



**Product Stewardship
Program**
5 year review

2007
2012



Vinyl Council Australia



Executive Summary

The PVC industry Product Stewardship Program ('the Program') is an initiative developed by the industry to characterise and address environmental impacts of the PVC product life cycle. It commenced in October 2002 and has now been operating for over ten years. The implementation and effectiveness of the Program were first reviewed in 2007. The Vinyl Council, with input from stakeholders, has undertaken this second 5 year review to:

- **evaluate Program effectiveness**, focusing on the past five years;
- **identify future challenges** for PVC industry product stewardship; and
- **propose recommendations** for ongoing Program development.

Signatories have made effective and measurable progress since the implementation of the Product Stewardship Program in 2002. Through the past five years, the following milestones have been achieved:

- phasing out of lead-based stabilisers;
- substitution of lead, cadmium and hexavalent chrome pigments where technically and commercially feasible;
- increasing the number of Signatories that implement Environmental Management Systems for their operations;
- introducing, continuing or developing recycling programs for various post-consumer waste such as bottles, pipe, flooring, medical waste;
- commencing the implementation of an industry-wide recycling strategy to address systemic issues; and

- extending existing commitments and developing new ones.

The make-up of the Signatory base has changed, with a larger proportion of businesses importing PVC products, and more small businesses. While Signatories have broadly confirmed the applicability of the Program commitments, the consensus on the practicality of many commitments is not as clear cut, reflecting the change in Signatory activities. In general, our feedback suggests that Signatories value the following from the Program:

- a unified voice for the industry;
- the recognition and credibility that comes with involvement in the Product Stewardship Program and an audited annual progress report; and
- opportunities to exchange information with stakeholders on the environmental credentials of PVC.

Traditionally, product stewardship has focussed on end of life issues. There is a growing trend, however, to consider the life cycle of products. The Australian PVC industry Program's focus has always been on the product life cycle, including design. This appears to be reinforcing the credibility of the Program among other industries and the public.

Probably the most important indicator of the effectiveness of the Program over the past five year period has been the reference to it by the Green Building Council of Australia is reviewing the life cycle of PVC products.

The GBCA reported that:

"Australian and European PVC manufacturers appear to be successfully addressing the minimisation of health

risks associated with PVC building materials through a combination of their current practices, commitments to improving practices, and their recent achievements pertaining to PVC production and end of life PVC product management” (GBCAb, 2010, pg 23).

The progress made by Signatories against the commitments of the Program provides a strong foundation for the future. Nevertheless, the Vinyl Council and industry participants recognise that this is a journey and both the Program and the industry need to evolve to meet current and future challenges.

Table 1 summarises all recommendations arising from the 5-year review. Each recommendation is rated in terms of priority and with an indicative timeframe for completion. The intention is to update and strengthen the Program to ensure it deliver effective improvements in an open and transparent way. Where possible, we aim to increase the value of the Program to all Signatories to encourage engagement and expanded Program membership.

The Program will remain a relevant mechanism for the achievement of the industry’s sustainability goals. It remains an effective way to provide information to Signatories and stakeholders and report on progress.

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Table 1 Summary of all Recommendations

Recommendations	
<i>Strengthen the shared understanding of Program purpose and commitment objectives among all Signatories.</i>	<i>Revise the Program structure</i>
<i>Keep commitments up-to-date with Signatories' progress and current industry standards through either discontinuing commitments that have been met, updating targets or creating new commitments.</i>	<i>Clarify commitment compliance requirements for specific groups of Signatories according to business type.</i>
<i>Strengthen the waste management commitment to meet stakeholder expectations.</i>	<i>Streamline the annual progress reporting.</i>
<i>Continue to build the Resource section of the members/Signatories website</i>	<i>Standardise the commitment update process.</i>
<i>Revise Technical Steering Group Terms of Reference to reflect the current practice and governance standards.</i>	

Scope

This report aims at evaluating the following points:

1. the effectiveness of the PVC industry Product Stewardship Program in achieving its stated objectives;
2. stakeholders' feedback and attitudes to PVC sustainability and product stewardship;
3. current policy trends related to product stewardship, waste, climate change and energy;
4. current trends with regards to product stewardship, and comparison of the PVC industry Program with other product stewardship programs;
5. assessment of the commitments by the Signatories against key criteria: appropriateness, commercial feasibility, practicality, and impact;
6. assessment of the waste management commitment;
7. analysis of Signatory feedback on the value of the Program;
8. assessment of Program governance, including a review of the TSG Terms and Reference and compliance with Australian Competition and Consumer law; and
9. assessment of foreseeable future challenges.

Based on this information, implications for the future of the Program have been identified and recommendations formulated throughout the report.

Program Effectiveness

Since the Program commenced in 2002, Signatories have made significant and measurable improvements with regards to the environmental, health and safety aspects of the PVC life cycle. The Program has encouraged progress in manufacturing best practice, safe and sustainable additive use, and initiated end-of-life recovery and recycling programs. Program effectiveness is assessed in relation to the following five commitment areas:

1. production and storage;
2. safe and sustainable use of additives;
3. waste management;
4. public reporting and engagement; and
5. program development.

Production and storage -

The purpose of this commitment area is to improve environmental and health aspects of the manufacturing of PVC and PVC products. It relates to both local resin, compound and product manufacturers, as well supply chains for imported resin, compound and products.

Key Review Findings:

- An increasing number of Signatories have Environmental Management Systems (EMS). A total of 14 Signatories reported ISO accreditation in 2012, up from 5 in 2005. A total of 28 Signatories currently meet the industry Minimum Acceptable Standard for environmental management under the EMS commitment.
- Vinyl chloride monomer emissions from the local resin manufacturer have been maintained below the 30

g/tonne voluntary commitment standard.

- A new commitment has been introduced in the form of a charter to improve energy efficiency and greenhouse gas management. Although in its first year of implementation, Signatories have undertaken a wide range of energy efficiency measures in manufacturing operations, warehouses, offices, and vehicle fleets, and improving the energy and carbon profile of PVC products.
- A new commitment to avoid the use of mercury in the supply chain in the form of mercury cell-derived chlorine and/or mercury catalysts has been introduced.

The safe and sustainable use of additives

Two commitments in the program relate to additive use: one in respect of heavy metal stabilisers and the other in respect of plasticisers. Signatories also commit to Life Cycle Thinking in development of new products and to disclose openly to stakeholders and customers upon request the substances used in their products.

Key Review Findings:

- The voluntary commitments in respect of heavy metal stabilisers have been effective in encouraging and supporting industry to substitute with alternative stabiliser systems.
- The use of lead based stabilisers by existing Signatories was phased out by the end of 2012. A new Signatory to the program in 2012 has been using lead stabilisers but under the

Program, commits to phase them out.

- The substitution of cadmium, lead and hexavalent chrome based pigments where technically and commercially feasible has been virtually completed. An alternative for one particular application remains to be sought.
- The Policy on the safe use of plasticisers has been broadly adhered to and the science related to phthalate plasticisers has been closely monitored.

Waste management

The objective of the waste management component of the program has been to encourage improved industry practices in term of diversion of waste from landfill by manufacturing operations, and product stewardship in terms of taking responsibility for their products at end of life.

The work undertaken by the Vinyl Council, Signatories and other PVC industry organisations provides a strong basis for ongoing waste avoidance and increased recycling. The current waste management commitment covers:

- *Waste Packaging:* Signatories from the PVC packaging supply chain are required to be signatories of the Australian Packaging Covenant (APC).
- *Recycling:* Implementing the Vinyl-2-Life Action Plan. This plan was launched in 2006 but has now been superseded by the Vinyl Industry Recycling Strategy.
- *Encouraging Consumer Responsible Care:* providing information to end consumers on management options for PVC products at end-of-life.

- *Life Cycle Thinking:* to consider the whole-of-life, including additives and end of life, when developing new PVC products.

Key Review Findings:

- The rates of recovery of PVC bottles through kerbside collections have improved through the Vinyl Cycle Program.
- The Vinyl-2-Life action plan for key PVC waste streams has had mixed success in improving recovery of different PVC applications. Much of the work was implemented by the Vinyl Council with limited Signatory involvement at times.
- A whole of industry strategy to advance PVC recycling practice in Australia by addressing some of the systemic issues identified under the Vinyl-2-Life plan has been formulated with broad stakeholder consultation. It is now being implemented by a working group comprised of industry representatives.
- Life cycle thinking continues to be demonstrated by some Signatories.
- Most Signatories in manufacturing actively engage in waste minimisation strategies including diverting increasing volumes of packaging waste from landfill as well engaging in more recovery and recycling of PVC waste.
- The voluntary commitment under the Program has no targets or specific measures of progress and reporting of activities by Signatories under the commitment is not mandatory. The current optional reporting does not capture all of the industry activity being undertaken. It is therefore difficult to provide any consistent measure of progress or to compare year-on-year progress.

- Waste management is seen by external stakeholders as of high and increasing importance, and reporting against quantitative targets is considered normal practice.
- The regulations related to the APC now cover a broader range of businesses, covering business to business packaging use and disposal. As a result, the approach in the PVC Program commitment is under review to provide a mechanism to support other Signatories with obligations to meet the APC requirements.

- Other PVC product stewardship programs such as VinylPlus in Europe, and the South African program, have quantitative targets for recycling (see pages 17).

Mandatory reporting of waste management would enable the industry to present a complete picture of recycling performance, including ongoing improvements. Table 2 below provides an example of possible format of targets, to be agreed with Signatories.

Table 2 Example of Waste management target format

Lifecycle step	Target aim	Target
<i>On-site manufacturing</i>	Manufacturers	XX% by end 2017
	Compounders	XX% by end 2017
	Converters	XX% by end 2017
<i>Post-consumer PVC recovery (installation & end-of-life)</i>	Rigid PVC industry	XXX,XXX tonnes by 2017
	Flexible PVC industry	XXX,XXX tonnes by 2017
<i>Waste packaging</i>	Packaging industry & business to business packaging Signatories	70% by end 2015 (consistent with APC target)
		Review life cycle assessment for all packaging used by 2017
<i>Broader life cycle thinking for improvement of waste management</i>	All members	Implement LCT for all new PVC products developed, including design recyclability, design for disassembly etc

In Australia, PVC recycling initiatives may be industry wide programs or run by individual companies. An overall quantitative target could cover all recycling initiatives, while allowing each Signatory the operational flexibility to manage waste and recycling as best suits their business. There may be advantages in separate approaches for manufacturing waste, which is reprocessed as standard practice, perhaps reporting the percentage of manufacturing waste reprocessed or recycled, due to

sensitivities in reporting manufacturing data.

Feedback from the GBCA (see page 18) suggested a need for education provision to the building industry on the recyclability of PVC. This is consistent with the general Global Product Stewardship Council recommendation that product stewardship include consumer education.

Public reporting and engagement

Reporting progress and developments and openly discussing the life cycle of PVC have been key parts of the Program since its inception. Stakeholder representatives continue to participate in the Technical Steering Group and provide the industry with guidance and encouragement.

Key Review Findings:

- Progress against commitments is publically reported annually and both reports and Signatories have been verified by an independent auditor since 2007.
- External stakeholders participated in information sessions held in 2008, 2009, and 2012, enabling constructive dialogue about progress and future developments.
- Up to date information about the health and environmental aspects of the PVC life cycle have been included in the annual reports eg scientific developments related to plasticisers and alternative stabilisers.

Program development

The Program commitments have been continuously reviewed and updated. Over the past five years, the following new and

revised commitments have been incorporated:

- In 2007:
 - substitution of lead, cadmium and hexavalent chrome pigments where technically and commercially feasible by 2010;
 - open disclosure of product ingredients;
- In 2008: a requirement to embed Program commitments in Business Management Systems;
- In 2009: a lower emissions standard of 30g Vinyl Chloride Monomer per tonne of PVC resin for local S-PVC manufacture;
- In 2010: mercury avoidance in production processes in the supply chain;
- In 2011: new production standards for emulsion PVC manufacturing; and
- In 2012: an Energy Efficiency and Greenhouse Gas Charter.

This process was informed by feedback from Signatories, government departments and agencies, external stakeholders and the independent auditor of the annual report.

Implications for the Program

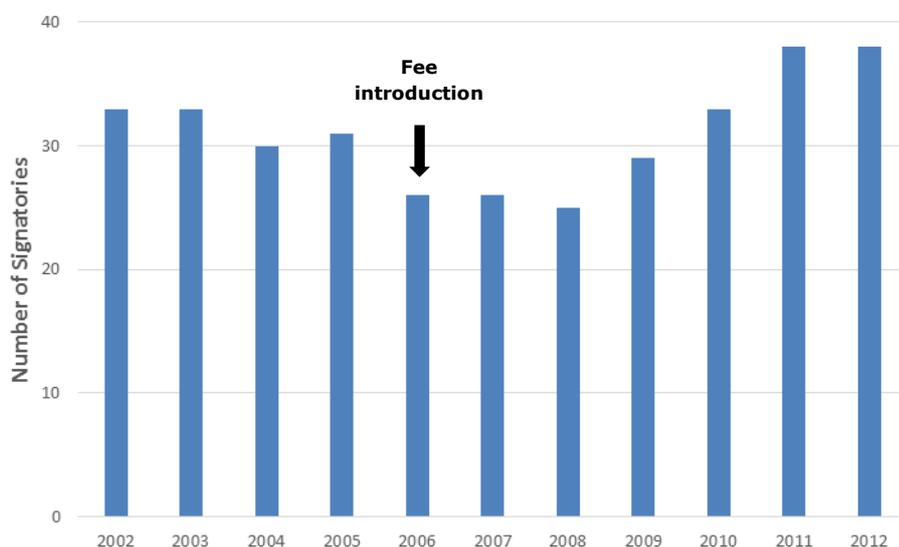
- Continue to revise existing commitments where significant progress has been made.
- Develop a policy and procedures for introducing new commitments
- Include a commitment on mandatory reporting of waste information.
- Define quantitative targets to comply with by the end of the next 5 year period.
- Separate commitments for production waste and post-consumer waste.
- Explore development of APC equivalent commitments related to packaging waste
- Educate the building industry on the recyclability of PVC.

Industry Engagement

Signatory participation

When launched in 2002 the Program had 33 Signatories from across the Australian PVC supply chain. Signatory numbers dropped to 25 in 2008, reflecting the impact of the fee introduced in 2006, as well as cessation or mergers of PVC-related businesses. Other Signatories have left the program due to formation of other industry groups, or a focus on individual business needs. One company was de-listed from the Program in 2011 due to repeated non-reporting. However increased involvement, particularly from companies in the flooring and windows sectors, boosted Signatory numbers to 38 by the end of 2012, and 39 by mid-2013, as shown in Figure 1.

Figure 1 Signatory Participation



The make-up of the Signatory base has changed as described below.

- **Importers:** There is an increased proportion of Signatories importing finished or semi-finished goods, with little or no manufacturing in Australia.

These Signatories tend to have more complex overseas supply chains, with commensurate difficulties in obtaining, reporting and verifying manufacturing data. The relevance of manufacturing and storage commitments as they may relate to their upstream suppliers is not as well understood by some of these Signatories.

- **SMEs:** There is an increased number of small businesses. These businesses generally do not have specific environmental staff, and limited resources to apply to implementation of Program requirements. Feedback indicates that meeting commitments and reporting requirements is daunting for these Signatories, who perceive the Program as geared towards larger businesses.

- **Value chain gaps:**

There remains an ongoing lack of Signatories from the recycling sector. While existing Signatory businesses have established recovery and recycling programs, businesses with a sole focus on recycling have chosen not to formally join the Program. This state of affairs is not changing despite

the fact that these businesses work closely with the Vinyl Council and some Signatories on particular programs, and despite competitive Vinyl Council membership offers. Necessary for the ongoing sustainability of the industry, this group is included in activities and

supported by initiatives such as links on the Vinyl Council web-site. However these companies essentially behave as free-riders to the Program.

Signatories' Views on the Program

Signatories were surveyed between December 2012 and February 2013, in conjunction with the 2012 annual reporting. Of the 34 Signatories surveyed, 24 responses were received, a response rate of 71%. Newer Signatories were less likely to respond to the survey. Some Signatories did not respond to all questions, focusing on those most relevant to them.

The importance of a unified voice for the industry, the recognition and credibility that comes with involvement in the Product Stewardship Program, an audited annual progress report, and the opportunities to present the environmental credentials of PVC were themes emerging from the recent Signatory survey.

On Program changes, Signatory recommendations included reductions in the compliance and reporting burden, particularly for small businesses, and development of generic tools. Additional promotion of the environmental credentials of PVC and of the Program were also suggested. Involvement of the whole industry is desired.

The survey also revealed that of Signatories responding:

- 100% believe the Product Stewardship Program is a responsible industry response. (2007 result: 78%)
- 74% believe government recognition / support is important. (2007 result: 89%)
- 96% believe an industry Product Stewardship Program is more credible

than individual company programs. (2007 result: 83%)

- 74% believe whole of life thinking is important to their organisation. (2007 result: 78%)

Commitment assessment

Signatories were surveyed and asked to rate current Program commitments based on appropriateness, practicality, commercial feasibility, and impact, on a scale of 1 (low) to 5 (high), in line with the 2007 review. These terms are defined as:

Appropriateness: how successfully the commitment addresses the environmental issue, including the proportionality of the commitment to risk.

Commercial feasibility: the degree to which the commitment can be implemented and achieved, whilst maintaining the viability of the business.

Practicality: the extent to which the commitment can be tracked, monitored, measured and reported on.

Impact: the degree to which meeting the commitment will make a significant difference to the environmental performance and/or life cycle impact of the industry.

Assessment analysis

Almost all commitments achieved averaged ratings of three or above for appropriateness, commercial feasibility, practicality and impact. Exceptions to this were:

- the commercial feasibility, practicality and impact of participation in the Australian Packaging Covenant;
- the impact of the emulsion PVC residual VCM standard; and
- the practicality of the Vinyl Industry Recycling Strategy.

Whilst the results indicate broad support for Program commitments, it has been observed that, on average, Signatories rate the appropriateness and impact of the commitments at a lower level than in 2007. In addition, many commitments were given a low rating during the 2012 survey by single or a small numbers of Signatories. This appears related to the lower relevance of particular commitments to these businesses. The variation in results from Signatories could indicate a lower shared understanding of the Program purpose and its commitments objectives, in comparison to 2007.

Figure 2 summarise the average results of the survey. It shows general trends in the feedback provided by Signatories. First, it appears that all commitments are generally supported by Signatories, with average ratings ranging between 3.4 and 4.5. The appropriateness of commitments is generally rated higher than other aspects, with ratings ranging between 3.8 and 4.5. The three other aspects are rated in a similar way.

The commitment on the use of lead and cadmium is the most supported by Signatories. This finding is consistent

with the progress observed in this area. A number of Signatories commented that the phase out and avoidance of toxic heavy metals was the most important aspect of the Program to their business. For all four criteria (appropriateness, commercial feasibility, practicality and impact), the Signatories have rated the commitment between 4.1 and 4.5 on average.

Following this broader review of feedback, a more detailed analysis has been undertaken, commitment by commitment, which highlight the following findings.

1. Pigment policy and pigment substitution rated highly, averaging above 4 for all aspects except for the practicality of pigment substitution, rated at 3.9.
2. Signatories supported the appropriateness of monitoring overseas developments related to lead and cadmium use and open disclosure of product ingredients to address the environmental issues related to additive use.
3. For production and storage, the highest ratings (averaging 4 or above) were given to the appropriateness of

Figure 2
Average survey results



environmental management systems and mercury avoidance commitments, and comments noted the importance of residual VCM standards, mercury avoidance and energy management for particular businesses. However, concern was expressed about the achievability of commitments for some importers of PVC products, such as mercury avoidance for European based manufacturing over which they have little influence and little ability to switch suppliers. The limited practicality in obtaining residual VCM data for PVC resin used to manufacture imported products was also highlighted.

4. The appropriateness and impact of recycling, in particular the Vinyl Industry Recycling Strategy, the appropriateness of monitoring overseas developments and of life cycle thinking were also rated at 4 over above. In contrast, the practicality of the Vinyl Industry Recycling Strategy was rated lower, at 2.9. Some Signatories commented on the importance of resource

management through production efficiency, packaging selection and recovery and recycling action. In general, Signatories gave lower ratings to participation in the Australian Packaging Covenant, which to date has only been applied to Signatories in the PVC packaging supply chain.

5. Several Signatories commented on the importance of credible reporting in demonstrating measurable industry progress and this commitment received average ratings of 4 or more for appropriateness and commercial feasibility. Some comments outlined difficulties faced by small businesses in meeting reporting requirements. The appropriateness of the 5 year review process was confirmed.
6. Higher ratings (averaging 4 or above) were also given to the appropriateness of commitments related to plasticiser policy and sharing information with NICNAS and monitoring and sharing research.

Implications for the Program

- Strengthen shared understanding of Program purpose and commitment objectives.
- Keep the induction procedure on-going for new Signatories to support shared understanding. Refresher sessions could be considered for other businesses.
- Review and revise existing commitments, to improve clarity, limit the compliance burden, and enable streamlined reporting requirements, while maintaining environmental objectives.

Implications for the Program (cont.)

- Undertake ongoing 5 year reviews.
- Ensure that commitment standards are achievable by small businesses and companies with complex supply chains.
- Improve the data survey to facilitate reporting and reduce errors.
- Continue to develop the Signatories' resource section of the Vinyl Council website, with implementation tools such as generic policies, procedures and templates suitable for use by small businesses and Signatories with complex supply chains.
- Encourage all Signatories to promote the environmental credentials of PVC, and their participation in the Product Stewardship Program.

Trends

Policy trends

Regulatory approaches have moved from a largely "command and control" style of regulation where the government sets and enforces standards with penalties for non-compliance, to include a range of regulatory mechanisms including market based schemes, information and incentives, community participation, and collaborative programs such as product stewardship.

Environmental issues are increasingly understood as integrating a range of aspects, including environmental and socio-economic considerations. Waste management, for example, is defined as relating to pollution, resource efficiency and product design.

In this context, programs such as product stewardship offer effective solutions. In other areas international policies and agreements influence domestic developments. This is typically the case for climate change and chemical regulation. These trends are expected to deepen, potentially entailing increased

complexity for businesses, industry associations, and programs such as the PVC industry Product Stewardship Program.

The following paragraphs summarise our understanding of these trends on both a national and state level.

Policy trends

Past specific policy and regulatory developments relevant to the Program have included:

- the National Waste Policy;
- the Product Stewardship Act 2011;
- Clean Energy Future;
- Australian Packaging Covenant; and
- NICNAS risk assessments of phthalates.

The National Waste Policy indicates the increased significance of waste at the national level over recent years, and targets the use of product stewardship to achieve waste objectives. A continued focus remains dependent on Commonwealth government priorities.

However, the Product Stewardship Act 2011 now provides a national legislative framework encompassing voluntary, co-regulatory and fully regulated schemes for product stewardship, depending on the particular product. This was the first time that the Commonwealth has used its powers to step into the product stewardship space. It offers the significant advantage of being able to deal with product stewardship at the national level rather than through a more complex, and potentially conflicting, state by state approach.

Regulation of a particular product under the Product Stewardship Act will continue to involve detailed national 'regulatory impact statements' into the future, with strong cost/benefit outcomes to justify regulation. A list of products to be considered for mandatory product stewardship was published by the Department for Environment and includes waste architectural and decorative paint, end-of-life handheld batteries, packaging, and-of-life air conditioners and refrigerators. The list is expected to be updated every year under the Product Stewardship Act 2011 (Department of the Environment, 2013).

Voluntary product stewardship schemes will continue, with the industry or business involved choosing whether to apply for accreditation under the Product Stewardship Act. Some businesses are seeking opportunities to enhance their broader business value by taking responsibility for their products and are establishing individual voluntary product stewardship initiatives, rather than acting with an industry as a whole. Similarly, some retailers have established consumer 'take-back' arrangements at their stores as part of their business

model (and not solely for their own products).

States also continue to develop waste strategies and policies, with waste-related targets often partnered with 'waste levies', which aim to divert waste from landfill to recycling and which can provide a source of funding for waste prevention / recycling / litter / illegal dumping programs. National and state legislation and regulation for packaging waste now extends to business to business packaging.

The community continues to understand and value recovery of scarce resources from 'waste'. This translated into a demonstrated and quantified 'willingness to pay' for recycling of TVs and computers, and the Decision Regulation Impact Statement for TVs and Computers 2009 therefore found a net benefit to the community of a national product stewardship scheme for that equipment. The willingness of the community to pay for recovery and recycling of other products and materials remains a future challenge.

On climate change, the Australian Government committed to reducing its emissions by between 5 and 15 - 25 per cent below 2000 levels by 2020. National and state based programs have been established to support businesses realise energy savings and greenhouse gas emission reductions. Since September 2013 and the change of government, policy with regards to climate change has shifted. The Coalition government is planning on abolishing the Clean Energy Futures policy by July 2014, to be replaced by a "Direct Action Plan" [Department of the Environment, 2013a]. Further details on the new policy are still to be revealed.

Implications for the Program

- Product stewardship will remain a relevant mechanism for delivery of environmental objectives, in particular for waste.
- Continued action on carbon reduction is anticipated. Although the future delivery mechanism is uncertain, energy efficiency remains a “no regrets” strategy for businesses.
- The PVC Program remains an effective way to provide information to Signatories and report on their progress.
- Accreditation under the Federal Government scheme may provide greater awareness of the PVC Program and confirm its credibility as an effective industry approach.

Product stewardship trends

Reviewing product stewardship action around the world, Russ Martin, president of the Global Product Stewardship Council (GPSC) identified the following trends: an expanded range of products covered by product stewardship, consolidated collections, and collaborative, multi-stakeholder approaches.

Internationally, product stewardship is moving beyond traditional end-of-life management approaches to target broader sustainability issues, as the PVC Program does. Business managers are willing to take on financial responsibility, but want operational control and the flexibility to minimise those costs.

The GPSC suggest that the distinction between voluntary and co-regulatory programs is less important than the following key program characteristics:

- Ongoing consumer education
- Convenient access to waste collection facilities
- Verifiable performance reporting
- Producer responsibility for operation and costs
- Minimum free riders

Other Voluntary Programs in Australia

The number of product stewardship programs in Australia is growing. The PVC industry program was unique in taking life cycle approach, however other industries and businesses are now using similar frameworks.

Steel Stewardship Forum

The Australian steel industry agreed to establish its Steel Stewardship Forum in 2008, and the program now has members from across the steel lifecycle. The forum considers impacts from mining, iron and steelmaking, product manufacturing, by-products, applications, and recycling. An initial project to map the footprint of the steel life cycle has been completed. A key purpose is to “maximize the value of steel to society while minimizing negative commercial, social, and environmental impacts across the life cycle”. At the time of writing this report, the specific commitments/targets of the Steel Stewardship program had not been determined.

Other PVC Programs

The European and South African PVC industries have made commitments to environmental and safety performance.

A comparison of commitments is provided in Appendix I.

Europe

In 2011, the European vinyl industry introduced a new ten year program called 'VinylPlus', following the completion of its first ten year voluntary commitment, 'Vinyl 2010'. VinylPlus is a more complex program focussing on five key sustainability challenges: Controlled-Loop Management, Organochlorine Emissions, Sustainable Additives, Sustainable Energy Use, and Sustainability Awareness. Each challenge has specific targets, sometimes related to evaluation of issues and development of industry approaches.

The first four challenges are technical and address similar issues to the Australian Program, although some differences recognise local circumstances. The fifth challenge relates to building sustainability awareness across industry and the community, beyond the engagement and transparency envisaged in the Australian Program commitment to public reporting, however similar to the broader work undertaken by the Vinyl Council.

A key difference in the European and Australian approaches is the European program quantitative recycling targets. The current VinylPlus commitment is to recycle 800,000 tonnes of PVC by 2020. Legacy additives in recycling have also been identified as a key issue to be defined and managed within the complexities of the REACH chemical management program. The European industry is continuing to investigate the complexity of safe additive use.

Other differences between the approaches are the introduction of a specific commitment in the Australian program to encourage avoidance of mercury in the supply chain and the completion of the lead phase out by 2012.

A number of Australian Program Signatories import products from European businesses involved with VinylPlus and associated programs, and for these businesses product specifications are likely to be in line with European standards.

South Africa

The South African Vinyls Association (SAVA) Product Stewardship Program signed in early 2012 covers commitments in five main areas: use of additives, recycling, communication, industry health, and association functionality.

SAVA's Program includes a commitment to use lead free stabilisers and pigments in all PVC products by January 2015 and to use cadmium free additives (including pigments) by July 2013. There is also a commitment to reduce the use of DEHP plasticiser in PVC applications from 68% in 2011 to 50% by 1 January 2015, and for Signatories to assist SAVA through constructive debate in identifying areas of considerable risk regarding the use of DEHP to ensure that the reduction target is reached by phasing-out DEHP in these areas as a priority.

Like Australia's Program, SAVA has a commitment for Signatories to only use PVC polymer sourced from mercury free manufacturing processes.

Quantifiable targets for post-production and post-consumer PVC waste have been established: Resin manufacturers are to recycle 99% of waste by January 2013; primary convertors 95%, and secondary convertors 90%. The industry targets for post-consumer waste are 15,000 tons per annum for PVC-P and 2,500 tons per annum for PVC-U, by January 2015.

Brazil

A survey commissioned by Instituto do PVC shows that the recycling index of post-consumption PVC in Brazil rose from 15% in 2010 to 19% in 2011. The

volume of PVC recycled was 29,857 tonnes in 2011. Almost 70% of the PVC recycled in Brazil is post-consumption, the remainder is post-industrial.

Other approaches

Other approaches seeking to drive environmental improvements through consumer demand, such as the GBCA

Green Star PVC credit or eco labelling, potentially provide commercial value to businesses in the PVC industry. Several Signatories are involved, and feedback indicates frustration when different approaches and standards are applied. However, support to Signatories to meet Program commitments may enable standards in other programs to be met.

Implications for the Program

- Include consumer education and engagement in the public reporting commitment.
- Align commitment measurements and standards with other programs, where consistency is relevant and practicable.
- Consider development of quantifiable targets in the Waste Management commitment.

External Feedback on the Program

Green Building Council of Australia (GBCA)

The Green Building Council of Australia (GBCA), in their review of the Green Star PVC Minimisation Credit, found that *“the lifecycle of PVC, from raw materials and production through use to end-of-life, recycling and disposal had changed considerably in the past five years.”* (GBCAa, 2010, p3).

The GBCA reviewed PVC industry actions in relation to environmental and health concerns, including the Product Stewardship Program progress and commitments relevant to the building industry. It concluded that: *“Australian and European PVC manufacturers appear to be successfully addressing the minimisation of health risks associated with PVC building materials through a combination of their current practices,*

commitments to improving practices, and their recent achievements pertaining to PVC production and end of life PVC product management” (GBCAb, 2010, pg 23).

The Australian industry Program has responded to GBCA’s review, for example, by introducing a mercury avoidance commitment.

The GBCA’s review provided some recommendations for further action, some of which are relevant to the PVC Product Stewardship Program (GBCAb, 2010):

- Industries involved in PVC building products should take an active part in educating the building, construction and demolition sector about the advantages and ease of PVC recycling.
- PVC resin and product manufacturers should support a voluntary collection

of PVC construction products waste as a means of avoiding waste-related concerns.

- PVC product manufacturers are encouraged to continue using PVC recycle in new products. In doing so, occupational health and safety aspects related to handling post-consumer waste and exposure to heavy metals or DEHP, DBP or BBP should be considered.
- PVC product manufacturers should provide the market with take-back agreements for their products.

Some Program Signatories are already undertaking activities in line with these recommendations, and some aspects of these recommendations are covered from an industry perspective by existing commitments and Vinyl Council activities. However there is scope to incorporate more clearly the GBCA recommendations in a revised Waste Management commitment.

The Auditor, NetBalance

NetBalance has audited the Program Annual Progress Reports since 2007. Some of their recommendations relate to the ongoing development of the Program commitments. In 2012 NetBalance recommended a revision of the waste management commitment to include mandatory reporting.

In addition, NetBalance has recommended the undertaking of strategies to improve Signatory understanding of commitments, and improved data reporting. Although the Vinyl Council has undertaken steps to address these issues, ongoing concerns and resource constraints indicate a need to simplify the Program commitments, while maintaining meaningful, measurable objectives; to clarify objectives and required actions by Signatories from different industry

sectors; and to facilitate streamlined reporting.

Other external stakeholders

PVC industry Product Stewardship Program information sessions for stakeholders were most recently held in Melbourne, Sydney, and Canberra in 2012. These provided an opportunity to outline industry progress to representatives of the building sector as well as industry associations, state and federal government, and other PVC businesses, and to receive feedback. Attendees noted:

- the Program's credibility and longevity;
- the increasing maturity of the Program, moving beyond fixing specific problems to more complex issues;
- the increasing importance of waste management, and the need for quantitative targets;
- the range of recycling arrangements, from collective approaches to individual approaches;
- the importance of life cycle thinking, although there also is a focus on end of life management;
- the desirability of promoting recycled content; and
- the increasing importance of energy management.

The Council has regularly shared information on the Program through its website, publishing annual reports and releasing news to media in an effort to reach a broad range of stakeholders.

In 2012, property industry e-media, *The Fifth Estate*, challenged the "on request" nature of the Australian PVC industry's commitment to open disclosure of product ingredients. The Council responded to clarify the approach.

Implications for the Program

- Simplify commitment descriptions to clarify objectives and actions required by Signatories
- Facilitate more accurate, streamlined reporting and shorter annual reports
- Revise the Waste Management commitment to include mandatory reporting and performance targets building on the GBCA Review's recommendations.

Governance

The Technical Steering Group (TSG) Terms of Reference envisaged Signatories nominating TSG members, who would then report back to Signatories. In practice, for a range of practical reasons, this representation at TSG level no longer occurs. All Signatories are welcome to attend TSG meeting and are informed of TSG decisions through the minutes and VCA Operations Reports. The original plan for communication between Signatories may have improved engagement with Signatories and their understanding of the Program developments but since not achieved in practice, other approaches are necessary to foster engagement and understanding.

Implications for the Program

- Revise the Technical Steering Group Terms of Reference to reflect current practice and governance standards.
- Utilise new approaches to improve Signatory knowledge of and engagement with the Program.

Future Challenges

Future challenges for the Program identified in the course of this assessment include the following topics:

- Resource efficiency;
 - Use of renewable raw materials;
 - Recycling end-of-life material;
- On-going activities from organisations promoting PVC minimisation;
- On-going focus on the safety and sustainability of additives, including legacy additives in recycled product;
- Complacency and lack of progress by some Signatories potentially undermining the credibility of the Program in the long term;

- Free-riding by PVC industry businesses benefiting from the activities of the Vinyl Council and Program Signatories without contributing.

Implications for the Program

- Monitor trends and new developments in renewable raw materials and additive safety, and assess relevance and applicability to the Program.
- Seek opportunities to engage with external stakeholder groups.
- Assist Signatories in maximising the value of the Program, and limit the compliance burden.
- Continue to seek a broader membership group.

Recommendations

The progress made by Signatories to the PVC industry Product Stewardship Program provides a strong foundation for the future. The recommendations provided in Table 1 on pages 4-5 are intended to update and strengthen the Program to ensure it continues to deliver effective improvements in an open and transparent way.

Commitment requirements should be clarified and practically achievable, with streamlined reporting enabling all Signatories to contribute to the success of the Program. Advocacy and promotion activities must be carefully targeted, with an aim to increase the value of the Program to all Signatories.

Appendix I:

Australia

<p>Production and storage</p> <ul style="list-style-type: none"> Mercury avoidance. Residual VCM ≤ 1ppm in 99% of batches. VCM emissions ≤ 30g/tonne S-PVC (Australian manufacture). VCM emissions ≤ 1000g/tonne E-PVC. EMS at manufacturing & storage sites. Energy efficiency and greenhouse gas Charter.
<p>The use of lead and cadmium</p> <ul style="list-style-type: none"> Adhere to Code of Practice (phase out lead stabiliser by 2010). Pigment substitution by 2010 if technically and commercially feasible. Monitor overseas developments. Open disclosure of additive information on request.
<p>The use of phthalate plasticisers</p> <ul style="list-style-type: none"> Adhere to industry policy. Share data with NICNAS.
<p>Waste management</p> <ul style="list-style-type: none"> APC participation for relevant Signatories. Implement Vinyl Industry Recycling Strategy Implement Vinyl-2-Life Action Plan. Encourage consumer responsible care Monitor overseas recycling initiatives and developments.
<p>Research</p> <ul style="list-style-type: none"> Monitor national and international scientific research.
<p>Public Reporting</p> <ul style="list-style-type: none"> Publish an independently verified annual progress report. Update PVC life cycle issues and developments in annual report. Conduct a 5 year review by end 2012.
<p>Technical Steering Committee</p> <ul style="list-style-type: none"> Established to oversee Program

Europe: VinylPlus

<p>Controlled-loop management</p> <ul style="list-style-type: none"> Recycle 800,000 tonnes PVC/year by 2020. Develop technology for 100,000 tonnes of difficult to recycle PCV/year by 2020 (within 800,000 tonne target). Legacy additives to be addressed and reported on annually.
<p>Organochlorine emissions</p> <ul style="list-style-type: none"> Consult stakeholders and develop plan for organochlorine emissions by end 2012. Comply with PVC resin Industry Charters in Q1 2012. Transport risk assessment for major raw materials by end 2013. Zero accident rate target for VCM transport.
<p>Sustainable additives</p> <ul style="list-style-type: none"> Replace lead in EU-27 by 2015. Develop criteria for 'sustainable use of additives' by end 2012. Validate criteria for 'sustainable use of additives' with downstream supply chain by end 2014.
<p>Sustainable energy use</p> <ul style="list-style-type: none"> Establish Energy Efficiency Task Force by end 2011. Resin producers to reduce specific energy consumption by 20% by 2020. Define specific energy consumption targets for converters by 2012. Energy Efficiency Task Force to recommend suitable environmental footprint. Measurement by end 2014. Establish Renewable Material Task Force by end Q1 2012. Status report by end 2012.
<p>Sustainability awareness</p> <ul style="list-style-type: none"> VinylPlus web portal by summer 2011. VinylPlus Monitoring Committee established by 2011. VinylPlus membership certificate by end 2011. Public and independently verified VinylPlus Progress Report to be published annually from 2012. <ul style="list-style-type: none"> Annual stakeholder meetings to commence from 2012. ECVM to promote VinylPlus to PVC industry and organisations internationally. Increase VinylPlus participants by 20% over 2010 by end 2013. Engage with 5 global brand holders by end 2013. Review globalisation progress by end 2015.

South Africa

<p>Responsible & sustainable use of additives</p> <p>Responsible & sustainable vinyl recycling programme</p> <p>Effective comminque</p> <p>Industry health</p> <p>SAVA functionality</p> <ul style="list-style-type: none"> Add value, grow membership, marketing.
<p>1 January 2013</p> <ul style="list-style-type: none"> Recycle 99% of all waste produced by PVC resin manufacturers. Recycle 95% of all waste produced by primary converters in the PVC industry. Recycle 90% of all waste produced by secondary converters in the PVC industry. Increase recycling of post-consumer PVC-P to 15,000 tonnes pa. Increase recycling of post-consumer PVC-U to 5,000 tonnes pa.
<p>31 June 2013</p> <ul style="list-style-type: none"> Mercury free manufacturing processes in all local and imported PVC polymer and chlorinated paraffin. Cadmium free additives and pigments used in PVC products. Hexavalent chrome free pigments used in PVC applications.
<p>1 January 2015</p> <ul style="list-style-type: none"> Phase out of lead based stabiliser use. VCM emissions < 250 g/mt S-PVC & E-PVC. Residual VCM in regular product < 5 g/mt S-PVC and < 10g/mt E-PVC. Residual VCM in food & medical applications < 1 g/mt (S-PVC & E-PVC). Bisphenol A free stabilisers. Reduce DEHP use from 68% to 50%.

Key
Mercury avoidance
Emissions (VCM)
Energy use / greenhouse gases
Additives (stabilisers / pigments / plasticisers)
Resource efficiency
Reporting
Governance
Marketing / promotion

Appendix II Summary of Key Commitments for 2013

Issue	2013 Commitment
one: production and storage	
Mercury avoidance	Verify via suppliers that imported VCM, PVC resin or PVC product is sourced from mercury-free processes.
Suspension PVC use:	
<ul style="list-style-type: none"> ● Residual VCM in finished resin 	Residual VCM in finished S-PVC resin powder is not greater than 1ppm in 99% of batches tested.
<ul style="list-style-type: none"> ● VCM emissions from resin manufacturing in Australia 	VCM emissions no greater than 30g/tonne S-PVC
Emulsion PVC use:	
<ul style="list-style-type: none"> ● Residual VCM in finished resin 	Residual VCM in supplied E-PVC resin is not greater than 1ppm in 99% of batches tested.
<ul style="list-style-type: none"> ● VCM emissions from manufacturing of E-PVC 	VCM emissions no greater than 1000g/tonne E-PVC
Environmental management systems at manufacturing and storage sites. Program commitments embedded into company Business Management Systems	Compliance with the PVC industry's Minimum Acceptable Standard for environmental management
Energy efficiency & greenhouse gas emissions	Compliance with the PVC industry Charter.
two: the use of lead and cadmium	
Code of Practice	Adherence to the industry Code of Practice for the use of lead and cadmium in PVC products in Australia, including commitment to avoid the use of cadmium and lead stabilisers.
Pigments	Substitution of lead, cadmium & hexavalent chrome pigments where technically feasible and alternatives are commercially available.
Other additives	Monitoring of pertinent overseas developments.
Open disclosure	Disclosure of information on additives used in PVC products or components to stakeholders upon request.
three: the use of phtalate plasticisers	
Phtalate plasticisers	Adherence to the industry Policy on Plasticiser Use. Share relevant information with NICNAS during risk assessment process.
four: waste mangement	

Australian Packaging Covenant (APC)	All relevant Signatories to have submitted waste management Action Plans under the APC and to maintain compliance with APC obligations.
Recycling	<p>Implement the Vinyl Industry Recycling Strategy.</p> <p>Implement the Vinyl-2-Life action plan.</p> <p>Monitor overseas recycling initiatives and developments.</p>
Encouraging consumer responsible care	Provide information to end consumers on management options for PVC products at end-of-life
Life cycle thinking	Consider whole-of-life in the developments of new PVC products.
five: research	
Research	Monitor national and international scientific research and share pertinent information with Signatories and stakeholders
six: public reporting	
Performance against commitments	Publish 2012 annual performance by 30 April 2013.
PVC life cycle impacts	Include an update on pertinent issues and developments related to aspects of the PVC life cycle in the annual report.
Review implementation and effectiveness of the product stewardship program	Complete review and publish recommendations by end March 2013.

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