeframes and technical details in relation to products regulated under the GEMS Act or proposed to be.[14]

OFFICE OF THE GEMS REGULATOR

The GEMS Regulator is responsible for administering the GEMS Act, maintaining the GEMS register and monitoring and enforcing compliance with the Act. ETWG members (like the NSW government) interact regularly with the GEMS Regulator as it is the ETWG chair, but the NSW government also has semi-regular informal meetings with the office of the GEMS Regulator as part of the E3 program (more on this in section P3 below).

---

[14] E3 Review Committee Terms of Reference 2016,
https://www.energyrating.gov.au/sites/default/files/documents/Terms_of_reference_-
_E3_Review_Committee_22022016_1.docx.

1.2   THE APPLIANCE STANDARDS PROGRAM

The purpose of the NSW Government's Appliance Standards program was to accelerate the processes used by the E3 program[15] to add new products to the program, investigate the benefits of various regulatory options for each new product and develop new energy efficiency standards where beneficial.[16]

$7 million of funding for this program was originally allocated to the Appliance Standards program under the CCF. However, after a funding re-prioritisation, the final budget for the program was $4.3 million. It covers the period 1 October 2018 to 30 June 2022.

Funding was used to undertake activities for the E3 program that were not progressed due to a lack of resources and additional work identified by E3 and the NSW Government. It was focused on accelerating four key product streams of the E3 work program, which were:

- Space heating (also known as residential heating)
- Hot water systems
- Commercial catering equipment
- Products already subject to international energy efficiency requirements/ regulations (the list of these products is set out in Table 2).

The list of products under these streams was finalised before program implementation with input from the interjurisdictional E3 committee, peak industry and consumer groups.

1.2.1   PROGRAM OBJECTIVES

Working within the E3 Program objectives mentioned above (see Section 1.1), the Appliance Standards program also has an objective to 'accelerate and expand cost-effective new product standards and labelling through the existing national E3 framework', the hypothesis being that 'this will remove less efficient products with high energy costs from the market, set a level playing field for quality manufacturers and retailers and help drive overall improvements in efficiency. As a result, NSW households and businesses will spend less on energy.'[17]

Initial program design envisaged that the Appliance Standards program would do this by undertaking supporting work to develop new standards and labelling, working with other jurisdictions and industry to reduce delays in the standards development process and submitting new standards to the COAG Energy Council (later, the Energy Ministers' Meeting; see Section 1.1.1 above) for approval. Stakeholder consultation conducted by the policy/ development team suggested that concentrated resourcing and a streamlined process, co-designed with key stakeholders, could deliver new minimum standards on some relatively

---

[15] The product review process is outlined in Appendix 1.
[16] NSW Government Department of Planning and Environment, *Appliance Standards Program (GEMS) – evaluation plan*, Climate Change Fund, p.1.
[17] NSW Government Department of Planning and Environment, *Appliance Standards Program (GEMS) – evaluation plan*, Climate Change Fund, p2

well-progressed products in 18 months, with another year's notice before implementation and savings are realised.

The program was designed such that:

- the ultimate outcomes are for products that perform poorly in energy efficiency to be removed from the market, consumers to then spend less on energy, and new standards to deliver significant additional savings to the NSW 2020 energy savings target and economic benefit to NSW; and
- these objectives would be measured by the energy and bill savings that are generated from accelerating standards.

As mentioned above in Section 1.2, the Appliance Standards program's goal was not simply to develop standards for all nominated products, but to conduct research and make a recommendation about whether and how to implement standards/ labelling for each nominated product (see Box 1 below). In some cases, this may involve the recommendation to not impose standards, for a range of reasons, which could include:

- Market for energy efficient versions of those products already developing rapidly without government intervention
- Regulatory burden outweighs benefits of regulation
- Evidence from other jurisdictions demonstrates pitfalls of regulation.

Box 1. Minimum Energy Performance Standards and Energy Rating Labelling – definitions

MEPS (Minimum Energy Performance Standards): a specification, containing a number of performance requirements for an energy-using device, that effectively limits the maximum amount of energy that may be consumed by a product in performing a specified task. The products need to be tested by the supplier/manufacturer and registered with the program.

Labelling (Energy Rating Labelling): products are tested to establish their performance, and labelling is used to communicate their performance relative to each other. The products need to be tested by the supplier/manufacturer and registered with the program.

MEPS and labelling can both be applied to a product together.

1.2.2   OUTCOMES

When the Appliance Standards program was designed, the implementation of standards for the appliances in the four key work programs was modelled to deliver NSW an additional 1,103 GWh per year in electricity savings by 2025, increasing to 2,060 GWh per year in 2030. This amounts to bill savings of $5.5 billion to NSW households and $1.5 billion to NSW businesses to 2040, resulting in $831 million in net economic benefits to NSW in present value terms to 2040.[18]

It is worth noting that those total energy and bill savings were modelled based on implementation of standards for *all* the appliances covered by the program's four key product streams, and during the course of the program, decisions were made not to

---

[18] Ibid, pages 18, 19 and 22.

implement standards for all of those appliances, for a variety of reasons, which will be covered to some extent in this evaluation.

1.2.3   OUTPUTS

As set out in the program logic (see section 1.3 below), the Appliance Standards program team intended to reach its outcomes through the following program outputs:

- Recommendations to the Commonwealth Energy Efficiency Advisory Team (EEAT) about the appropriate regulatory approach for each nominated product.
- Regulatory and supporting documentation: includes Consultation Regulation Impact Statements (CRIS), Decision Regulation Impact Statements (DRIS) (explanations below), GEMS determinations (sets out the requirements to be met by products in order to be legally registered, supplied, or offered for supply in Australia), test schedules and policy frameworks. We note these higher-level documents are usually supported by relevant research including product profiles which summarise characteristics and energy use of, and consumer behaviour around, specific energy-using products; and technical issues papers which explore the potential for implementing MEPS or labelling and is developed in parallel with a CRIS.
- Reliable information and resources on energy efficiency options and benefits for various groups: industry, end-users etc.
- Streamlined process is documented and demonstrated for technical analysis, standards development, stakeholder engagement, and Regulation Impact Statement (RIS) preparation with GEMS lessons embedded.

Regulation Impact Statements are a critical part of the Australian regulation process. Their primary purpose is 'to ensure that the economic and social costs and benefits of regulatory proposals are examined fully so that Ministers proposing the regulations and members of the community can be satisfied that the benefits of the regulations exceed the costs.'[19]

CRIS are prepared for the purpose of 'consulting interested parties on regulatory proposals' and comprise all formal elements of a RIS including full cost-benefit analysis. DRISs incorporate comments and feedback from submissions received on the CRIS. They are also assessed by the Office of Best Practice Regulation to confirm compliance with the Commonwealth's regulatory impact analysis guide. They assist decision-making about adopting a regulatory proposal.[20] See Appendix 1 for more information on the regulation process.

---

[19] NSW Department of Communities and Justice, *Regulatory Impact Statement*, https://www.justice.nsw.gov.au/justicepolicy/Pages/lpclrd/lpclrd_consultation/lpclrd_statements.aspx.
[20] Australian Building Codes Board, *Consultation Regulation Impact Statements* and *Decision Regulation Impact Statements*, https://www.abcb.gov.au/consultation-regulation-impact-statements and https://www.abcb.gov.au/have-your-say/regulatory-impact-assessment/decision-regulation-impact-statements.

1.3   PROGRAM LOGIC

The Department revised the program logic diagram in 2018 when the Appliance Standards program first began. The program logic is included in the program's 2022 evaluation plan[21] and is reproduced as Figure 2 on the next page.

The theory of change presented in the program logic diagram above is underpinned by the following six assumptions:

1. Work undertaken by the Department is 'additional'[22] to other work programs and improvement by industry.
2. There will be sufficient turnover of products for Minimum Energy Performance Standards (MEPS) and labelling to achieve timely and efficient change.
3. Consumers will save energy and money when there is increased availability of and information about more energy efficient appliances.
4. If industry is consulted in sufficient time, they are likely to adapt.
5. Jurisdictions will accept NSW-led proposals and process and Commonwealth will enact changes.
6. Cost effective energy efficiency opportunities are available.

The E3 program (and therefore the Appliance Standards Program) was designed to respond to a market failure wherein consumers buy available energy-using products without being aware of the energy consumption impact.

The program assumes that energy efficient products are available that may have a lower whole-of-life cost to the consumer, either currently or in the future as production adapts to government regulation to provide more efficient products. In addition, this assumes that consumers buy new products frequently enough for the inventory of products in homes and businesses to be upgraded with the newer, more efficient products coming on the market.

The theory of change therefore elucidates that the program aims to either:

- Develop standards, removing subpar products below this standard of energy performance from the market;
- Develop labelling, enabling consumers to make informed purchasing decisions that consider the ongoing financial cost of energy use as well as the initial investment; or
- Decide not to develop standards or labels for specific products in circumstances where: (a) products were already improving in energy efficiency, so were unlikely to produce considerable savings, standards or labelling would be restrictive for industries (manufacturers, suppliers or retailers) which may produce unwanted costs to the economy (i.e. imposition of standards or labelling would not be 'additional' to movements already occurring in the market), (b) product regulation was restricted by

---

[21] NSW Government Department of Planning and Environment, *Appliance Standards Program (GEMS) – evaluation* plan, Climate Change Fund, p.5
[22] 'Additionality' refers to the elements of a program/project being 'additional' to what would have happened if the project had not been carried out (e.g., continued as business-as-usual). I.e., if, in the absence of the program, the activities (like industry moving toward more energy efficient appliances) would have happened anyway, the program benefit is not additional.

existing legislation, or for other reasons (eg: lessons from overseas jurisdictions about specific regulations having unwanted consequences).

Ultimately, the program was only able to enact the foundational activities, activities and outputs contained in the program logic (Figure 2). The program assumes that the Commonwealth will accept NSW-led proposals and enact the changes proposed therein. Any program outcomes beyond the outputs (Figure 2) are contingent on this assumption.

FIGURE 2.   **APPLIANCE STANDARDS PROGRAM LOGIC**
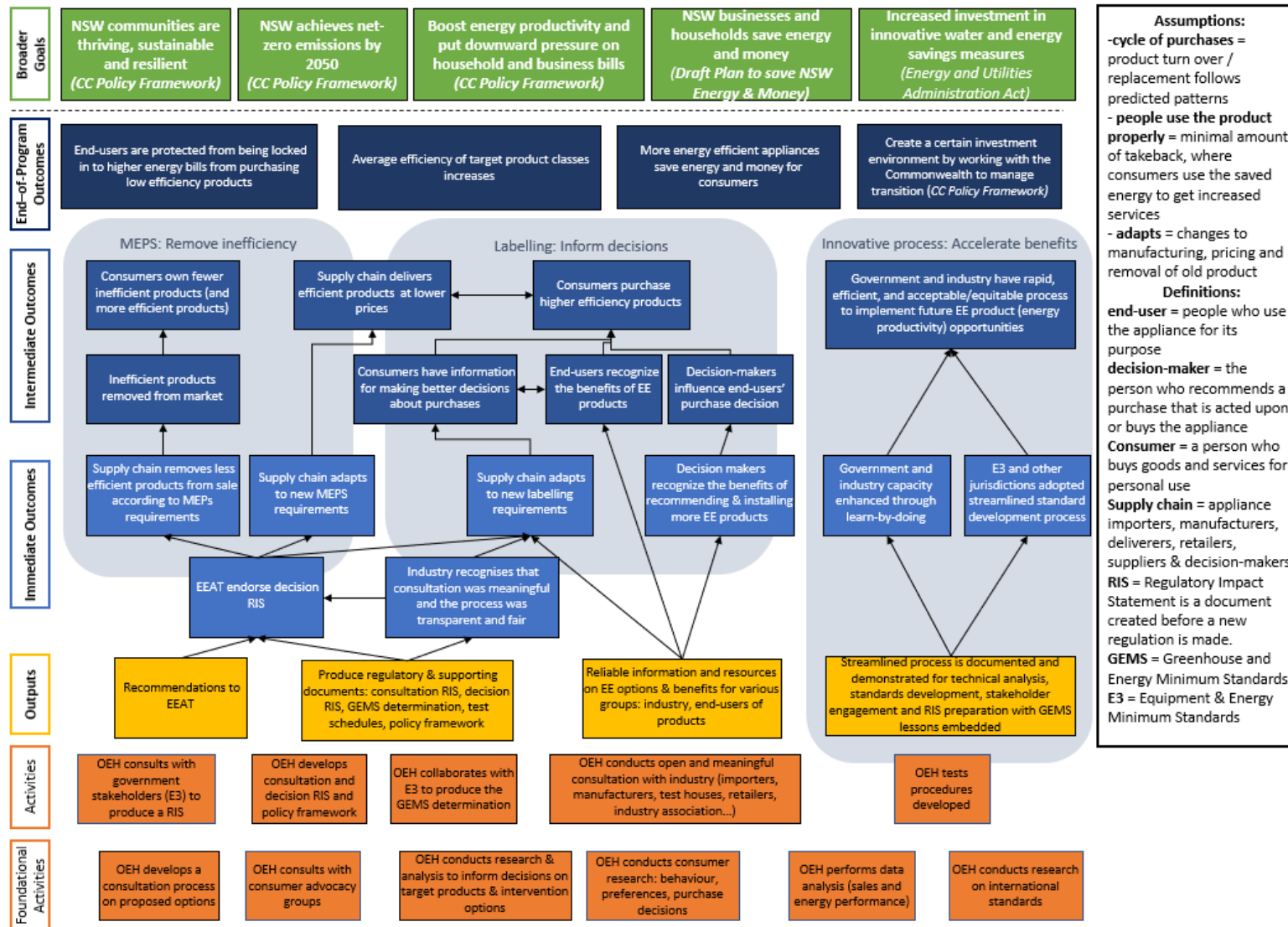
2.   THE EVALUATION

The Department engaged ARTD Consultants (occasionally referred to as ARTD) to conduct an independent **process and outcomes evaluation** of the Appliance Standards Program.

The purpose of the process evaluation is to understand:

- how well the program overcame barriers to delivery
- the ways in which stakeholder consultation informed the program's design and decision making
- how well the program has collaborated with the Commonwealth Energy Efficiency Advisory Team (EEAT) and the office of the Greenhouse and Energy Minimum Standards (GEMS) Regulator in delivering the program.

The purpose of the outcomes evaluation is to assess whether:

- proposed outcomes were achieved (and the extent to which they were or were not achieved)
- the program streamlined the standards development process
- the program led to regulation and increased regulatory capacity within the Department.

2.1   KEY EVALUATION QUESTIONS

The evaluation sought to answer eight Key Evaluation Questions (KEQs), which are as follows:

PROCESS EVALUATION

P1   How well has the program overcome barriers to successful delivery? To what extent has the program been able to apply adaptive management measures?

P2.1   To what extent were the right stakeholders engaged in an appropriate and timely way in the design and delivery of the program?

P2.2   To what extent did consultation inform decisions?

P3   How well has the program collaborated with the Commonwealth Energy Efficiency Advisory Team (EEAT) and the office of the GEMS Regulator in delivering this program? To what extent has this contributed to effective and efficient program delivery?

ACHIEVEMENT OF PROGRAM OUTCOMES

O1   To what extent does the program expect to achieve energy, greenhouse gas and bill savings? How does this compare with initial forecasts?

O2.2   To what extent did the initial product stream selections lead to regulation? To what extent did these products meet requirements of sufficient sales volumes, energy usage and energy efficiency potential to develop MEPS or labelling?

EFFECTIVENESS OF DELIVERY MECHANISMS

O2.1   To what extent has the program streamlined the development process? What are the key success factors and challenges?

O2.3   To what extent has the program increased the capacity for regulatory development work? To what extent is this capacity likely to provide future benefit for NSW?

2.2   METHODS

DOCUMENT REVIEW

ARTD undertook a desktop review of 150 documents that were relevant to the program, including design and strategy documents, committee and meeting agendas and notes, prioritisation plans, research papers, and draft regulation impact statement documents.

The Department provided ARTD with a document register, which listed each document type against the KEQs that the information contained within could contribute to answering. When reviewing the documents, ARTD summarised key information that pertained to the relevant KEQ. An excel workbook was used to separate document summaries by KEQ to allow summaries to be easily filtered and used for analysis and reporting.

STAKEHOLDER INTERVIEWS

The evaluation team worked with ARTD to identify and engage 30 relevant stakeholders for qualitative interviews (Table 1). ARTD used two interview guides— one for industry peak bodies and one for program design and implementation stakeholders—which ensured more targeted questioning during the one-hour timeslots. Interviews were used to explore KEQs, triangulate feedback and understand lessons learned.

TABLE 1.   STAKEHOLDER TYPES ENGAGED IN THIS EVALUATION

Stakeholder type	n
Program Team Member	6
Other DPE Staff	7
Non-NSW State/ Territory Agency staff	1
NZ Government Agency Staff	1
Office of Best Practice Regulation staff	1
Commonwealth Agency Staff (including office of the GEMS Regulator)	3
Consultant (including economic evaluator)	6
Industry stakeholder*	5
Total	**30**

* Including from Lighting Council Australia, Consumer Electronics Suppliers Association and the Gas Appliance Manufacturers Association Australia.

2.2.1   LIMITATIONS

While industry stakeholders interviewed during this evaluation were candid with their feedback on the program, it is possible that these stakeholders only represent those with which the Department has a positive relationship. This may have resulted in findings that are not representative of the whole of industry's voice. This limitation is inherent in all stakeholder analysis, unless evaluators can verify the independence and diversity of all interviewees. Similarly, consumers were not consulted as part of this evaluation.

In addition, ARTD was unable to view cabinet-in-confidence material, limiting the depth of our understanding of the program's complete rationale and expectations.

3.   EVALUATION FINDINGS

This chapter provides an in-depth examination of the evaluation's findings. Process and outcomes evaluation questions have been reported in a specific order to support the narrative that was unearthed during stakeholder consultation.

- **Section O2.2** (page 15): examines the appropriateness of product stream selections and how these ambitious decisions impacted the program delivery team. It also summarises the progress each product stream has achieved in terms of regulatory development.
- **Section P1** (page 19): examines the barriers faced by the program delivery team during the implementation of standards development, and how adaptive management measures were applied to overcome such barriers.
- **Section P2.1** (page 23): examines the breadth and quality of the program team's stakeholder consultation, particularly in relation to industry and consumers.
- **Section P3** (page 26): describes the quality of the program team's collaboration with the Commonwealth through the EEAT and office of the GEMS Regulator.
- **Section P2.2** (page 28): examines how the above stakeholder consultation impacted standards development decisions at both the micro and macro scale.
- **Section O1** (page 30): compares how energy, greenhouse gas and bills savings estimates changed throughout the life of the program as models were updated with new information.
- **Section O2.1** (page 41): investigates the extent to which the program was able to streamline the standards development process as per its original remit, and whether this objective was feasible.
- **Section O2.3** (page 43): examines how the program increased the capacity for regulatory development work within the NSW Government, and how this capacity can be retained within the NSW Government and leveraged for similar work.

O2.2 TO WHAT EXTENT DID THE INITIAL PRODUCT STREAM SELECTIONS LEAD TO REGULATION? TO WHAT EXTENT DID THESE PRODUCTS MEET REQUIREMENTS OF SUFFICIENT SALES VOLUMES, ENERGY USAGE AND ENERGY EFFICIENCY POTENTIAL TO DEVELOP MEPS OR LABELLING?

As of July 2022, no clear regulatory outcomes have been achieved for any product stream. However, Consultation Regulatory Impact Statements (CRIS) have been internally finalised in preparation for delivery to the E3 program team for the commercial catering equipment stream, along with commercial ice makers and domestic cooking appliances, the latter two having been removed from the international products stream and dealt with as separate product streams. Regarding the hot water systems stream, New Zealand's EECA have published a hot water systems policy framework, a hot water systems roadmap and a hot water comparative technology methodology discussion paper. The document review also confirmed that a product profile for the space heating stream was finalised in September 2020.

For the International Appliance Standards product stream, the standards status has been set out for the following 12 products as shown in Table 2 below.

TABLE 2.   INTERNATIONAL STANDARDS STATUS FOR VARIOUS PRODUCTS

#	Product	Standard's status
1	Domestic ovens and range hoods	CRIS produced as part of a standalone product stream called Domestic Cooking Appliances, which also included stove tops.
2	Commercial ice makers	CRIS produced as part of a standalone product stream called Commercial Ice Makers.
3	Domestic ceiling fans	Standards development not going ahead but a paper describing findings and opportunities for energy efficiency improvements will be delivered
4	Vacuum cleaners	Standards development not going ahead but a paper describing findings and opportunities for energy efficiency improvements will be delivered
5	Hot and cold-water dispensers	Standards development not going ahead but a paper describing findings and opportunities for energy efficiency improvements will be delivered
6	Dehumidifiers	Standards development not going ahead as regulation was determined not to be appropriate
7	Home audio systems	Standards development not going ahead as regulation was determined not to be appropriate
8	Heated towel racks	Standards development not going ahead as regulation was determined not to be appropriate
9	Air cleaners	Standards development not going ahead as regulation was determined not to be appropriate

10	Commercial photo copiers	Standards development not going ahead as regulation was determined not to be appropriate
11	Microwaves	Standards development not going ahead as regulation was determined not to be appropriate
12	Coffee machines	Standards development not going ahead as regulation was determined not to be appropriate

Source: NSW Government Department of Planning and Environment, *Appliance Standards Program (GEMS) – evaluation plan*, Climate Change Fund, p.3-4.

Product stream selections were identified at the Commonwealth level in the 2017-2018 E3 Prioritisation Plan[23] and in a 2019 Independent Review of the GEMS Act[24] and were further investigated through cost-benefit analyses by an external consultant. The E3 prioritisation process, founded on robust evidence and thorough analysis,[25] provides jurisdictions the opportunity to give feedback on the list of prioritised products and argue their case to lead standards development for these products. The E3 Prioritisation Plan also identified those products that were of a high priority to regulate, and those of a lower priority.

Interviewees explained that, while the policy team within the Department had set out a rationale for NSW's product stream selection in the program's design, **the final decision was negotiated between the Department and the Commonwealth and made by the EEAT**. They described a hesitancy in the Commonwealth to adopt standards for the large number of products under the international package (see Box 2 below) because of the associated registration and compliance burden.

Box 2. Package of international products

Prior to the finalisation of the program's design, a list of 200 potential products already subject to international energy efficiency requirements/ regulations was reduced to 12. Further research found that applying standards to seven of these products would produce little value for Australia as: (a) products were already improving in energy efficiency, so were unlikely to produce considerable savings; or (b) product regulation was restricted by existing legislation.

The program team eventually decided not to pursue standards development for ceiling fans, vacuum cleaners and water dispensers for various reasons, but findings papers will still be produced for these products to set out the Department's research and rationale for its decision not to pursue regulation (Table 2). For example, in relation to ceiling fans, there were concerns about the reliability and reproducibility of the test methods underlying the US government's ceiling fan standard that was being investigated by the Department. Interviews done by the Department with industry stakeholders also revealed that testing would be expensive, the market was already moving to energy efficient products, and that the estimated energy savings generated would not justify proceeding through to regulation.

---

[23] Energy Rating, *E3 Prioritisation Plan 2017-18*, https://www.energyrating.gov.au/document/e3-prioritisation-plan-2017-18.

[24] Australian Department of Climate Change, Energy, the Environment and Water (2019) *Greenhouse and Energy Minimum Standards (GEMS) Act Review - Final Report,* Table 2 https://www.energy.gov.au/publications/greenhouse-and-energy-minimum-standards-gems-act-review-final-report.

[25] As described by interviewees.

Interviewees had different views regarding the appropriateness of the package of international products. Some interviewees felt that the Department should never have attempted to regulate these products, while others—particularly industry members—felt that simply adopting international standards would have both accelerated the regulatory process and satisfied industry (where many products are imported by global suppliers). Other departmental staff felt that it was necessary to investigate the impact of adopting international standards in Australia rather than blindly adopting them.

Departmental staff described the package of international products (besides Commercial Ice Makers and Domestic Cooking Appliances, which became their own product streams) as the hardest product stream to implement because of these challenges.

While industry members were consulted prior to the finalisation of the program's design, one industry member commented that they would have liked industry to have been more involved in the process for selecting product streams. Some industry members felt the program was unnecessary—that Australian industries are already too highly regulated, and that the nation's regulation is unable to keep up with global innovations in energy efficiency. They felt that the regulatory (registration and compliance) burden is already high for industry members and difficult to keep up to date with. There will always be industry stakeholders who do not want more regulation, and decisions not to pursue standards development should be shared with industry stakeholders in an effort to maintain good will.

The consensus among interviewees was that products were selected based on a combination of factors. These can be summarised as:

- **_'Bang for buck':_** Product selections would generate considerable energy, greenhouse gas and bills savings from standards development.
- **_'Low-hanging fruit':_** Some product selections were considered the easiest products to regulate (that were not already regulated) or were already being investigated by other jurisdictions (as was the case with hot water systems in New Zealand).
- **_'Fill the gaps':_** Some product selections were lower on the E3 prioritisation list, so the Department opted to work on these products while other teams worked on higher-priority products.

Some staff members felt that the Commonwealth had already regulated all the 'low-hanging fruit', and the only products left were all hard to regulate.

Most interviewees agreed that the NSW product stream selections seemed **appropriate/ suitable**, in terms of savings generated. However, the number of products selected relative to the Department's human resourcing was **overly ambitious**, with many interviewees commenting that the timeframes to get product stream selections to regulation were unrealistic. Many interviewees commended the amount of work the Department achieved despite the tight timeframes and less staffing relative to the Commonwealth (see section P1). The Commonwealth's standard resourcing is one full-time employee per product, and stakeholders felt the NSW program staff investigated much more products relative to the Commonwealth's standard.

> *When you look at what [the NSW Department staff] were covering, they may have been actually covering like 18 products between two people.* [Consultant]

Interviews revealed a **disconnect between the product stream selection decisions and the NSW program delivery team**. Staff involved in delivering the program believed that those who made the policy decisions did not consider the market impacts of regulating certain products to an adequate depth, nor had they understood how much effort it would take to truly implement the program. Program staff reported feeling that they had been given a very difficult task, with little justification for why so many product streams had been selected.

Recommendation 1
When designing programs, incorporate time and resources for coordinated overlap/ handover between the program design and program delivery teams.

As shown in Table 2 and discussed in Box 2 (pp. 16), the program decided not to pursue regulation for many products from the international package due to not meeting requirements of sufficient sales volumes, energy usage and/or energy efficiency potential to develop MEPS or labelling. The document review confirmed that program staff considered energy savings potential, the impact of COVID-19 on appliance sales and appliance usage, consumer purchasing behaviours and technical and policy options for all product streams.

Despite deciding not to pursue standards development for seven of the international products, and not progressing as far as they would have liked with the space heating and hot water systems streams, some interviewees felt it was valuable to have gone through the process to understand which products did not meet requirements for regulation. However, some were concerned the program did not come to these conclusions fast enough.

P1 HOW WELL HAS THE PROGRAM OVERCOME BARRIERS TO SUCCESSFUL DELIVERY? TO WHAT EXTENT HAS THE PROGRAM BEEN ABLE TO APPLY ADAPTIVE MANAGEMENT MEASURES?

A number of barriers impacted the program's ability to accelerate/ streamline standards development during the program's four-year timeframe. Adapting to these barriers was difficult for the project team, as many felt that these factors were out of their control. Interviews and documentation such as progress reporting and meeting minutes indicate that the program team were continually responding to issues as they arose, to differing levels of success. Box 3 on the next page describes how the program team displayed agility in adapting test methods for the hot water systems product stream.

As the program approached the end of its funding period, meetings were held monthly rather than quarterly, allowing the program team to be more adaptive.

Many interviewees spoke to the idea of **heroic assumptions**—that the program design expectation that multiple activities could be conducted in parallel throughout the program was highly aspirational. Many interviewees felt that one of the main barriers was the program's four-year timeframe itself, which was described as overly ambitious to achieve standards development for all selected products/ product streams. These ambitious expectations extended into the delivery plan. This issue was made more problematic by the relatively small team (compared to Commonwealth teams) which, at least at the program's onset, had limited technical expertise and experience in standards development.

> *You can't bulldoze through a label like this, particularly when you're talking about a label that's across heater types, fuel types, technology types. It is a process that you need to work through with the industry and it's really technically complicated.* –Department staff

The program's **governance**—as a state-led program under the E3 (i.e., a Commonwealth) program, and also working with the New Zealand government in the case of the hot water systems stream—meant the Department was somewhat constrained by the Commonwealth's process requirements under the GEMS Act and somewhat by the different cultures between agencies, limiting their ability to achieve standards development within the four-year timeframe. For example, heated towel racks and coffee machines (under the international products package) could not be regulated through the use of mandatory timers under the GEMS Act. However, this limitation only represented a fraction of the potential energy savings generated through regulating all four product streams.

While the E3 Review Committee and the Energy Technology Working Group (the body that replaced the Energy Efficiency Advisory Team – see Section 1.1.1 above) both had Terms of Reference that outlined their roles and responsibilities, there was still some confusion among interviewees around the various responsibilities between jurisdictions and who was responsible for making the final decisions. Despite these kinks, most interviewees recognised the value of having different jurisdictions contribute to a federal program even with the added layers of bureaucracy (see Box 5, pp. 42).

Box 3. Adapting test methods for the hot water systems product stream

The hot water systems product stream was selected based on its potential for generating considerable energy, greenhouse gas and bills savings, despite the knowledge that it would be a difficult stream to get to regulation due to a vocal industry lobby group.

The Department sought to lead a research study project to update and strengthen hot water 'draw off'[26] profiles for residential hot water use across Australian and New Zealand climate zones, household sizes and water heater technology type. Initially, the COVID-19 pandemic delayed the supply of parts for testing meters. When testing meters were eventually installed on roughly 20 hot water systems, the program team discovered that the data collection unit was capturing data before they were installed and were capturing more data than necessary, draining the battery too quickly and limiting the scope of relevant future data capture. The batteries were replaced at no charge by the supplier of that component.

As the time to install the new testing meters approached, installers then refused to install them because the meters were not WaterMarked. This discovery spurred the program team to investigate the requirement further, and essentially learn that WaterMark certifies that a product in contact with drinking water is fit for purpose, protecting community health and safety. To get WaterMark certification the product first needed to be tested against AS/NSW 4020. The program team sought to establish that the meter satisfied AS/NZS 4020 and then propose a Performance Solution approach to bypass the requirement for the full WaterMark certification.

The program team first sought to determine whether the meter had passed an equivalent test method in an international jurisdiction. They found evidence that it had been certified in 2011 and 2016 in two different European jurisdictions, but the more recent certification expired in May 2021. The Australian supplier had a similar meter certified in Australia however it had only been certified for temperatures up to 50 degrees Celsius, meaning that the original meter had to undergo testing.

The meter passed 6 of the 7 testing components at 90 degrees Celsius—it did not affect the safety of the heated water it was collecting data on. However, it failed the taste test, meaning the testing meters could not be used to test the energy efficiency of hot water systems. All installed meters were subsequently uninstalled.

While not a success story, this case study demonstrates the program team's agility in responding to new information to overcome barriers to program implementation.

As previously mentioned, there was initially **limited technical expertise** within the program team and a limited pool of available consultants with the required knowledge, experience and expertise. The time spent recruiting the program team resulted in a delayed start and lack of a handover between the authors of the program design and the program team. This meant that a significant portion of the program's infancy was spent building the program team's knowledge and expertise, and that the program had to rely on external technical consultants to do much of the work. This **reliance on technical consultants** was described as a risk by some or as beneficial by others. For some product streams, the program team received few high-quality responses to tenders, which also slowed the program's momentum.

Indeed, programs without proper internal capacity are at risk of not meeting their timeframes or producing work that may not hold up to scrutiny. A reliance on technical consultants can help produce research in the short-term but may limit the NSW Government's ability to build

---

[26] Water that is heated up and stored waiting to be dispensed when the tap is opened.

its own internal capacity. Whether or not the benefits outweigh the risks can only be determined through reflections with program staff about whether consultants met their needs and the extent to which their own capacity for regulatory work grew.

Adapting to the limited pool of technical consultants

Internal documentation such as Monitoring, Evaluation and Reporting (MER) reporting and internal status reporting indicated that the program team, at least for the hot water 'draw off' project, pivoted to Expressions of Interest (EOI) rather than Requests for Quote (RFQ) for the first stage of procurement to investigate the viability of potential technical solutions. Department staff explained in interviews that this reduced the number of lengthy proposals they had to read.

Similarly, after an unsuccessful RFQ process for the commercial catering stream, the program team used an alternative procurement process in which they approached and negotiated directly with a provider.

Some interviewees felt that the program had not successfully found the right staff until the final 18 months of the program. Interviewees explained that the program funding meant that staff on temporary contracts often left the team and had to be replaced.

Recommendation 2

When designing programs, incorporate time and resources for recruitment, including an allowance for contingency should there be delays in approvals.

Recommendation 3

Clearly define governance structures and responsibilities between the Commonwealth and NSW Government from the outset.

Recommendation 4

Consider establishing a secondment arrangement, where a NSW government employee works in the Commonwealth E3 program team and/or vice versa. This would improve collaboration between the NSW and Commonwealth governments by increasing each other's understanding of one another's organisational culture and procedures.

Interviewees noted that it was **difficult to access high-quality data** for some product streams, particularly for the commercial catering equipment stream. They explained that readily available sales data is essentially non-existent. The program team could make requests through suppliers and industry peak bodies to access sales data, but this only provided them with extracts or estimates instead of the raw data. The COVID-19 pandemic also affected the completeness of some sales data purchased by the Department.

> *Yeah, and if you've got sales data, that helps as well, but unfortunately, sales data in Australia is pretty much non-existent now. For any product, and to get any sort of sales data, you actually have to go to the supplier or the industry body, and get an estimate or a percentage.* – Department staff

Adapting to limited available data

When faced with a lack of available performance data, the program team were able to find a cost-effective way to circumvent this issue by reviewing product catalogues and extracting performance data relating to each product stream. Despite the possibility that this data may not have been perfect, interviewees felt that, without pivoting to this approach, they would not have been able to produce the CRIS for commercial ice makers.

> *One of the things that we did was scrape the internet for product performance data. We looked through product catalogues ... It took a long time, and the data may not be perfect, because sometimes it's difficult to work out whether the products have been tested to a particular standard ... but it gave us a really cheap way to understand if there was a problem in the market that needed fixing ... Without that data scraping, we wouldn't have been able to progress the commercial ice makers work in particular.* – Department staff

In attempts to meet the accelerated timeframe to regulation as compared to regular E3 processes, the program team **decided not to develop product profiles** for commercial ice makers, domestic cooking and commercial catering. The product profile stage was not a requirement for participating E3 jurisdictions to complete, and, and because the program team felt they had sufficient data to proceed without them, they decided to forego the product profiles and proceed straight to the development of CRIS.

Similarly, the program team applied adaptive management measures by **deciding not to recommend regulation for ceiling fans, vacuum cleaners and water dispensers**. The document review confirmed that the EEAT had advised the program team to reduce or prioritise products, citing that that NSW had insufficient funding to cover all of its intended products. The program team, including contracted consultants, investigated the potential savings and barriers to regulation for products in the international products stream. They found that applying standards to seven of these products[27] would produce little value for Australia as: (a) products were already improving in energy efficiency, so were unlikely to produce considerable savings or (b) product regulation was restricted by existing legislation. They decided not to pursue standards development for these products.

This outcome—to not pursue standards development for seven products—in and of itself is not negative or indicative of a failure by the program. Rather, it reflects the program's ability to consider and adapt to information and make the best choice for product regulation in NSW.

---

[27] Dehumidifiers, Home audio systems, Heated towel racks, Air cleaners, Commercial photo copiers, Microwaves, Coffee machines.

P2.1 TO WHAT EXTENT WERE THE RIGHT STAKEHOLDERS ENGAGED IN AN APPROPRIATE AND TIMELY WAY IN THE DESIGN AND DELIVERY OF THE PROGRAM?

Interview feedback and the document review provided clear evidence that the program team engaged relevant stakeholders, and that these stakeholders were generally engaged well. The document review revealed that the Department sought stakeholder views from appliance manufacturers and designers, suppliers, importers, retailers and consumers through surveys/ questionnaires and interviews.

As discussed in section 2.2.1 on data limitations, it is possible that the industry members who participated in this evaluation are those with which the Department has a positive relationship, which may skew industry feedback in this evaluation more positively.

> *I think NSW do a very good and thorough job on [stakeholder consultation]. Over many years, I've been impressed with the work that NSW government's done. I think they did all the right things … [the Department] did a fairly thorough job consulting with pretty much all the right stakeholders.* – Stakeholder from another jurisdiction

The E3 GEMS product review guideline provides support for the importance of public consultation to the product review process: 'It is a critical path to getting the information needed to gain a better understanding of the market and the effect of regulation on the industry and other stakeholders.'[28]

Engagement with industry generally went well, with many industry stakeholders describing a willingness to provide feedback and explaining that the Department approached industry consultation with integrity. Department staff explained that engagement with industry can be challenging and is highly **dependent on their relationship** with certain industry members/ peak bodies—with program staff mentioning their relationship with the National Association of Food Equipment Suppliers (NAFES) as particularly strong. The program team also established a technical working group for the space heating product stream. This was described as beneficial in bringing relevant industry stakeholders together to contribute to the design of comparative methodologies for technology types, fuel types and product purpose.

> *Look, the team seems to have done a good job in setting up workshops and having a clear agenda on what they were going to talk about, what they were looking for, and the feedback they were looking at getting.* – Department staff

> *When [the Department] went out for the stakeholder consultation for the space heating project, we were able to attract most of the industry participants. And we were able to form a technical working group and people working in different technologies behind space heating gladly participated in these forums or the workshops that we have done.* – Department staff

---

[28] E3 Program (2019) *E3 GEMS product review guideline to introduce minimum energy performance standards and labelling*.

Industry members often explained that **industry stakeholders prefer to be consulted as early as possible**, with one industry member commenting that they would have liked industry to have been more involved in the process of selecting product streams. Another industry stakeholder was dissatisfied that they were not informed when products they represented were dropped from the international package.

> *In developing the policy in the first place, it would be useful to consult with [industry] to understand how feasible [product selections] were ... [Industry] members are at the coalface, they're in the marketplace, they're selling the products, they know the real world. It'd be useful to have them give input early in the process.* – Industry stakeholder

Recommendation 5
Ensure decisions around changes to program scope, such as product stream selection or decisions not to pursue standards development, are clearly communicated to stakeholders in line with E3 guidelines. This would help maintain positive relationships with industry stakeholders and participating E3 jurisdictions.

There was mixed feedback about whether stakeholder consultation was meaningful and contributed to decision-making, but this is discussed in more detail in section P2.2.

Interviewees explained that **import data was a key enabling factor** for effective stakeholder consultation.[29] Import data was available for commercial ice makers, which enabled the program team to identify the full scope of suppliers to consult with and develop a deep understanding of the market and the impacts of regulation.

> *With the ice makers, we had the import data, so we were able to work out exactly who we needed to talk to get the full picture .... So we had a really, really good picture about whether we should regulate these products.* – Department staff

The program team had a **successful working relationship with the Commonwealth**. This cooperative approach fostered information sharing, regular communication regarding the program's progress, and frank and open discussions about the impacts of product regulation.

> *I thought [the program team] were very cooperative. It was very much an open, cooperative approach. And I think that's the way you got to do this. You don't do this behind closed doors. You don't assume everything; you don't assume you can do everything.* – Commonwealth staff

---

[29] Import data refers to information about who is importing what products into Australia.

Box 4. Consumer research

Interview feedback suggests that consumer research for the program was more difficult than consultation with industry. Interviewees mentioned that consumer research was performed mostly by external consultants, and it was particularly difficult getting enough households to participate during the COVID-19 lockdowns. One interviewee explained that 200 households (the contractually required minimum) participated in a hot water systems water profile study, which was segmented by climate zone, household size and water heater type.

The Department received advice that, with the proposed budget for the water profile study, the maximum number of households that could be comprehensively monitored would be 50 to 100 houses in each region/ climate zone. The advice also acknowledged that the number of households comprehensively monitored would have to be reduced if the cost to monitor 500 households was prohibitive, and that if the sample size needed to be smaller, a greater number of houses could be monitored less comprehensively.

At the EOI stage, the Department stated that minimum sample size of the water profile study had to be 200 households. One interviewee felt that the 200 households that did eventually participate in the water profile study was not a large enough sample size, and that they were not satisfied with the transparency of the consultants' approach to sampling households.

> *There was commentary that, I think we had 200 households. It was probably not enough for a meaningful outcome. It's pretty difficult to say because we didn't have any visibility on who was being contacted, but we had a target number of people in particular climate zones, household sizes and technology types ... Certainly the consultant told us that they had ticked off all of those.* – Department staff

It is clear that stakeholder consultation was a key strength of the program, enabled by having access to import data, strong relationships with industry peak bodies, and engaging industry stakeholders as early in the process as possible.

P3 HOW WELL HAS THE PROGRAM COLLABORATED WITH THE EEAT AND THE OFFICE OF THE GEMS REGULATOR IN DELIVERING THIS PROGRAM? TO WHAT EXTENT HAS THIS CONTRIBUTED TO EFFECTIVE AND EFFICIENT PROGRAM DELIVERY?

The document review provided clear evidence of extensive collaboration between the Department, the Commonwealth Energy Efficiency Advisory Team (EEAT) (from November 2021 known as the Energy Technology Working Group (ETWG) – see section 1.1.1) and, to a lesser extent, the office of the GEMS Regulator. The Department's relationship with the EEAT and the office of the GEMS Regulator were described by most internal stakeholders as effective opportunities to share information and discuss solutions to overcome barriers.

COLLABORATION WITH THE EEAT/ ETWG

Under the former Energy Council arrangements, the EEAT oversaw the E3 program and recommended actions through the ESOM and then the EMM for decisions.

As discussed in Section 1.1.1 above, NSW is a jurisdiction member of the ETWG and was a member of the former EEAT. The ETWG is chaired by the GEMS Regulator and its membership is made up of nominated representatives of jurisdiction parties to the GEMS Inter-Governmental Agreement. The ETWG makes decisions on the advice of members to achieve the priorities and goals of the EMM. Decision-making occurs on a consensus basis (agreement by all jurisdictions), informed by evidence including Commonwealth, State and territory reports, as well as analysis and recommendations from the E3 Prioritisation Plan and any other relevant policy documents.[30]

The program team regularly presented papers at the EEAT meetings, which interviewees described as **a valuable opportunity to discuss compliance and registration implications, review proposals, and talk frankly and deeply** about technical issues with little political interference. EEAT meeting agendas usually covered an update from the chair, an update from each jurisdiction on progress achieved for each product stream, and ended with a summary of actions from each meeting.

> *[EEAT meetings] are really focused on the technical aspects and on the proposals ... It's all nerds, and everyone's keen to get energy efficiency adopted and stuff. So the discussions are all very nerdy ... It's very technical stuff. – Department staff*

Industry stakeholders were also invited to attend E3 Review Committee (E3RC) meetings (see section 1.1.1), helping to ensure the standards development process was as transparent as possible.

> *There's an invite for key industry groups to be part of those conversations ... So that the industry feel like they have a forum to engage with the people running the standards and provide feedback and they know what's in the plan. – Department staff*

---

[30] Energy Technology Working Group Terms of Reference (draft), 2021.

Some interviewees felt that **EEAT meetings were too focused on the technicalities**, which they felt hindered the program's vision of streamlining the standards development process. Ultimately though, the Department's relationship with the EEAT was viewed as a valuable way to distil technical information and communicate it up to Commonwealth decision-makers.

COLLABORATION WITH THE OFFICE OF THE GEMS REGULATOR

As mentioned above, the ETWG is chaired by the GEMS Regulator. The program team also submitted monthly status reports to the GEMS Regulator, which covered program details, success stories, risks, issues, outstanding issues, decisions, changes, and lessons learned.

However, beyond this interaction, some Department staff explained that there was **not a formal arrangement between the Department and the office of the GEMS Regulator**, at least not for all product streams. While the Department's engagement with the office of the GEMS Regulator was more *ad hoc*, it ultimately evolved into a mutually beneficial exchange of ideas, particularly towards the end of the program.

> *One of the issues with this is that we didn't engage early enough with [the office of the GEMS Regulator] and create a working group that met regularly ... It would've been really valuable to set something like that up, and certainly [was] a mistake [that we didn't] ... We really just had informal chats with them. [The office of the GEMS Regulator] have been really great over the last year in particular. So we've built a good relationship with them, but I think if we had set in place a formal arrangement, it might have been a lot easier for us.* – Department staff.

Recommendation 6
Formally establish regular collaborative arrangements with all key collaboration partners. These may be as formal as developing an MoU and establishing Terms of Reference, or as informal as instating half-hour catch-up meetings.

P2.2 TO WHAT EXTENT DID CONSULTATION INFORM DECISIONS?

There were somewhat conflicting perspectives regarding the extent to which consultations informed decisions during program delivery. Most Department staff felt that stakeholder feedback influenced decisions throughout the program, however not all Department staff shared this perspective. Some industry stakeholders felt that consultations were tokenistic, and that their feedback was not always considered. Such differences among industry stakeholders are expected given the diverse range of competing stakeholder interests in energy efficiency standards.

It is clear that the program team consulted widely throughout the delivery of the program, and on the balance of evidence, it appears these **consultations significantly informed several key decisions.** Department staff explained that industry groups were invited to participate in helping fill important knowledge gaps to ensure that the best regulatory decisions are made.

Information gathered through stakeholder engagement informed decisions to not progress work on several product types within the international products stream (see Box 2, pp. 16). The program team also heard concerns about adopting international standards in Australia and New Zealand due to problematic US and European test methods, particularly in relation to vacuum cleaners and ceiling fans. This feedback from industry informed the program team's decision to not recommend these products for regulation, as evidenced in the interviews and documents reviewed.[31]

> *The information we got from stakeholders was crucial, especially for the ceiling fans and water dispensers … that information was critical in making the decision about those two products.* – Consultant

There was similar feedback regarding the space heating product stream. The program team engaged with industry stakeholders to find out what was happening in the industry, what technologies were available, and how their decisions might impact the market. The advice they received influenced the development of a product profile for space heating equipment. This was then publicly released for further feedback from stakeholders, which informed the technical options paper. Further consultation was done with the technical working group formed from the stakeholders that they had consulted.

> *We have engaged them to develop these new tools that we are trying to develop. I think they're part of the decision-making process and they're very closely engaged.*
> – Department staff

---

[31] This work has informed three reports which will be put to the E3 program subgroup for consideration at a later date.

Overall, the majority of Department staff were positive about how consultations informed decisions during program delivery.

> *I think most of the decisions—like 99% of the decisions—were made based on the stakeholder consultation. Because we work as a team, the New Zealand government, NSW government, the researchers, the project partner, we work together as a team in this journey.* – Department staff

In contrast, some stakeholders—including some Department staff members—commented that consultations were done primarily to inform industry of changes rather than to gather feedback that may impact policy decisions.

> *I don't think [stakeholder consultation] had heaps of influence, because I think we already had kind of an idea of what we wanted to do.* – Department staff

Some industry stakeholders had similar perspectives – that they'd been given opportunities to provide comments on reports, but that their **feedback was not always taken onboard**. They felt that their feedback might lead to small changes, but that ultimately the program team had already made up their mind about key decisions. These views may not reflect industry stakeholders' experiences with the Department but with regulatory consultation more generally.

> *I think it depends on whether it suits their predetermined approach or not ... Sometimes they seem to note comments that we've made, but they don't change their approach, they just continue to steamroll down their own path.* – Industry stakeholder.

> *Usually with these sorts of programs, the minds of the bureaucrats that are involved are usually already made up. And quite often the so-called consultation is lip service. It's not really consultation, it's so they can tick the box.* – Industry stakeholder.

These conflicting perspectives are expected given the **competing interests of industry members and other stakeholders** involved in energy efficiency standards. Regulatory programs cannot appease all stakeholders equally. Instead, they should aim to understand key stakeholders' concerns, and find solutions that balance these with the goals of regulatory intervention (i.e., to remove energy inefficient products from the market).

O1 TO WHAT EXTENT DOES THE PROGRAM EXPECT TO ACHIEVE ENERGY, GREENHOUSE GAS AND BILL SAVINGS? HOW DOES THIS COMPARE WITH INITIAL FORECASTS?

The Appliance Standards program did not have energy savings targets, but this evaluation explores the extent to which energy savings are expected to be achieved as a result of nominated products being regulated, and how this latest data compares with the initial (2018) forecast estimates. When the program was designed, estimated annual future electricity, gas, bill and emissions savings were modelled out over the following two-three decades, assuming that all the products that the NSW program was tasked with investigating would in fact be regulated via labelling and/or standards. Energy savings estimates were then updated in September 2020 and again in June 2022 as the product list changed and as more accurate data became available.

The degree to which the program will achieve energy, greenhouse gas and bill savings is dependent on the products' progress through consultation and regulation, as decided by the Commonwealth/E3 program. The document review (particularly CRIS papers and EEAT papers) revealed that the Department was considering how different regulation options— including various MEPS options and products such as an online comparison tool and database for water heaters—would result in different energy, greenhouse gas and bills savings. Total future, modelled electricity, gas, greenhouse gas emissions and bill savings estimates, from 2018, 2020 and 2022 are summarised in Table 3.

TABLE 3.   SUMMARY OF ELECTRICITY, GAS, EMISSIONS AND UNDISCOUNTED BILL SAVINGS ESTIMATES MADE IN 2022

Savings	2025	2030	2035	2040	2050
Total electricity savings (GWh/ yr)	153	930	--	--	--
Total gas savings (GWh/ yr)	122	748	--	--	--
Aggregate annual emissions savings (kt CO_2-e)	--	2,958	--	11,069	14,324
Total undiscounted bill savings ($m)	--	--	$3,228.62	$5,291.59	--

Note: Electricity and gas savings values are for the nominated year and include allowance for line losses. Emissions and bill savings values are based on calculated electricity and gas savings.
Source: Appliance Standards savings estimates 2022.

ELECTRICITY AND GAS SAVINGS

Overall, modelled electricity savings **estimates made in 2020 and 2022 were lower than estimates made in 2018**. This was particularly the case in relation to the commercial catering stream and the international products stream. The major reason for reductions in estimated energy savings, is the reduction of the number of products being considered for regulation (as explained in Box 2, pp. 16). The other major reason is that, as the program team conducted more research into the benefits of regulating each product and RIS's were developed, the energy savings data they had available to them was more accurate. Notably, while electricity savings were substantially lower in 2022 compared to the 2018 forecast estimates, gas savings were substantially higher.

When comparing 2018 and 2022 energy savings estimates from 'year 1' of savings onwards, the following was found[32]:

- Overall estimated energy savings are 22% lower than 2018 forecast estimates at year 5 and 20% lower at year 10 but start to beat 2018 estimates from year 14 onwards.
- 42% reduction of overall estimated electricity savings at year 5 and year 10 of program delivery. 2022 estimated electricity savings begin to beat 2018 forecast estimates from year 16 onwards.
- 38% increase in estimated gas savings at year 5 of delivery and 40% increase at year 10.

Note: Comparisons of electricity and gas savings for each workstream are summarised in Table 5 in Appendix 2.

This report investigates the factors that led to the changes in estimates in the sections below.
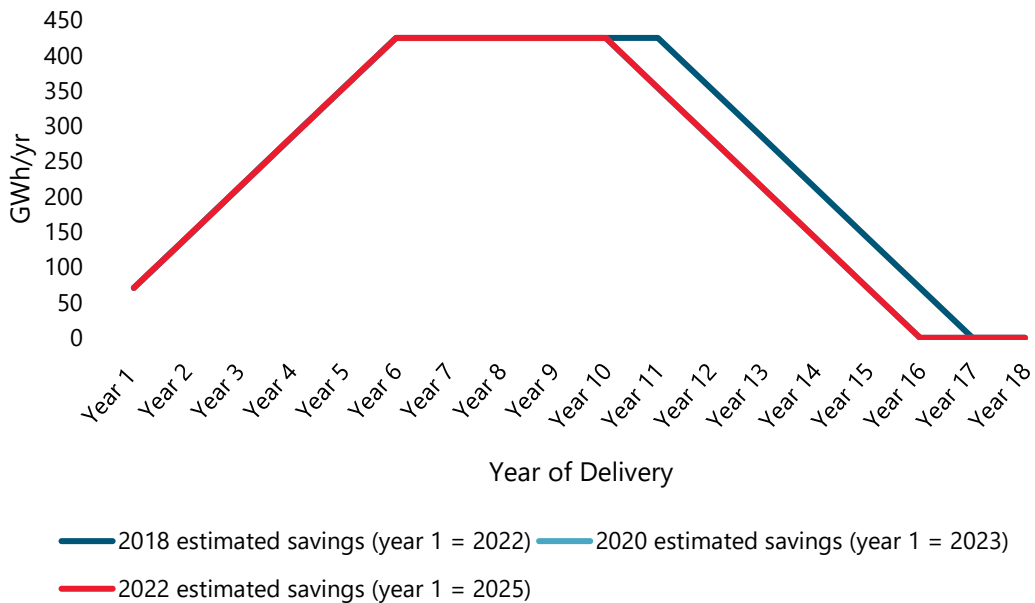
HOT WATER SYSTEMS

Aggregate annual electricity and gas savings estimates for 'year 1', 'year 5' and 'year 10' of regulating hot water systems were the same in the 2018, 2020 and 2022 data. By year 15, there was a 50% reduction in predicted electricity and gas savings in the 2022 data as compared with the 2018 initial forecast figures (see Figure 3 and Figure 4 below), but overall, the amount, and the progress, of energy savings remains very similar as between the 2018, 2020 and 2022 data. This suggests that no external factors have impacted the estimated energy savings of hot water systems, between 2018 and 2022.

We note that the 'pyramid' like nature of the savings benefits over time (see Figure 3 below), where savings start to reduce significantly after about twelve years, usually relates to the normal product life of an appliance, where they age and become less efficient over time, and eventually require replacing.

---

[32] Due to delays in making decisions about, and rolling out, standards and/or labelling, the 2018, 2020 and 2022 datasets made different assumptions about what year would be 'year 1' of savings delivery. That is: the 2018 estimates assumed 'year 1' of savings would be 2022, whereas in the 2020 data, 'year 1' is 2023 and in the 2022 data, 'year 1' is 2025. On this basis, calculations of energy savings did not compare year with year between the datasets, and instead compared from the assumed 'year 1' of delivery onwards.
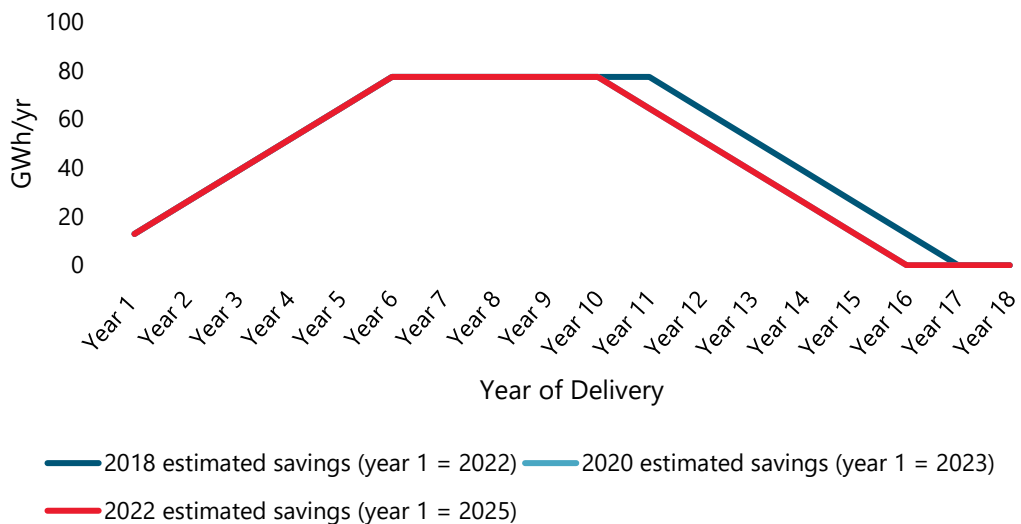
FIGURE 3.   HOT WATER SYSTEMS STREAM - 2018, 2020 AND 2022 ESTIMATED AGGREGATE ANNUAL ELECTRICITY SAVINGS (NSW)
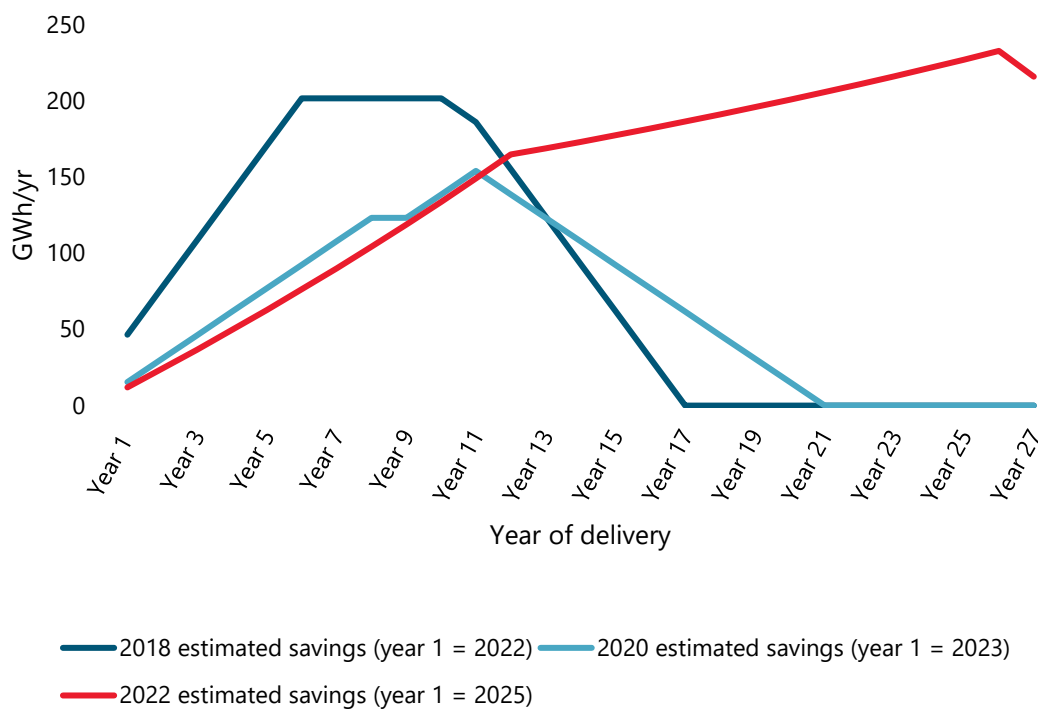

Note: Values represent aggregate annual savings and include allowance for line losses. They do not include allowance for confidence levels.
Source: Appliance Standards savings estimates for 2018, 2020 and 2022.

FIGURE 4.   HOT WATER SYSTEMS STREAM - 2018, 2020 AND 2022 ESTIMATED AGGREGATE ANNUAL GAS SAVINGS (NSW)

Note: Values represent aggregate annual savings and include allowance for line losses. They do not include allowance for confidence levels.
Source: Appliance Standards savings estimates for 2018, 2020 and 2022.

COMMERCIAL CATERING

As set out above, electricity savings estimates dropped quite significantly for the commercial catering stream as between the 2018 and the 2022 data (63% reduction at year 5, and 34% reduction by year 10) but then began to overtake 2018 estimates at the year 12 mark (6% increase of estimated electricity savings by year 12 of delivery, and 186% increase of estimated electricity savings by year 15), largely because the initial 2018 estimates predicted savings would rapidly decline from year 10 onwards and cease by year 17 and the 2022 figures predicted that savings would gradually increase until year 26.[33] See Figure 5 below.

FIGURE 5.   COMMERCIAL CATERING STREAM - 2018, 2020 AND 2022 ESTIMATED AGGREGATE ANNUAL ELECTRICITY SAVINGS (NSW)

Note: Values represent aggregate annual savings and include allowance for line losses. They do not include allowance for confidence levels.
Source: Appliance Standards savings estimates for 2018, 2020 and 2022.

It is not clear why 2022 electricity savings estimates for commercial catering products are significantly lower than initially estimated in the first ten years of delivery. It is possible that the reduction relates to a decrease in the number of products proposed to be regulated under the commercial catering stream. Some of the initial modelling which informed the 2018 forecast spreadsheet looked at the energy saving potential of eight products proposed to be regulated, but when the program commenced, it was quickly whittled down to four of

---

[33] We note that in this analysis, we have assumed that the 2018 estimate data was in error when it listed the annual electricity savings for the commercial catering stream to be 57 GWh/yr, because in four documents produced between 2017 and 2018, the energy analyst who worked on the initial forecast data amended the annual electricity savings amount from 57GWh/yr to 29 GWh/yr for commercial catering. Therefore this analysis assumes an annual electricity savings of 29 GWh/yr for the commercial catering stream.

these.[34] It is unclear, however, whether the 2018 estimates included modelled electricity savings from those eight initial products (and we note that the four products decided upon had the vast majority of the electricity savings potential).

The better answer may be that, through the research and RIS documentation that the program team put together over the course of the program, they gained access to better and more accurate data, suggesting the initial 2018 forecast estimates for this steam were simply an over-estimation. This seems to be supported by the comment made by stakeholders that it was difficult to access high-quality or complete sales and other data for the commercial catering stream (see Section P1 above). The lack of information of the source of the 2018 forecast estimate data (i.e., what products were included, how the average annual savings were calculated, etc) made it difficult to understand what had changed between 2018 and 2022 to make the results so different.

Recommendation 7
Costs and benefits modelling should document the basis for the figures provided, in particular – the sources of the data, relevant assumptions and methodologies, and any research justifying the assumptions, parameters, and inclusions or exclusions of different components. Where there are data limitations, there should be a written explanation of those limitations, the reasons for them, and how they have been addressed, etc. Documentation should be kept in a central place, referred to in the modelling spreadsheet, and should be communicated to new team members as team turnover occurs.

Notably, there were no gas savings estimates made in 2018 for the commercial catering and international products streams (Figure 6), but gas savings were estimated in the 2022 data. The 2022 data predicts gas savings of 147 GWh/yr at year 5, 314 GWh/yr at year 10 of delivery and 417 GWh/yr by year 15. It is not clear why no gas savings were predicted in 2018, but it is likely it was the result of the strong focus on electricity savings resulting from the NSW Government's target of reaching 16,000 GWh of electricity savings by 2020. We note that in 2020, there was an estimate of a small amount of gas savings for the commercial catering stream, which still differs significantly from the 2022 data.

---

[34] Being deep fryers, commercial ovens (incl pizza ovens which was added later), hot food holding and display cabinets, and dishwashers.

FIGURE 6.   COMMERCIAL CATERING STREAM - 2018, 2020 AND 2022 ESTIMATED AGGREGATE ANNUAL GAS SAVINGS (NSW)
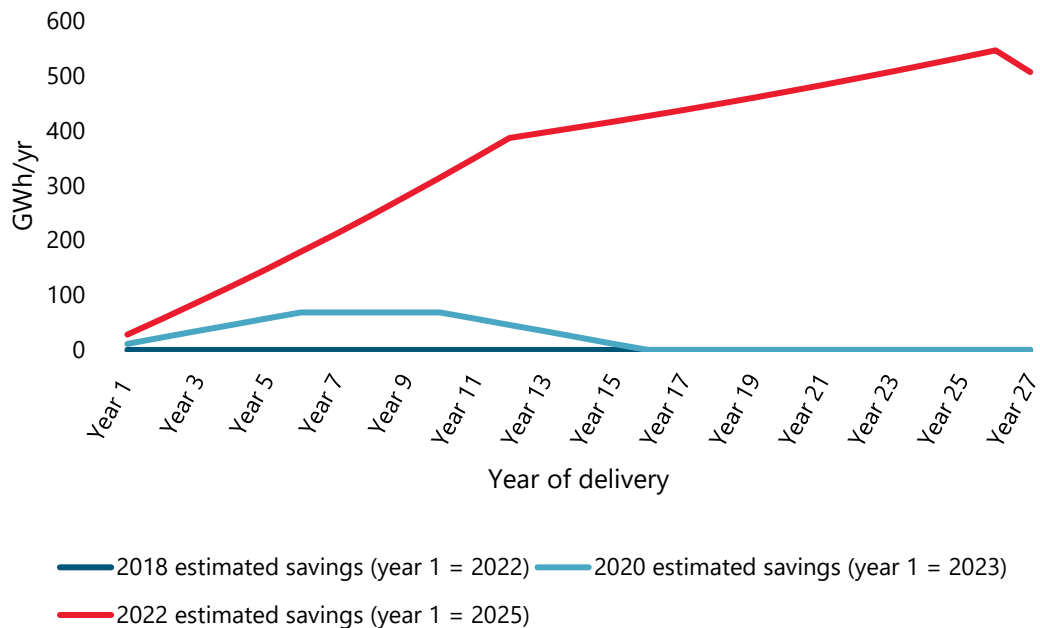
Note: Values represent aggregate annual savings and include allowance for line losses. They do not include allowance for confidence levels.
Source: Appliance Standards savings estimates for 2018, 2020 and 2022.

From stakeholder feedback, one industry member felt that energy savings estimates can be misrepresented to tell a more positive narrative about standards/ product regulation than what would actually happen. They felt that other factors, such as appliance user behaviour, need to be dealt with by government to fully realise savings estimates. This suggestion seems reasonable.

Recommendation 8
Ensure that the uncertainty and limitations regarding energy, greenhouse gas and bill savings modelling are clearly communicated to key stakeholders, including industry peak bodies and the general public.

RESIDENTIAL HEATING

Aggregate annual electricity and gas savings estimates for 'year 1' and 'year 5' of regulating residential heating systems were the same in the 2018, 2020 and 2022 data (Figure 7 and Figure 8), suggesting that the estimated energy savings benefits of regulating this product remained strong. The 2020 data estimated slightly fewer savings from year 10 onwards, but the 2022 data then matches the 2018 data.
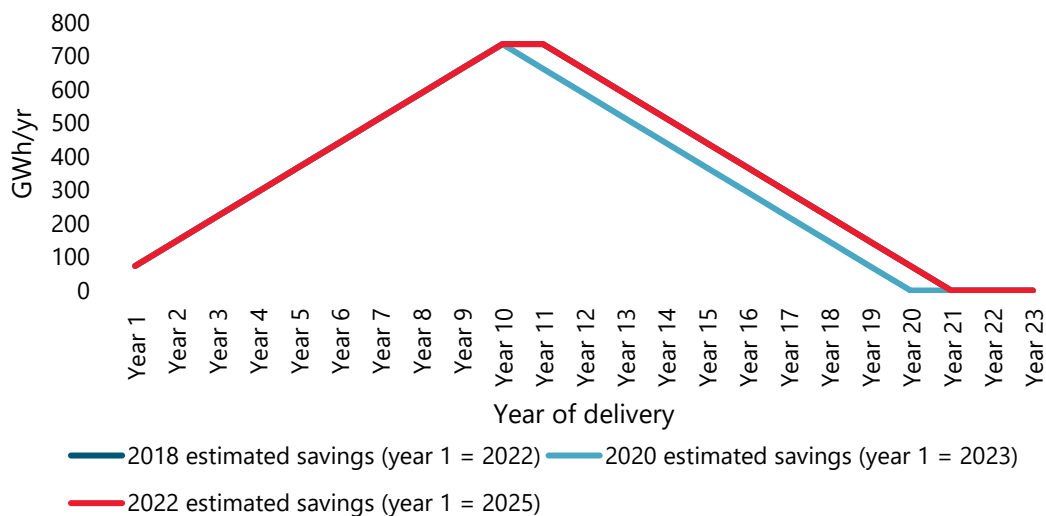
FIGURE 7.   RESIDENTIAL HEATING STREAM - 2018, 2020 AND 2022 ESTIMATED AGGREGATE ANNUAL ELECTRICITY SAVINGS (NSW)
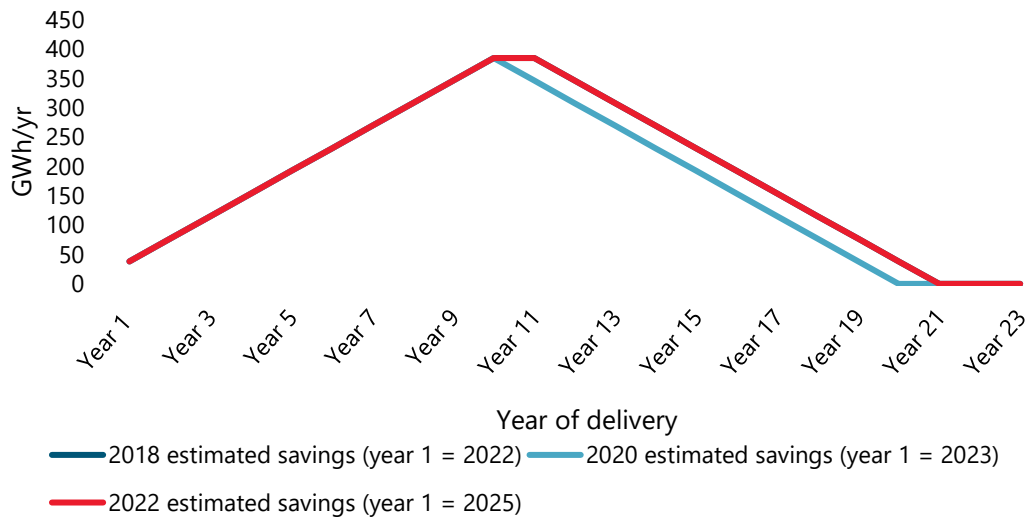
Note: Values represent aggregate annual savings and include allowance for line losses. They do not include allowance for confidence levels.
Source: Appliance Standards savings estimates for 2018, 2020 and 2022.

FIGURE 8.   RESIDENTIAL HEATING STREAM - 2018, 2020 AND 2022 ESTIMATED AGGREGATE ANNUAL GAS SAVINGS (NSW)

Note: Values represent aggregate annual savings and include allowance for line losses. They do not include allowance for confidence levels.
Source: Appliance Standards savings estimates for 2018, 2020 and 2022.

INTERNATIONAL PRODUCTS PACKAGE

For the international product package, there was a 67% reduction of estimated electricity savings at year 5 of program delivery, 66% reduction by year 10, and 21% reduction by year 15 of delivery in the 2022 data as compared with 2018 estimates (Figure 9). The principal reason for the major reductions in electricity savings for the international products stream is the removal of ten products from the original 12 products in the stream. The 2018 estimates

assumed that all products in the initial Appliance Standards list would have energy standards or labelling applied. Since the program started, the program team has undertaken research and made recommendations about those products that would benefit the most from regulation. Therefore, in the international products stream, only the remaining two products which are likely to proceed to regulation have their estimated energy savings included in the 2022 data.

In terms of gas savings, it is again unclear as to why no gas savings were estimated in the 2018 and 2020 data for the international products stream, but it is likely to have been a result of the focus on electricity savings due to the NSW government target of 16,000 GWh of electricity savings by 2020 (see above).

We note that the two products recommended to proceed to regulation – commercial ice makers and domestic ovens – were initially listed under the international products stream but that over the course of the program, they were taken out and dealt with as separate product streams. However, in our data analysis, for the sake of consistency of data comparison, those two products were always counted in the international package product stream data.

FIGURE 9.   INTERNATIONAL PRODUCTS STREAM - 2018, 2020 AND 2022 ESTIMATED AGGREGATE ANNUAL ELECTRICITY SAVINGS (NSW)
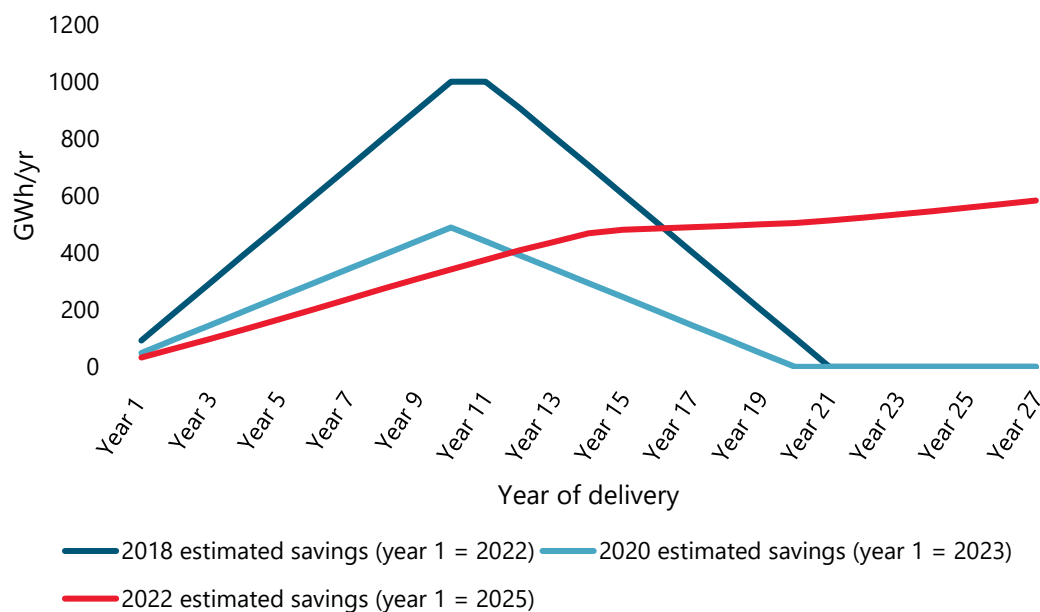
Note: Values represent aggregate annual savings and include allowance for line losses. They do not include allowance for confidence levels.
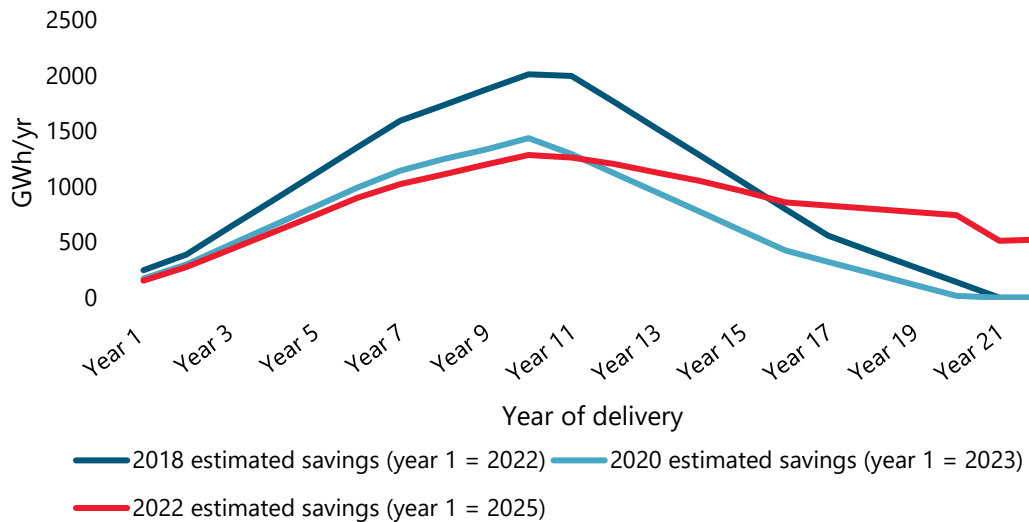Source: Appliance Standards savings estimates for 2018, 2020 and 2022.

TOTALS

Total energy saving estimates in 2022 differed significantly from the 2018 estimates. Total electricity savings in 2022 are 33% below at that which was estimated in 2018 at year 5 and 36% below by year 10 of program delivery, and 8% below at year 15. 2022 estimated electricity savings begin to beat 2018 estimates from year 16 onwards (Figure 10). In terms of

gas, the 2022 gas savings estimates are 38% above what was predicted in 2018 at year 5 and 40% above at year 10 (Figure 11).

Overall energy savings are 13% lower than 2018 estimates at year 5 and 14% lower in year 10 but start to beat 2018 estimates from year 13 onwards (Figure 12).

FIGURE 10.   TOTALS - 2018, 2020 AND 2022 ESTIMATED AGGREGATE ANNUAL ELECTRICITY SAVINGS (NSW)

Note: Values represent aggregate annual savings and include allowance for line losses. They do not include allowance for confidence levels.
Source: Appliance Standards savings estimates for 2018, 2020 and 2022.

FIGURE 11.   TOTALS - 2018, 2020 AND 2022 ESTIMATED AGGREGATE ANNUAL GAS SAVINGS (NSW)
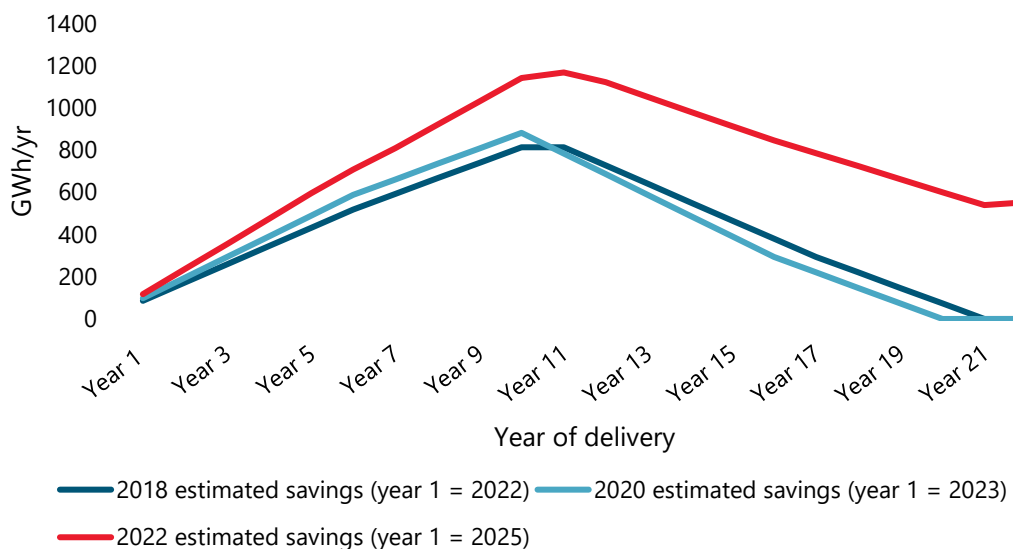
Note: Values represent aggregate annual savings and include allowance for line losses. They do not include allowance for confidence levels.
Source: Appliance Standards savings estimates for 2018, 2020 and 2022.

FIGURE 12.   TOTALS - 2018, 2020 AND 2022 ESTIMATED AGGREGATE ANNUAL ENERGY SAVINGS (NSW)
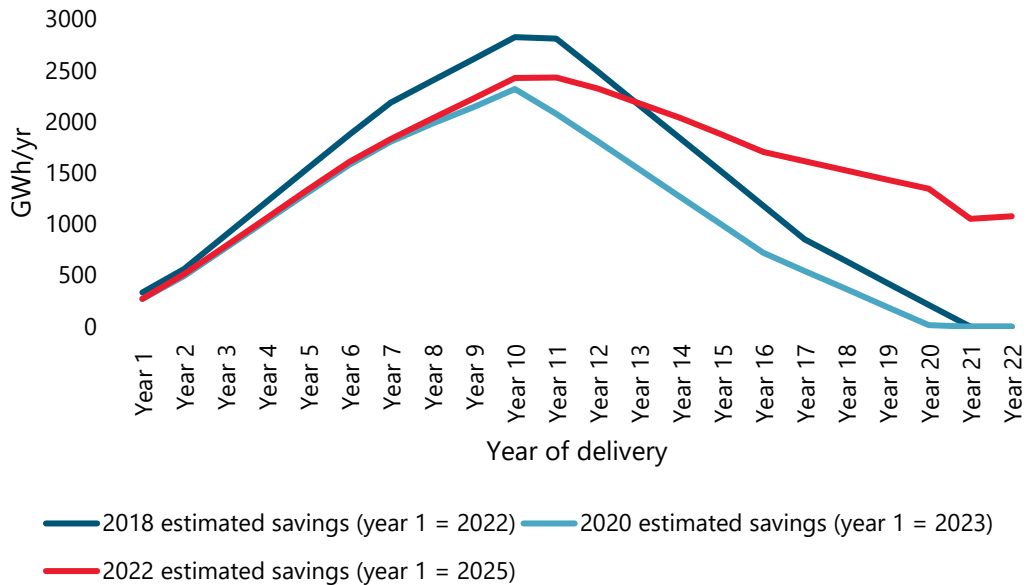

Note: Values represent aggregate annual savings and include allowance for line losses. They do not include allowance for confidence levels.
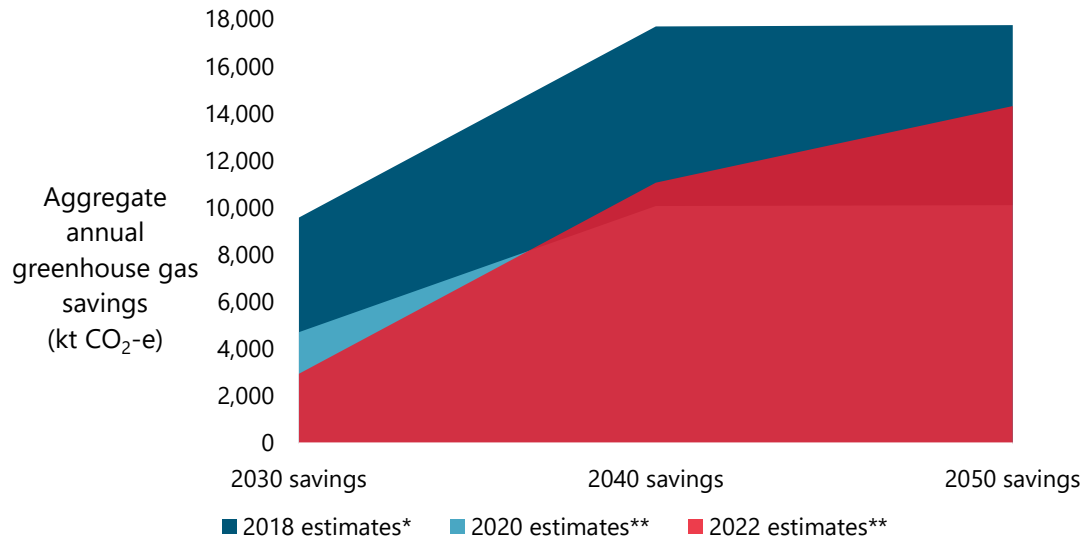Source: Appliance Standards savings estimates for 2018, 2020 and 2022.

GREENHOUSE GAS AND BILL SAVINGS

Similarly, 2022 estimates for greenhouse gas savings were also lower than estimates made in 2018 (Figure 13), which relates directly to the reduction of overall estimated energy savings because of the removal of ten of the total 15 proposed products from potential regulation. However, estimates made in 2022 for 2040 and 2050 greenhouse gas savings were higher than estimates made in 2020 (Figure 13). Since the start of the program, the NSW government has released a range of policies, strategies and initiatives to address the greenhouse gas intensity of the grid[35]. These work in tandem with energy efficiency, as reducing energy demand is more efficient than producing and distributing additional renewable energy. Nevertheless, it is common that greenhouse gas savings are reduced as the electricity grid decarbonises. Updated modelling of the grid does not appear to have been applied to the 2022 estimates, rather these use the 2018 grid intensity forecasting for consistency.

---

[35] Department of Planning, Industry and Environment, *Net Zero Plan Stage 1: 2020-2030,* released 14 March 2020, https://www.energy.nsw.gov.au/sites/default/files/2022-08/net-zero-plan-2020-2030-200057.pdf; Department of Planning, Industry and Environment, *NSW Electricity Strategy*, https://www.energy.nsw.gov.au/nsw-plans-and-progress/government-strategies-and-frameworks/nsw-electricity-strategy; NSW Government, *Electricity Infrastructure Roadmap*, https://www.energy.nsw.gov.au/nsw-plans-and-progress/major-state-projects/electricity-infrastructure-roadmap.

FIGURE 13.   COMPARISON OF 2018, 2020 AND 2022 CUMULATIVE NSW GREENHOUSE GAS EMISSIONS REDUCTIONS ESTIMATES
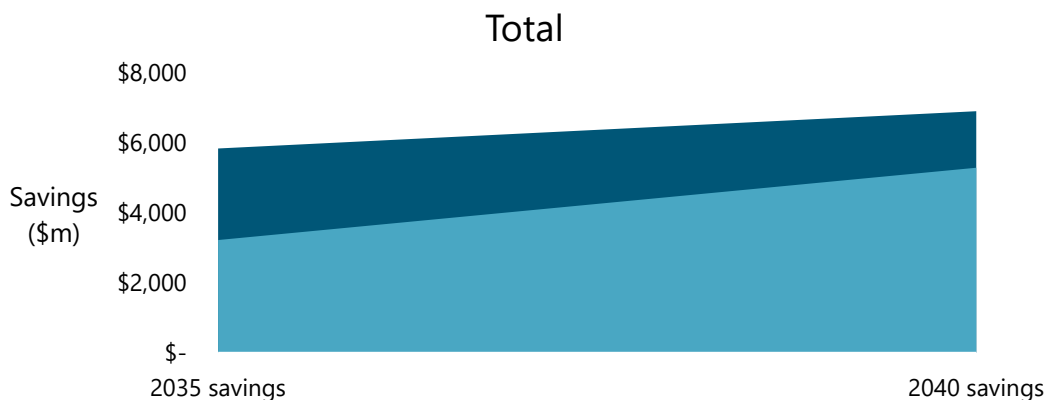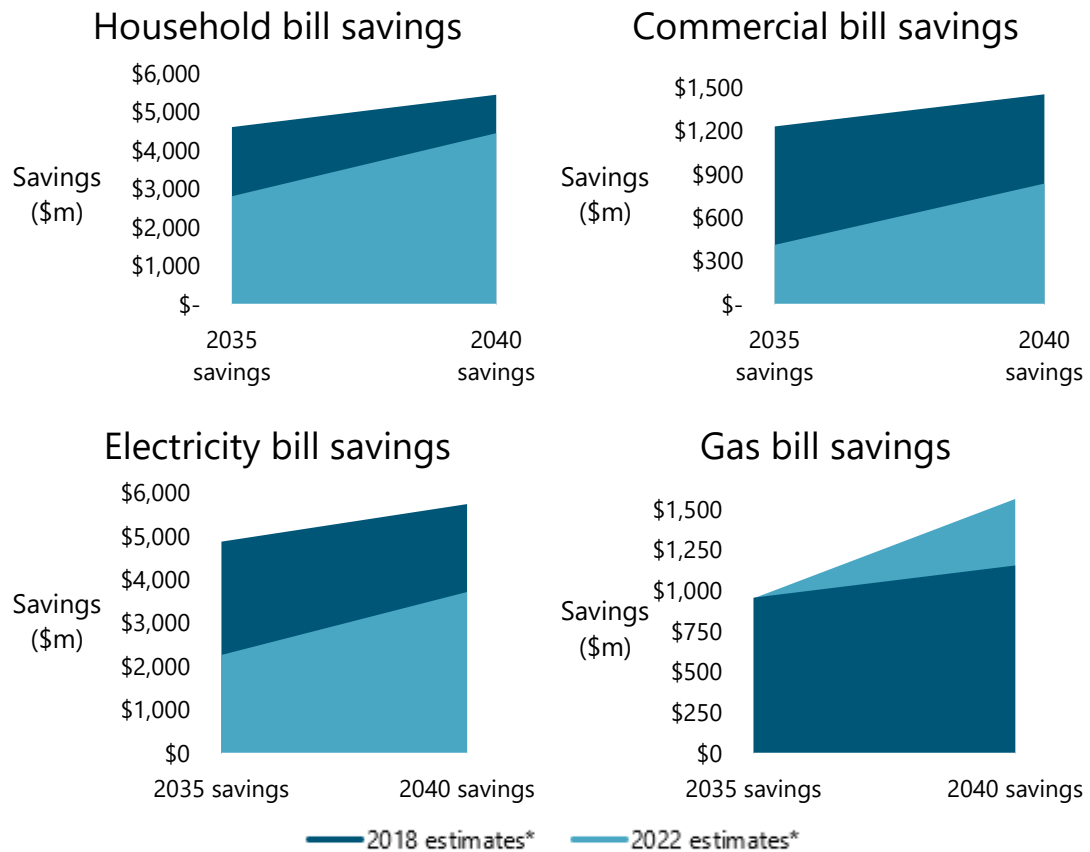

Note: Values are based on calculated cumulative electricity and gas savings. The Department used the same emissions factors in 2022 as they did in 2018 but did use updated emissions factors in 2020. The above greenhouse gas and bill savings comparisons both assume year 1 as 2024.
Source: *Appliance Standards Program (GEMS) – evaluation plan; **Appliance Standards savings estimates.

2022 estimates for overall bill savings were also lower than estimates made in 2018 (Figure 14). ARTD did not have access to any estimates of bill savings made in 2020. However, estimates made in 2022 for 2040 gas bill savings exceeded those made in 2018 (Figure 14), which relates to the fact that there were no gas savings estimates made for the commercial catering and international products streams in 2018 but there were gas savings estimates for those streams in 2022 (discussed above).

Based on current estimates, the Appliance Standards program results in larger bill savings for household products than for commercial products, and total electricity bill savings are about half what was modelled in 2018 due to the reduction of products.

FIGURE 14.   COMPARISON OF 2018 AND 2022 AGGREGATE ANNUAL BILLS SAVINGS ESTIMATES

Household bill savings

Commercial bill savings

Electricity bill savings

Gas bill savings

── 2018 estimates*   ── 2022 estimates*

Note: Values are based on calculated electricity and gas savings and are undiscounted. Greenhouse gas and bill savings comparisons both assumed year 1 as 2024.
Source: *Appliance Standards program services estimates.

O2.1 TO WHAT EXTENT HAS THE PROGRAM STREAMLINED THE DEVELOPMENT PROCESS? WHAT ARE THE KEY SUCCESS FACTORS AND CHALLENGES?

One of the outputs from the Appliance Standards program logic (Figure 2) is that streamlined processes are documented and demonstrated. From the document review, it is clear that lessons from implementation are captured, but it is **unclear the extent to which streamlining processes have been documented**. Two interviewees mentioned dropping the product profiles from the regulatory development cycle (see Figure 15 in Appendix 1) in order to accelerate the process to get to the CRIS stage, and this was confirmed in progress reports provided to ARTD by the Department.

There were **divergent views among interviewees about how and how well the program had streamlined the regulatory process**. Many felt that the Department had been able to achieve a lot, particularly in relation to the amount of human resourcing available to the Department compared to the Commonwealth. Some interviewees who felt that the program had accelerated the process questioned whether the amount of acceleration was worth the time, money and effort expended, and doubted that the program had accelerated the process as much as predicted.

Others felt that it was never the program's remit to accelerate the process, or, if it was, this expectation was unrealistic. One industry member felt that Australia (and therefore NSW) should take a 'more pragmatic approach' instead of trying to accelerate the process, expanding their investigations into other factors such as user behaviour.

Box 5. Success factors and challenges to streamlining development processes

Interviewees who did not think that the process had become streamlined cited the bureaucracy that came with having jurisdictions work under the E3 program and the Commonwealth's hesitancy to both support NSW's timeframe and adopt international standards. One interviewee felt that the original goal of the program design was to try something different than the Commonwealth's usual approach, and that this vision may have been lost throughout the life of the program.

Others felt that the interjurisdictional approach helped the acceleration in that more products can be investigated concurrently.

One of the key success factors mentioned by Department staff and industry members was having good relationships with industry peak bodies. For example, having access to complete import data (see section P1), and good relationships with industry peak bodies like NAFES accelerated the time taken to consult industry members. Some interviewees felt that adopting the international standards would have accelerated the work further.

O2.3 TO WHAT EXTENT HAS THE PROGRAM INCREASED THE CAPACITY FOR REGULATORY DEVELOPMENT WORK? TO WHAT EXTENT IS THIS CAPACITY LIKELY TO PROVIDE FUTURE BENEFIT FOR NSW?

Generally, interviewees felt that the program had built the capacity for regulatory development within the Department, but that this capacity was held within a few key program staff—**if they leave, this capacity is likely to be lost with them**. Indeed, interviewees reflected on how some program team members left during the program due to the length of their temporary contracts, leaving a temporary gap of expertise and capacity.

Recommendation 9
Develop or improve systems for skills transfer and maintenance, succession planning and handover to provide opportunities to better maintain expertise within the Department when a program ends.

There was a general sense of frustration and disappointment that the program had finished just as three products had achieved the CRIS stage. Many **interviewees felt that the program should continue** in some way to progress the CRIS' to Decision Regulatory Impact Statement (DRIS) stage, and there was a sense of uncertainty/ unease that the Commonwealth would not prioritise these products, stagnating the momentum created by the Department.

> *I think that there could be huge value in keeping the program going … I think NSW is sort of a leader in this space and it seems like, if they continued, I think that they could do great work.* [Commonwealth]

Many interviewees **praised NSW as a leader** in standards development following this program and the expertise it fostered in Department staff, urging other jurisdictions to follow in NSW's stead in developing standards for multiple products in parallel.

Box 6. Best practice and novel approaches
Some interviewees felt that the research / stakeholder consultation / data collection and analysis approaches used by NSW were stronger than those taken by the Commonwealth in the past.

For example, the Department used an approach called a **Discrete Choice Experiment** to survey consumers' preferences for domestic cooking products that are more energy efficient and how much more they are willing to pay for a more energy efficient product, providing evidence for setting a precise MEPS for the domestic cooking stream. This approach was described as robust and best practice, and interviewees commented that all E3 projects should use this approach. Another Discrete Choice Experiment was applied to the hot water systems stream to understand the impact that various energy efficiency information provision scenarios would have on the uptake of different water heater types.

These approaches reflect the Department's increased capacity for regulatory development, and they should be captured and shared should similar standards development project be funded by the Department.

As discussed in section O2.2, only three products reached the CRIS stage of the regulatory process. Despite this, many interviewees still felt that the groundwork completed by NSW was valuable for the Commonwealth and/or other jurisdictions to build on top of. Interviewees recognised that the program was somewhat exploratory—i.e., investigations would reveal whether it was indeed appropriate to develop standards for all product streams, and which ones need further investigation. It will be important for the Department to share its work, including any learnings and novel testing/ consultation approaches, with other jurisdictions who wish to carry on this work.

Recommendation 10
Maximise benefits to governments by ensuring that key lessons and innovations—including any innovations applied to streamline/ accelerate processes or novel approaches—are shared with relevant government bodies. Consider the use of an innovations/ streamlining register.

4.   CONCLUSION

Three products/ product streams have produced draft Consultation Regulatory Impact Statements (CRIS): commercial ice makers, domestic cooking appliances and commercial catering equipment. No products/ product streams made it past the CRIS development stage of the product review process, suggesting that the goal to '*develop energy efficiency standards for selected products within the four-year timeframe*' was not achieved. There was some concern among internal and external stakeholders that this goal, and the goal of streamlining/ accelerating the product review process was ambitious at best and unrealistic at worst.

However, the program faced many barriers to implementation and there was mixed feedback on the feasibility of the program design's vision to achieve standards development for selected products/ product streams in the four-year timeframe. While the program did not achieve regulation—that is, Decision Regulatory Impact Statements (DRIS) or beyond—for any of its products/ product streams, the Department did apply adaptive management strategies to help overcome these barriers. It was difficult to definitively prove that the Department had achieved CRIS' faster than the Commonwealth normally would, but many interviewees felt that the Department had completed a lot of work despite the tight timeframe and the barriers to implementation.

Stakeholder consultation was reportedly thorough and done with integrity, with industry stakeholders (those who represent manufacturers, suppliers, and retailers) mostly satisfied about the timeliness and appropriateness of their engagement. Having good relationships with industry peak bodies and access to product import data were key enabling factors to effective and efficient stakeholder engagement. There were some concerns that stakeholder feedback was not always incorporated into the program's decision-making, but this is expected given the diverse range of competing stakeholder interests in energy efficiency standards.

Electricity savings were substantially lower in 2022 compared to the 2018 forecast estimates, while gas savings were substantially higher in 2022 compared to the 2018 forecast estimates. The reduction in electricity savings estimates also meant that 2022 estimates for greenhouse gas savings were also lower than estimates made in 2018. Reductions in estimated energy savings may be related to the reduction in the number of products being considered for regulation and/or that energy savings data became more accurate as the program team conducted more research into the benefits of regulation. However, we cannot explain with certainty the primary reasons for the changes in estimates between 2018, 2020 and 2021, as it was difficult to locate sufficient documentation that described how energy, greenhouse gas and bills savings estimates were made, including modelling inputs.

At the end of the program, the Department has produced a solid foundation for the Commonwealth or other jurisdictions to build on and key staff members have increased their capacity for regulatory development work. Should the Department seek to further develop energy efficiency standards for appliances, it should ensure this capacity is retained in the Department and successful adaptive management and streamlining processes are documented and shared with new program team.

5.   RECOMMENDATIONS

Based on the findings from the evaluation, ARTD has provided ten recommendations in the table below.

TABLE 4.   LIST OF RECOMMENDATIONS

Recommendation	Rationale	Benefit
1. When designing programs, incorporate time and resources for coordinated overlap/ handover between the program design and program delivery teams.	There appeared to be a disconnect between the product stream selection decisions and the program delivery team. Without a clear linkage/ handover period, staff may struggle to understand the program's rationale and priorities.	Having this overlap would allow for those who selected product streams (policy team) to explain their rationale, providing clarity to the program delivery and management/ oversight staff.
2. When designing programs, incorporate time and resources for recruitment, including an allowance for contingency should there be delays in approvals.	The time spent recruiting the program team resulted in a delayed start, making it more difficult to achieve the program's desired outcomes in the four-year timeframe.	Building in a dedicated portion of time and resources for recruitment at the program design stage would provide the program team with a buffer to recruit a sufficient number of skilled staff. Discussion with NSW government staff revealed that new programs build in a 12-month recruitment period, and the funding cycle for CCF-funded programs was recently extended to 8 years (as opposed to 4), allowing programs more contingency if recruitment takes longer than expected.

Recommendation	Rationale	Benefit
3. Clearly define governance structures and responsibilities between the Commonwealth and NSW Government from the outset.	There was some confusion among interviewees around the various responsibilities between jurisdictions and who was responsible for making the final decisions, and some concern that the Department was constrained by the Commonwealth's process requirements, limiting their ability to achieve standards development within the four-year timeframe.	Articulating what should be embedded knowledge would allow the program team to better understand how to work within/ to Commonwealth structures. Defining the expectations between both the NSW and Commonwealth governments may expedite the product review stage from draft CRIS development to consultation to DRIS development and so on.
4. Consider establishing a secondment arrangement, where a NSW government employee works in the Commonwealth E3 program team and/or vice versa.		Having a NSW government staff member work in the Commonwealth would provide program delivery staff with a better understanding of the Commonwealth's culture and how to navigate the Commonwealth's processes and governance structure. Following the secondment, program delivery staff may also have stronger connections with Commonwealth staff, helping to progress priority actions. Having a Commonwealth staff member work in the NSW government would enable the Commonwealth staff to gain a deeper understanding of the complexities of program implementation at the state/ territory level. Ultimately, a secondment arrangement and clear governance arrangements between the Commonwealth and NSW government will likely make collaboration easier.
5. Ensure decisions around changes to program scope, such as product stream selection or decisions not to pursue standards development, are clearly communicated to stakeholders in line with E3 guidelines.	One industry member was very dissatisfied that they were not informed when products they represented were dropped from the international package. One of the key success factors for streamlining stakeholder communication and data access was having good relationships with industry peak bodies.	Ensuring a continuum of communication will help maintain positive relationships with industry peak bodies, therefore securing a vital success factor. This recommendation acknowledges that only the E3 program has the authority to make decisions about product stream selection and so communication may occur through the E3 program.

Recommendation	Rationale	Benefit
6. Formally establish regular collaborative arrangements with all key collaboration partners. These may be as formal as developing an MoU and establishing Terms of Reference, or as informal as instating half-hour catch-up meetings.	Some Department staff explained that there was not a formal arrangement between the Department and the office of the GEMS Regulator, at least not for all product streams. While the Department's engagement with the office of the GEMS Regulator was more ad hoc, it ultimately evolved into a mutually beneficial exchange of ideas, particularly towards the end of the program.	Formalising regular arrangements with key collaboration partners would ensure that the benefits of collaboration (i.e., mutually beneficial exchange of ideas, learnings, implications of regulation/ program findings) are gained from the outset.
7. Costs and benefits modelling should document the sources of the data, relevant assumptions and methodologies, and any research justifying the assumptions, parameters, and inclusions or exclusions of different components. Where there are data limitations, there should be a written explanation of those limitations, the reasons for them, and how they have been addressed, etc. Documentation should be kept in a central place, referred to in the modelling spreadsheet, and should be communicated to new team members as team turnover occurs.	During this evaluation, it was difficult to locate sufficient documentation that described how energy, greenhouse gas and bills savings estimates were made. Without clear proof of the savings modelling inputs, it was difficult to explain with certainty the primary reasons for the changes in estimates between 2018, 2020 and 2021.	Ensuring that inputs into costs and benefits modelling are archived and are easily accessible will enable the Department to better communicate how and why savings estimates change. This will better enable accountability and will improve messaging to key stakeholders, such as industry peak bodies (see recommendation 8 below).

Recommendation	Rationale	Benefit
8. Ensure that the uncertainty and limitations regarding energy, greenhouse gas and bill savings modelling are clearly communicated to key stakeholders, including industry peak bodies and the general public.	As a result of the program's investigations to develop regulations and understand the costs and benefits of potential policy options, models became more accurate over time, and appliances may be removed from product streams or form their own product streams. There was some concern among industry members that energy savings estimates are used to promise good outcomes and get programs funded/ regulate more products but are not representative of the actual savings generated from standards development. It is possible that these views are related to industry stakeholders feeling overregulated by government.	Clearly communicating the limitations and uncertainty of energy, greenhouse and bills savings models will help manage stakeholder expectations.
9. Develop or improve systems for skills transfer and maintenance, succession planning and handover to provide opportunities to better maintain expertise within the Department when a program ends.	As a consequence of funding ending, many interviewees were concerned that staff capacity for regulatory development would be lost as staff move on to other programs. Many felt it would be a shame to lose this expertise. Interviewees reflected on how some program team members left during the program due to the length of their temporary contracts, leaving a temporary gap of expertise and capacity.	Should the Department wish to continue its work to date under the E3 program or implement similar standards development projects, it is vital that the internal expertise developed during this program is retained or, at a minimum, shared with other staff. Improving or developing systems to maximise skills transfer, enable succession planning and handover should staff leave would enable expertise to be indirectly maintained.

Recommendation	Rationale	Benefit
10. Maximise benefits to governments by ensuring that key lessons and innovations—including any innovations applied to streamline/ accelerate processes or novel approaches—are shared with relevant government bodies. Consider the use of an innovations/ streamlining register.	Despite only three products reaching CRIS stage, many felt that the groundwork completed by NSW was valuable for the Commonwealth and/or other jurisdictions to build on. The Department used an approach called Discrete Choice Experiment (DCE) during consultations to understand the impact that various energy efficiency information provision scenarios would have on the uptake of different water heater types. This approach was described as robust and best practice, and interviewees commented that all E3 projects should use this approach. It will be important for the Department to share its work, including any learnings and novel testing/ consultation approaches, with other jurisdictions who wish to carry on this work. From the document review it was unclear the extent to which streamlining processes were documented. It was difficult for ARTD Consultants to definitively assess whether the Department had achieved CRIS faster than the Commonwealth normally would, and which strategies were responsible for this streamlining.	By improving internal knowledge capture and sharing systems, the Department will be better able to continue standards development programs should staff with expertise change roles or leave. Sharing any novel approaches and best practice will benefit all jurisdictions participating in the E3 program. This would also help reduce the duplication of effort among participating E3 jurisdictions. Clearly documenting innovations in streamlining processes—through a register or some other means—would benefit all jurisdictions participating in the E3 program, supporting a collaborative and transparent approach to innovation. This may also help any future evaluations better determine the extent to which the Department has streamlined processes and support the development of business cases for future programs.

APPENDIX 1. PRODUCT REVIEW PROCESS

The E3 work plan establishes the strategic direction of the E3 Program and provides a priority listing of products proposed for investigation. There are six stages in the product review process (Figure 7).

A new product can take many years (typically three to six) to progress through the stages from development of the policy parameter to the commencement of regulations, depending on the product complexities. The process is typically quicker when updating a regulated product, than when reviewing and assessing a new product to regulate.

1. **Policy parameter paper development**
    a)   This is the draft plan that will inform the CRIS and allow EEAT to review and agree on the scope of the work and deliverables. It should describe the product to be regulated and address the project rationale, authorisation, outcomes, objectives and stakeholders. The scope must be linked to and build on the information provided in the E3 work plan. The paper will be for internal use.

2. **Technical issues paper development**
    a)   This is a technical discussion document for public release to explore the potential for implementing MEPS, labelling, or other policy interventions for a product. It should discuss the role of the E3 Program and the rationale for policy action; provide an overview of the market; consider the coverage and scope; provide an overview of the test methods and standards currently in use; and consider the effects of imposing regulation, such as registration and standards. Broad stakeholder questions should be posed that would provide better information to profile the product. It is developed in parallel with the CRIS.

3. **Consultation regulation impact statement development**
    a)   A CRIS is a means to examine the costs and benefits of introducing or updating energy efficiency regulations for a product and should be developed in parallel with the technical issues paper. It informs the ongoing stakeholder consultation process and is intended to focus the debate on regulating the product. During this process, new data or information often becomes available and will feed into the next step, the decision RIS. Before preparing a CRIS, government agencies are required to contact OBPR to seek advice on whether a RIS is required for decisions made by COAG councils. A RIS is required for proposals that are expected to have a regulatory or compliance effects on businesses or individuals or change the way that individuals or businesses do business.
    b)   Known stakeholders should be advised by email of the document's release. The project manager should alert stakeholders to the release of the consultation RIS by working with industry associations and advertising in trade and specialist publications. Feedback should be sought from a range of stakeholders, including retailers, other suppliers, consumer groups and other interested stakeholders.
    c)   A policy paper update should be released following consultation on the RIS and prior to commencing the decision RIS. The paper should provide any extra technical detail and changes to the E3 Program policy positions. The final policy

decisions should draw on consultation RIS submissions, stakeholder consultation meetings, industry meetings and the technical and policy advisory groups.

4. **Decision regulation impact statement development**
   a) The purpose of a final RIS for decision makers is to draw conclusions on whether regulation is necessary, and if so, on what the most efficient and effective regulatory approach appears to be, taking into account the information gathered through the consultation process. The DRIS is based on the CRIS. It should include issues raised, discussed and resolved during the CRIS stage, incorporating a list of stakeholders consulted and a summary of their views.

5. **GEMS determination implementation**
   a) Regulation of a product can occur once the decision RIS is endorsed or approved by the COAG Energy Council and the New Zealand Cabinet. The legal instrument used to impose regulations under the GEMS Act in Australia is a determination signed by the Commonwealth Energy Minister. This determination may contain all the detailed requirements applying to a product, or it may call up one or more Australian and New Zealand standards (AS/NZS) or international standards.
   b) Stakeholders affected by the regulations must be advised that the determination has been signed and advised when the regulations will commence. The project manager will need to work with the GEMS Registration and Outreach and Energy Efficiency Compliance teams to develop communications and guidance material for stakeholders to inform them of the new regulations to be introduced.

6. **Compliance and evaluation**
   a) The GEMS Regulator is responsible for monitoring and enforcing compliance with the GEMS Act. The Regulator is assisted by GEMS inspectors who use inspection, monitoring and investigation powers provided by the GEMS Act to monitor and investigate supplier compliance. The GEMS Regulator: assists responsible parties to understand the requirements of the GEMS Act; monitors responsible parties' compliance with the requirements; and actively pursues those who opportunistically or deliberately contravene the Act.
   b) An annual compliance plan is to be prepared and then compliance activities are conducted. There are ongoing evaluation processes, compliance and energy efficiency impact analysis. Ongoing program evaluation occurs to assess the effectiveness of MEPS and product energy labelling regulations.

FIGURE 15.   SUMMARY OF THE SIX PRODUCT REVIEW STAGES, PROCESSES AND APPROVALS
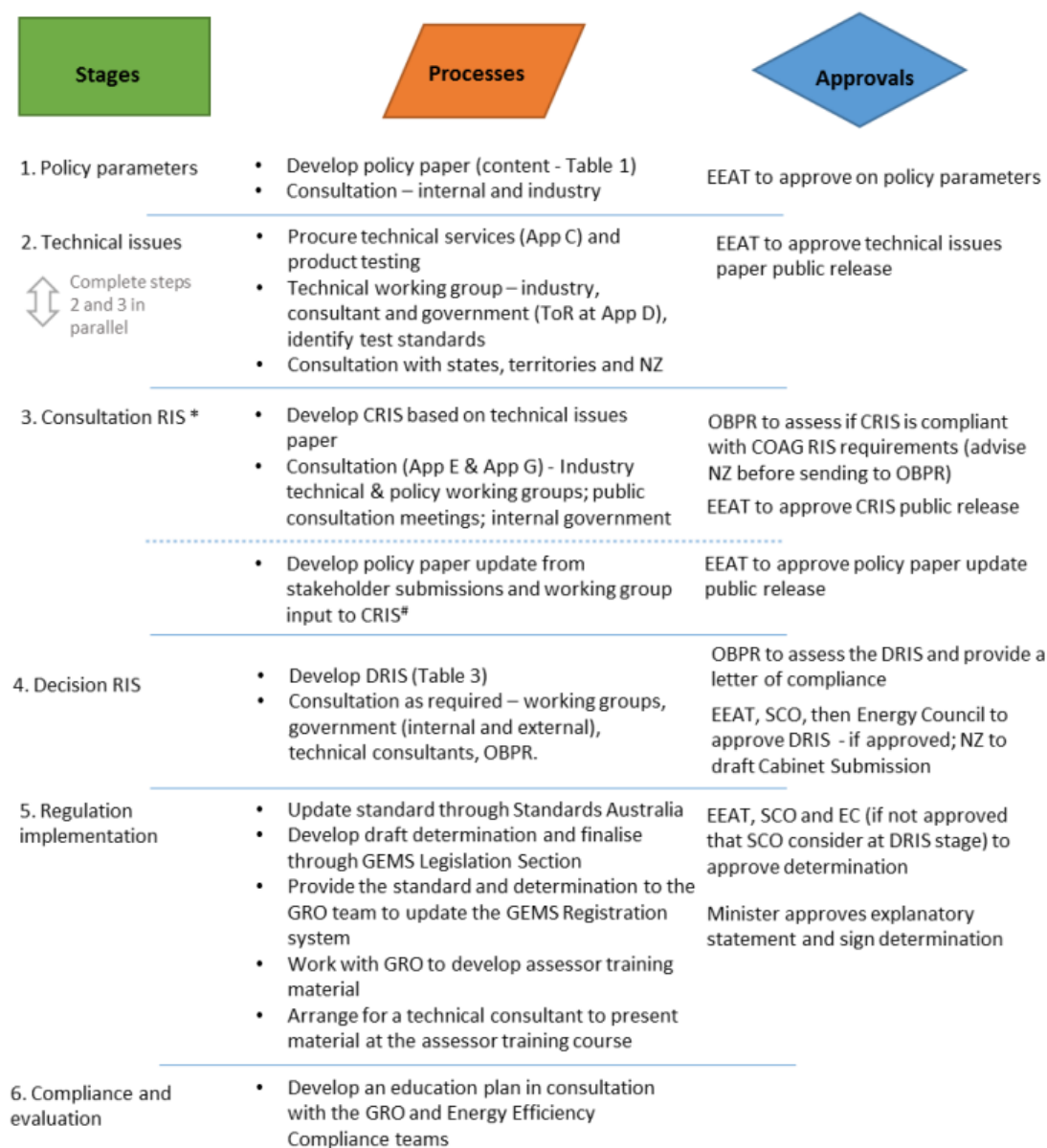
* Before commencing the CRIS engage with OBPR – provide a problem statement to determine if a RIS is required and to demonstrate why policy action may be necessary.
\# There may be several rounds of policy paper updates, depending on the complexity of issues raised during public consultation.
Source: E3 GEMS Product Review: Guidelines to introduce minimum energy performance standards and labelling.

APPENDIX 2. COMPARISON OF SAVINGS ESTIMATES MADE IN 2018 AND 2022

When comparing 2018 and 2022 energy savings estimates from 'year 1' of savings onwards, the following was found:

TABLE 5.   COMPARISON OF SAVINGS ESTIMATES MADE IN 2018 AND 2022

Stream	Comparison of savings estimates made in 2018 and 2022
Total savings	• Overall estimated **energy savings** are 22% lower than 2018 forecast estimates at year 5 and 20% lower at year 10 but start to beat 2018 estimates from year 14 onwards. • 42% reduction of overall estimated **electricity savings** at year 5 and year 10 of program delivery. 2022 estimated electricity savings begin to beat 2018 forecast estimates from year 16 onwards. • 38% increase in estimated **gas savings** at year 5 of delivery and 40% increase at year 10.
Hot water systems	• No change in **electricity or gas savings** estimates for year 1, year 5 or year 10 of program delivery as compared with 2018 estimates. • By year 15, there is a 50% reduction in predicted **electricity savings** as compared with the 2018 estimates.
Commercial catering	• 63% reduction of estimated **electricity savings** at year 5 of program delivery, 34% reduction by year 10 and 186% increase of estimated electricity savings by year 15. • Increase of estimated **gas savings** from 0 GWh/yr to 147 GWh/yr at year 5, 314 GWh/yr at year 10 of delivery and 417 GWh/yr by year 15.
Residential heating	• No change in **electricity or gas savings** estimates for years 1, 5, 10 or 15.
International products	• 67% reduction of estimated **electricity savings** at year 5 of delivery, 66% reduction by year 10, and 21% reduction by year 15. • Increase of estimated **gas savings** from 0 GWh/yr to 7 GWh/yr at year 1 of program delivery and 37 GWh/yr at year 5 of program delivery.