



**Asia-Pacific
Economic Cooperation**

Advancing Free Trade
for Asia-Pacific **Prosperity**

13th SCSC Conference: Standardisation in Circular Economy for a More Sustainable Trade

APEC Sub-Committee on Standards and Conformance

December 2021



**Asia-Pacific
Economic Cooperation**

13th SCSC Conference: Standardisation in Circular Economy for a More Sustainable Trade

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APEC Sub-Committee on Standards and Conformance

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1. Executive Summary

Circular economy (CE) is a concept that aims to improve resource efficiency by minimising resource consumption and waste generation. It is an alternative to the traditional linear economy model (make-use-dispose) in which we keep resources in use for as long as possible, extracting the maximum value from them while in use, then recovering and reusing the products and materials.

The implementation of CE principles in processes, products and services enables organisations to optimise the management of their resources and to deploy new business models, in order to be more resilient to environmental, social, and economic challenges, especially during the COVID-19 pandemic. Transitioning to a CE is a great opportunity for APEC members to support the goals of the UN 2030 Agenda for Sustainable Development.

CE standardisation is still a nascent concept within APEC economies, as there is no single accepted international definition of CE. ISO TC 323 is currently developing international standards and a common definition for CE. According to the pre-conference survey results, majority of APEC economies responded that they are participating in international standards development. There are some standards directly related to CE that are developed within the APEC region. CE is a comprehensive model supported by “building blocks” that are processes such as repair, recycle, reuse, remanufacture, biodegradability, composting, environmental performances of organisations, and other sub-models including servitisation, sharing economy, renewable energy, etc. Several APEC economies are focusing on the development of standards for these CE building blocks, which were also identified as important processes by both conference participants and survey respondents.

Over 10 APEC economies have already developed policies related to CE. A defined roadmap, framework and strategy were identified as the most common policy tools in the APEC region to support CE. Some of these policies are cross-cutting, while some focus on specific sectors such as plastics. The sectors of interest in the APEC region include plastics (the most common sector), food, battery and energy, ICT, and the built environment, among others. Other policy levers¹ are R&D, convening and partnership, public procurement, incentives and funding, data sciences, raising awareness, and promotion. At the regional level, ASEAN has just endorsed a framework for CE under Brunei Darussalam’s chairmanship. As CE is still in its infancy stage within the APEC region, most of these policies are not mandatory requirements in order to encourage the uptake of CE without warranting its implementation. There are however a few mandatory rules such as the banning of or reduced use of plastics, especially plastic bags. Standards and conformance play integral roles in supporting the implementation of these policies, especially in the ASEAN framework for circular economy as a strategic priority.

International trade unlocks more potential for CE due to economies of scale and specialisation. This is even more critical during the pandemic with scarce resources and a disrupted supply chain. Consistent standards and regulations are fundamental to the international trading system. The WTO Technical Barrier to Trade (TBT) agreement requires technical regulations to be based on international standards. Objective data from the OECD and WTO shows inconsistent standards and regulations add cost to traded goods, and there is an increasing number of specific trade concerns with new regulations related to CE. These highlight the importance of harmonising standards and regulatory regimes for CE. Accreditation plays an important role in supporting the implementation of standards. The global accreditation system led by ILAC, IAF and APAC has developed several mutual recognition arrangement programmes to support international trade and CE.

¹ Policy levers defined by the Ellen MacArthur Foundation: <https://ellenmacarthurfoundation.org/policy-levers>

From an industry perspective, CE is an up-and-coming trend. Many companies are already adopting CE to improve resource efficiency, productivity, acquire know-how, reduce environmental impacts, support social responsibility and corporate governance. Companies are motivated to go the extra mile and adopt standards voluntarily to improve productivity, cut costs, benchmark against the most stringent international targets especially the UN SDGs, and stay ahead of the curve. These are important learning points for the MSMEs in the APEC region, and policymakers who are interested in helping MSMEs in this aspect. The use of standards is a very effective and objective way to demonstrate compliance and avoid “green-washing.” Due to a lack of dedicated standards for CE, some companies mix-and-match existing standards to meet their needs. CE can also be a demand driver and create new business opportunities in recycling, repurposing, refurbishing, repair, etc. As these business opportunities are very new, the adoption of standards can help business leaders gain the trust of customers and policymakers.

Some of the key challenges of international CE standards development include difficulty in achieving consensus for global relevance especially for developing economies, and the speed of standards development. After the standards are developed, APEC economies need to overcome domestic challenges while adopting the standards e.g., stakeholder support, technical know-how, lack of budget (especially for MSMEs), industry readiness, availability and suitability of standards, and a lack of resources and tools.

Recommendations:

- Continued sharing of good practices, exchange experiences and case studies about CE and standards
- Continue to raise awareness of CE and standards and conformance for CE
- Initiatives to encourage harmonisation of standards and regulations related to CE and the use of recognised conformity assessment to support CE
- More participation by APEC economies in international standards development activities to influence global CE standards
- Identification of gaps and the proposal of new standards to support CE stakeholders in APEC region
- Technical assistance for standards related to CE especially for MSMEs
- Development of APEC guidelines
- Involvement of private sector in the development of CE policy and standards
- Cross fora collaboration with CTI, PPSTI, CD, and other international organisations such as the OECD and WTO

2. Introduction

2.1 Background

The 13th SCSC Conference is an APEC project proposed and overseen by the Department of Standards Malaysia (DSM), supported by co-sponsoring economies which include Australia; Canada; Chile; Japan; Korea; Papua New Guinea; Singapore; Thailand; and United States.

This conference was proposed during APEC 2020 Malaysia and developed around the theme of *Optimising Human Potential Towards a Future of Shared Prosperity*, which was further supported by three important priorities, namely:

- Improve the narrative of trade and investment;
- Inclusive economic participation through digital economy and technology; and,
- Driving innovative sustainability.

One of the key challenges in the APEC region is when APEC economies approach resource efficiency, sustainable materials management and circular economy concepts in a non-coherent manner due to the diversity of APEC economies which might hinder the transition to CE. As we navigate the effects of the COVID-19 pandemic, maximising resource efficiency while increasing economic and environmental sustainability are now more important than ever. Policy makers and businesses, especially from MSMEs from developing economies needs to be better informed on how to embrace CE approaches through capacity building in the utilisation of standards, which in turn promotes sustainable economic growth.

Hence, the topic of “Standardisation in Circular Economy for a More Sustainable Trade” was chosen to support the thematic priorities of APEC 2020 and UN Sustainable Development Goals.

The transition into a CE is a great opportunity for rapid and sustainable development, not only achieving economic, social, and environmental goals but also helping to deal with climate change. The transition into a CE also supports the goals of the UN 2030 Agenda for Sustainable Development. The 17 Sustainable Development Goals (SDGs) serves as a “blueprint to achieve a better and more sustainable future for all.”² Some of the SDGs with the strongest relationships with the CE practices are:

- SDG6 – Clean Water and Sanitation
- SDG7 – Affordable and Clean Energy
- SDG8 – Decent Work and Economic Growth
- SDG12 – Responsible Consumption and Production
- SDG15 – Life on Land

CE is widely regarded as an important aspect of a company's sustainability efforts because these initiatives can help companies continue to grow, while managing limited resources, supply chain volatility and changing global regulations. Most importantly, CE standards and practices can help to support trade within economies, through the cooperation and harmonisation of CE standards.

2.2 Project Objectives

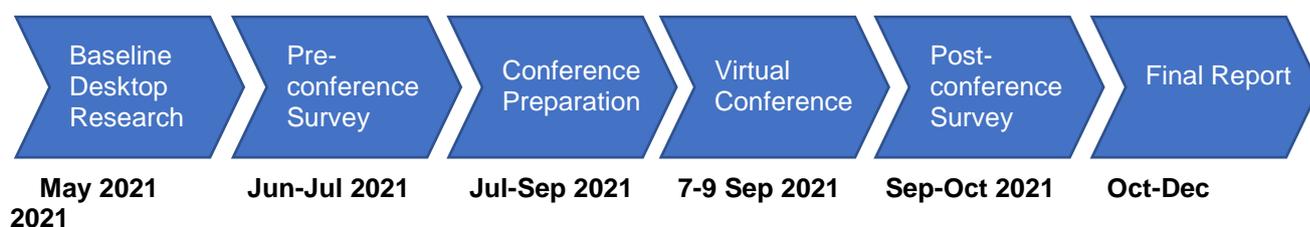
The key objective of this project is to provide a platform for sharing of information and best practices in creating a policy environment that supports a more resource efficient and circular economy, as well as

² United Nations [17 Sustainable Development Goals](#)

allowing exchange of ideas between APEC economies on initiatives to better align trade policies with more resource efficient, “circular” business outcomes.

In addition, this project aims to raise awareness and encourages standardisation among APEC economies in developing the relevant infrastructure to maintain quality across highly globalised supply and diverse supply chains.

2.3 Project Approach



2.3.1 Desktop Research (May 2021)

A desktop research was conducted as the first step of this project, which includes the current state of circular economy policies in the APEC region and standardisation in the region and international standardisation activities.

This research was conducted purely on desktop to form the baseline understanding and support the planning and design of the future stages.

2.3.2 Pre-conference Survey (Jun-Jul 2021)

With the information gathered in the desktop research, the outcome was analysed to identify any gaps which could not be gathered on desktop, and/or any information for further validation from APEC SCSC members directly, which was compiled into a draft questionnaire set.

The target respondents of this survey were the standards bodies, policymakers and industry representatives from the APEC economies.

2.3.3 Conference Preparation (Jul-Sep 2021)

A conference programme was drafted based on the outcomes of the desktop research and inputs from APEC economies in the pre-conference survey. The programme comprised several sections with dedicated scopes on trend of standards development, good practices of policymakers, interplay of standards, CE and international trade actors, and case studies from the industry. After the sharing by speakers, all the participants would be invited to share their inputs in breakout discussion.

The speakers were identified in consultation with the co-sponsoring economies and other interested APEC economies. To achieve gender balance, female speakers were prioritised.

2.3.4 Virtual Conference (7-9 Sep 2021)

The 3-day virtual conference was held from 7th to 9th Sep 2021, for three hours each day.

The target audience are APEC economies' stakeholders interested in the topic of standardisation in circular economy and trade, including standards bodies, accreditation bodies, policymakers and regulators, private sector and industry associations, conformity assessment bodies.

The delegates from other APEC fora, especially Committee on Trade and Industry (CTI), Policy Partnership for Science, Technology and Innovation (PPSTI) and the Chemical Dialogue were welcome too. Economies were strongly encouraged to consider qualified female participants in their nominations.

2.3.5 Post-conference activities

After the conference, a post conference survey was conducted to collect feedback on the conference and attendee learnings from the conference, and other recommendations.

A final report was composed to summarise the information collected and discussion outcomes throughout difference stages of this project.

3. Desktop Research

3.1 Approach

This research was the first step of the project. It was conducted purely desktop about the current landscape of CE in the APEC economies.

The researchers were asked to focus on the government policies that relate to circular economy, including CE roadmap, waste legislation, requirements for reporting, procurement policies, incentive, association and consortia, among others. The research also aimed to identify case studies on adoption of CE practices by industries and businesses in APEC economies, including business-to-business closed loop initiatives and company led consumer recycling programmes. Last but not least, the research also looked into the presence of CE standards commonly promoted and adopted within the APEC region.

3.2 Preliminary findings

The desktop research found that initiatives about waste management and recycling are already very common in the APEC region, with many of these policies being practised in most of the APEC economies for years. Some economies are starting to shift toward the CE model to widen and intensify their waste and recycling efforts, in order to contribute to the broader sustainability agenda such as UN Sustainable Development Goals. There are case studies of industries and businesses promoting circular economy in their business practices, which are mostly related to their processes and technologies on recycle, reuse, and reduce single use of materials and resources. The research also found that companies are adopting more comprehensive approaches such as Zero-Waste-to-Landfill which are adopted by Fuji Xerox New Zealand³ and Samsung⁴.

In terms of standards development, research found that international standards for CE are being developed by ISO/TC 323 – Circular Economy⁵ and IEC/TC 111 - Environmental standardisation for electrical and electronic products and systems⁶. APEC economies are represented in these two technical committees, including 15 out of 72 (20.8%) of the participating members of ISO/TC 323 and 8 out of 26 (30.8%) of the participation members of IEC/TC 111. In addition to these two TCs, other relevant ISO and IEC technical groups are ISO/TC 207 – Environmental Management⁷ and IEC/TC 61/WG 49 - Circular economy and material efficiency. For these international standards, APEC members could continuously review their developments, coordinate and facilitate the participations in APEC region to influence these standards and support APEC priorities.

These findings were valuable inputs used as the baseline for the subsequent pre-conference survey design and conference preparation.

³ <https://environment.govt.nz/what-you-can-do/stories/fuji-xerox-zero-landfill-scheme/>

⁴ <https://news.samsung.com/global/samsung-receives-zero-waste-to-landfill-validations-for-all-its-global-semiconductor-manufacturing-sites>

⁵ <https://www.iso.org/committee/7203984.html>

⁶ https://www.iec.ch/dyn/www/f?p=103:7:::::FSP_ORG_ID:1314

⁷ <https://www.iso.org/committee/54808.html>

4. Pre-conference Survey

4.1 Introduction

The purpose of this survey was to seek views from stakeholders across the APEC member economies to understand the current landscape of resource efficiency, sustainable material management, and/or CE, the use and implementation of CE and thoughts of how the harmonisation and use of standards related to resource efficient CE can support trade within the member economies.

There are three key stakeholder categories identified in this project, which are Standards Bodies, Policymakers and Industries. Each category has different sets of interests and involvement in CE, and hence three different sets of questionnaires were tailored to collect their inputs more effectively. For instance, in the questionnaire for standards bodies, there were specific questions about the standardisation workplan of the economy, adoption and participation of international standards, challenges in engaging stakeholders, among others. For policymakers, the questions focused on the CE policies in their economies and the use of standards to support these policies. The industry representatives were invited to weigh in on use of standards to support business objectives, participation in standards activities, challenges and supports needed.

A total of 66 responses from 14 APEC economies were received:

- 12 from Standards Bodies
- 31 from Policymakers
- 23 from Industries/Businesses

4.2 Findings

The findings were grouped based on the similarities and differences in responses across the three audiences for the following key themes:

- General understanding of CE and level of involvement in CE related activities
- Sentiment towards how CE related standards can contribute to trade / facilitate implementation of CE related policies in their economy
- Challenges faced and support needed unique to each target audience

4.2.1 Understanding of CE and level of involvement in CE related activities

Standards bodies and policymaker respondents had the most aligned and comprehensive understanding of CE. However, Industry respondents were more varied, with some replying “unsure” when asked to state current understanding of CE. Despite the varied levels in understanding, the majority of the 3 target audience categories (>80%) are aware of CE related initiatives / roadmaps within their economy. This may suggest the need for further alignment across stakeholders within each economy to ensure that there is a common level of understanding to ensure efficient implementation / discussion of CE related activities.

Respondents provided feedback that there is no single accepted international definition of CE, ISO TC 323 is currently developing international standards for CE and a common set of definition. The majority of APEC economies responded that they are participating in international standards development.

Some existing standards directly related to CE developed within APEC region are TISI standards on the Framework for Implementing the Principles of the Circular Economy in Organisations, Circular

Economy Management System for Organisation, UL 3600 Measuring and Reporting Circular Economy, Cradle-to-cradle, and GB/T Standards on CE guidelines. Other standards within the APEC region reported by the respondents are related to repair, recycle, reuse, remanufacture, biodegradability, composting, environmental performances of organisations. Beyond the APEC region, BS 8001 is called out by some respondents, especially by businesses and industries.

The following are the policies stated by the respondents:

Economy	Policies stated
Australia	National Waste Policy, National Waste Policy Action Plan, Australian Recycling and Waste Reduction Act 2020, CSIRO - Circular Economy Roadmap, Recycling and Clean Energy Manufacturing Priority Roadmap, Recycling Modernisation Fund, Australian Recycling Investment Fund, Minister's Product Stewardship Priority List, National Product Stewardship Investment Fund, National Food Waste Strategy, Food Waste for Healthy Soils Fund.
Canada	Mining Value from Waste initiative, Circular Built Environment Roadmap, Design for Disassembly initiative
Hong Kong, China	Waste Blueprint for Hong Kong 2035
Indonesia	Guidance for Plastic Recycle, Extended Producer Responsibility 2020 – 2030
Malaysia	Circular Economy Roadmap for Plastics, National Construction Policy 2030, National Agri-Commodity Policy, Construction Industry Transformation Programme (CITP) 2016-2020, Circular Bioeconomy Model, National Policy Statement on Radioactive Waste and Used Nuclear Fuels, National Cleanliness Policy, Sustainable Plastics Alliance (private sector initiative)
New Zealand	National Waste Strategy
The Philippines	Energy Efficiency and Conservation (EEC) Measures and EEC Roadmap
Chinese Taipei	Demonstration circular industrial park (Dalinpu, Kaohsiung), Circular technologies and advanced material R&D district, Green consumption and transaction. Energy and resource integration and industrial symbiosis,
Thailand	Bio-Circular-Green Economy

The respondents also shared evidences of standards referenced in existing policies in the APEC region:

Economy	Standards & Policy
Indonesia	ISO 14040 and 14044. These standards are adopted in the government regulations (Ministry of Environment and Forestry) to rate the environmental performances of a company.
Malaysia	1. MS 2697:2018 Motor Vehicle Aftermarket - Repair, Reuse, Recycle and Remanufacture (4R) for Parts And Components - Code of Practice; and 2. MS 2696:2018 Motor Vehicle Aftermarket - Service and Spare Parts (2s) - Code of Practice – both referenced in National Automotive Policy 2020 (NAP 2020); Ministry of International Trade and Industry (MITI); 3. MS EN 643 (P) 2021 Paper and Board - European List of Standard Grades of Paper and Board for Recycling; National Policy on the Environment (DASN/NEP); Ministry of Environment and Water (KASA); 4. MS EN 17085 (P) 2021 Paper and Board - Sampling Procedures for Paper and Board for Recycling; National Policy on the Environment (DASN/NEP); Ministry of Environment and Water (KASA).
Singapore	1. SS EN 12620 Specification for aggregates for concrete; 2. SS 587 Management of end-of-life ICT equipment; 3. SS 627 Specification for different grades of industrial recycled water from refineries, and petrochemical, chemical and utility plants; 4. SS 628 Specification for compost used in agriculture and horticulture; 5. SS 661 Specification for clean and green urban farms – Agriculture.

	These standards are used to support government agencies in the use of sustainable building materials, recycling of ICT products and water and sustainable farming practices.
Thailand	Standards- Plastic recycling traceability and assessment of conformity and recycled content - requirement Policy - Action plan for plastic waste management Authority - Pollution Control Department
USA	UL 1974 on repurposing batteries. To support circular economy in EV batteries, New York's 2020 Uniform Fire Prevention and Building Codes allows use of storage batteries previously used in other applications, such as electric vehicle propulsion, if the equipment is refurbished by a battery refurbishing company approved in accordance with UL 1974 (link)

Stakeholder engagement plays an integral role for successful and effective CE standards development. There were specific questions in the “Standards Bodies” questionnaire to better understand the challenges and opportunities in engaging stakeholders for CE standards development. The results are:

- Lack of technical assessment and capacity building was perceived by 42% of the respondents as the biggest challenge in encouraging stakeholder participation in the development of CE related standards
- 41% of the respondents perceived lack of budget and lack of guidance documents as the biggest challenges in encouraging stakeholder adoption of CE related standards
- Policymakers or regulators are deemed as the most important stakeholders in CE standardisation by 91% of the respondents, as opposed to NGOs who were voted as least important.
- Academia was voted by 50% of the respondents to providing most support among stakeholders in participating and implementing CE related standards for CE priorities in the economy as opposed to consumer associations with the lowest rank.
- Respondents cited the measures below for improving stakeholder participation and adoption of standards related to CE:
 - Raise awareness and educate stakeholders through workshops / seminars
 - Conduct consultations with key industries and government sectors
 - Provision of support resources

4.2.2 Sentiment towards how CE related standards can contribute to trade / facilitate implementation of CE related policies in their economy, and to industries

When respondents were asked for how CE related standards can contribute to trade, similar examples were provided across standards bodies and policymakers. Some examples include:

- Helps to open more markets as economies are transitioning towards production of products which are based on CE models
- Promotes value creation - CE standards enable value addition for products, increase cost efficiency, reduce environmental pressures, improve resource efficiency and material usage

Respondents shared examples of CE related standards adopted in policymaking and by businesses in their respective economies, such as TISI standards and BS 8001. Most of the other standards cited by the respondents are not directly related to CE, but the “building blocks” of CE e.g., repair, recycle, reuse, remanufacture, biodegradability, composting, green building, energy management, and environmental performances of organisations.

With regards to how CE related standards can facilitate implementation of CE related policymaking in their economy, the three target audience categories had similar perspectives, further driving the need for incorporation / setting of CE related standards in economies. Some key examples are:

- Allow stakeholders to work with the same definitions and frameworks for easy implementation of CE related policies and monitoring of progress against fixed terms
- Act as a benchmark for targets in the policies/initiatives/roadmaps and translated into KPIs that can be monitored and improved over time
- Act as a catalyst for leaders of companies and organisations to make the transition towards a more sustainable economy

Types of standards that are needed to support CE related policy but are not yet available:

- Standards that relate activities directly to CE approaches such as labels/certifications that satisfy principles of CE
- Sector/industry specific standards that help guide implementation of the CE in enterprises and ensures greenwashing does not occur

Respondents from the industries indicated the following as key examples of how CE related standards contribute to them:

- Facilitates sharing of best practices through standardisation of design and manufacturing
- Acts as a framework / guidance to improve production process to ensure raw material is environmentally friendly
- Enables trust and acceptance of CE products

In addition, respondents also cited the following enablers as important to the industries:

- Academia
- Piloting of projects on the implementation of CE related standards
- Incentivisation to encourage CE adoption across industries

Once international standards are developed, incorporated into policies and adopted by industries, they will facilitate common understanding of the concept of CE and cross-border trade within the APEC region. CE standards can incorporate social and economic aspects with environmental considerations on the path towards a more sustainable society.

4.2.3 Challenges faced and support needed that are unique to each target audience

Key challenges of international CE standards development include difficulty in achieving consensus for global relevance, especially for developing economies, and the speed of standards development. After the standards are developed, APEC economies need to overcome domestic challenges while adopting the standards e.g., stakeholder supports, technical know-how, lack of budget, industry readiness.

Respondents from both policymakers and industries had varied comments on the challenges they faced when incorporating CE related standards, some examples include:

- Initial cost and investment
- Difficulty faced in coordinating commitment across the different stakeholders due to differences in types of business/level of development and adoption of these standards
- Lack of standardisation and understanding of CE related standards

However, they provided similar examples of how standards bodies can help overcome their stated challenges. Some examples are:

- Standards bodies should be included in the policy development process to ensure standards requirements are addressed, implementable, and verifiable
- Create awareness through workshops, technical assistance trainings, exhibitions, summits, conferences as well as educating on capacity building processes
- Provision of funding / incentives to alleviate compliance costs

- Evaluating and predicting related CE trends to keep up with business growth and track the benefits of standards

More details of the pre-conference survey can be found in Annex 3

5. Conference Discussion

The conference was a 3-day virtual event that delivered a tailored programme to disseminate information and share experience of resource efficient CE approaches and practices implemented in APEC member economies. The conference included several sessions with expert presentations, panel discussion forums, participant question and answer, and breakout sessions to maximise learning and knowledge retention.

5.1 Conference objectives

The conference objectives are aligned with the overall project objectives:

- Raise awareness of CE and the roles of standards and conformance.
- Provide a platform for sharing of information and best practices in creating a policy environment that supports a more resource efficient and CE through standards and conformance.
- Allow exchange of ideas between APEC economies on initiatives to better align trade policies with more resource efficient and circular business outcomes to maintain quality across highly globalised and diverse supply chains.
- Share existing trends of standardisation to encourage APEC economies' participation in standards development activities.

5.2 Conference date and time

The virtual conference was held from 7-9 September 2021, each day from 10am to 1pm Malaysia time. The conference agenda can be found in Annex 1.

5.3 Participants

The conference was attended by 99 participants from 14 APEC member economies and non-APEC economies such as Myanmar, New Caledonia, and the ASEAN secretariat.

The complete list of participants can be found on Annex 2.

5.4 Conference Discussions

The conference was comprised of 6 segments:

- Opening and Keynote speakers
- Panel 1: Circular Economy Initiatives by Standards Developing Organisations
- Panel 2: APEC Economies' Approaches to Circular Economy Policy Making
- Panel 3: Standards and Conformance Supporting International Trade, Sustainability and Circular Economy
- Panel 4: Good Practices on the Use of Standards and Conformance in Industry to Support Circular Economy in APEC economies
- Breakout discussion

5.4.1 Opening and Keynote Speakers

The conference was opened by **Mr Shaharul Sadri Bin Alwi, Director-General, Department of Standards Malaysia**, and **Mr Adam Dubas, APEC SCSC Chair, Ministry of Business, Innovation and Employment of New Zealand**

The keynote speakers and their salient points of their presentations were:

Ms Krasna Bobenreith, Chair, APEC Committee on Trade and Investment (CTI) provided an overview of the existing and upcoming initiatives under CTI or other fora, such as Chemical Dialogue (CD), Policy Partnership on Science, Technology and Innovation (PPSTI), Oceans and Fisheries Working Group (OFWG). She reassured the alignment of this conference with the APEC priorities in CE and sustainable material management.

Ms Satvinderjit Kaur Singh, Researcher, APEC Policy Support Unit (PSU) presented on a recent paper published by APEC PSU titled *What Goes Around Comes Around: Pivoting to a Circular Economy*⁸. This paper highlighted the waste crisis growing in the APEC region, and how CE can enable waste minimisation and resource optimisation by turning waste into opportunities. CE is dependent on trade, which makes CE more efficient through scale and specialisation. Standardisation and regional cooperation play an important role to unlock the potential.

Prof Dr Agamuthu Pariatamby, Senior Professor in the Jeffrey Sachs Centre on Sustainable Development at Sunway University, Malaysia provided an overview of what CE is, including the principles, elements and frameworks. He further explained that while there is no dedicated legal framework for CE, there are relevant policies and initiatives in Malaysia that date back to the Environmental Quality Act in 1974. In order to successfully implement the CE, top-down and bottoms-up approach are required in Malaysia. Several Malaysian case studies reveal the practice of CE at an enterprise level which implies a willingness of some firms to take part in a bottoms-up approach.

5.4.2 Panel 1: Circular economy initiatives by standards developing organisations

This panel was moderated by **Dr Raslan Ahmad, Chair of Technical Committee on Circular Economy under Malaysia's National Standards Committee on Environment**. It focused on the sharing of existing standards development initiatives and projects relating to CE from major standards developing organisations around the world.

The panellists and their salient points of presentation were:

Ms Catherine Chevauché, Chair, ISO/TC 323 – Circular Economy shared the scope of ISO/TC 323 is standardisation in the field of Circular Economy to develop frameworks, guidance, supporting tools and requirements for the implementation of activities of all involved organisations, to maximise the contribution to Sustainable Development. The Technical Committee (TC) is currently working on a standards definition and framework, which is highly anticipated as they are expected to serve as baseline reference for other standards, policymakers, trade practitioners, and industries. In addition, the TC is developing standards on guidelines, measuring, product circularity datasheet, which are expected to be published in mid-2023. ISO/TC 323 welcomes more APEC members' participation.

Dr Miyuki Takenaka, Vice Chair, IEC/TC 111 - Environmental Standardisation for Electrical and Electronic Products and Systems shared that IEC/TC 111 has been in operation since year 2004 to develop standards on environmental aspects for electrical and electronic products and systems. It prepares guidelines, basic and horizontal standards, cooperates with other IEC committees to ensure consistency in IEC standards, monitors regional standardisation and regulatory activities as a one stop shop for environmental and CE standards in IEC. The TC is working on a few new standards relating to CE such as material circularity consideration, reused components, carbon footprint calculation, E-waste, etc. IEC/TC 111 standards are referenced in regulations around the world e.g., European Union

⁸ <https://www.apec.org/Publications/2020/05/APEC-Regional-Trends-Analysis---What-Goes-Around-Comes-Around>

and China. IEC/TC 111 is represented by 9 APEC member economies - Canada; China; Korea; Japan; Malaysia; Mexico; Russia; Thailand; and the United States. Dr Takenaka urged more Asian economies to join this TC, especially on the e-Waste project.

Dr Bill Hoffman, Corporate Fellow and Senior Scientist, UL Environment and Sustainability, United States shared that Underwriters Laboratories (UL)'s approach for CE standards development is by mapping against existing frameworks such as the Ellen MacArthur Foundation (Fig. 1) to address gaps in Reuse, Recycle, Remanufacture and Repurpose such as UL 1974 for repurposing/second-life of EV batteries. Another UL standard, UL 3600, provides a clear way to measure and report progress towards circularity at the product, site, and corporate level. This standard was developed through a panel with experts from 7 APEC economies – Canada; China; Indonesia; Singapore; Chinese Taipei; Thailand; and the United States. Moving forward, UL plans to look into standards for GHG emissions, social and supply chain issues.

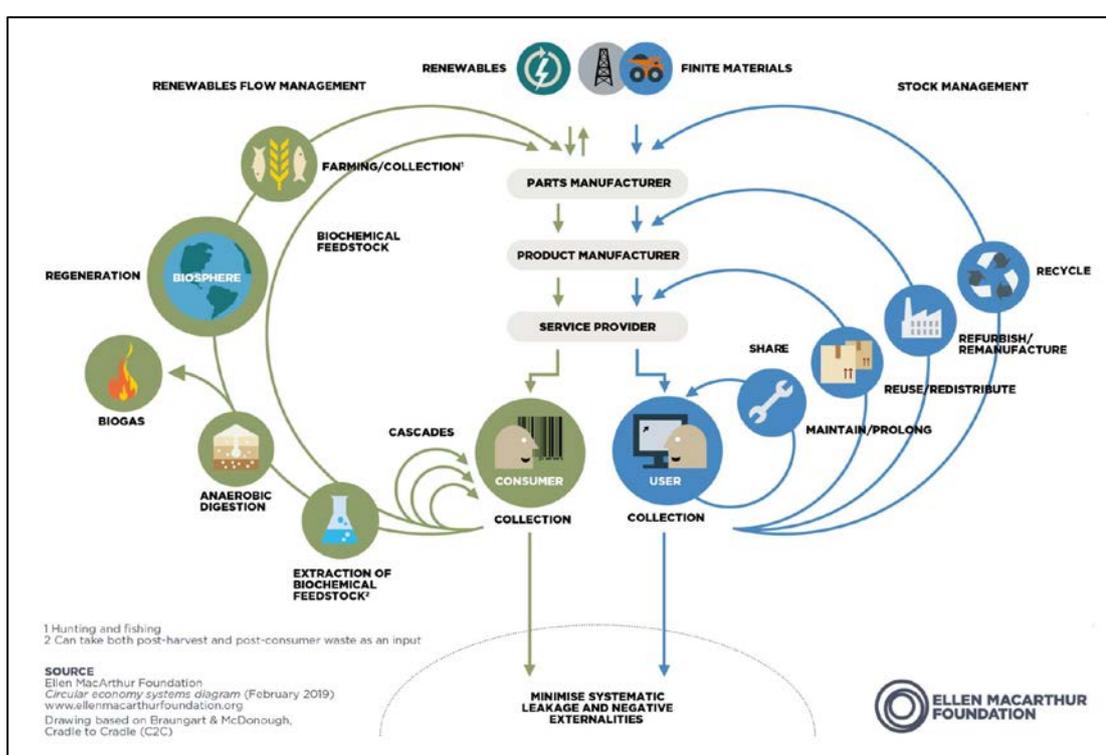


Fig. 1: Circular Economy Diagram from the Ellen MacArthur Foundation

Mr Shunsuke Kurita, Technical Staff, Cooperation Promotion Office, National Laboratory for Advanced Energy Storage Technologies (NLAB), National Institute of Technology and Evaluation (NITE), Japan shared Japan's contribution to CE in the area of Battery Energy Storage System (BESS) which supports renewable energy. Japan has been leading IEC/TC 120 - Electrical Energy Storage (EES) Systems as the committee secretary when it was launched in 2012. One key standard is IEC 62933-5-2 on the Safety Requirements for Grid-integrated Electrical Energy Storage (EES) Systems. The TC is also working on another standard IEC 62933-5-3 which is the safety of BESS after unplanned modifications. The Japan National Laboratory for advanced energy storage technologies (NLAB) maintains state-of-art large scale facilities for safety tests of BESS to support standards development and improve safety and reliability of BESS.

APEC economies could monitor these standards developments and leverage them to support CE policy and industry. These standards are open to APEC economies, and some of us have

already participated. There are also opportunities for APEC economies to influence by getting involved early.

5.4.3 Panel 2: APEC Economies' Approach to Circular Economy Policy Making

This panel was moderated by **Prof. Dr Agamuthu Pariatamby, Senior Professor in the Jeffrey Sachs Centre on Sustainable Development at Sunway University, Malaysia**. The economies in the APEC region have created or are exploring the possibility of creating circular economy policies, ranging from roadmaps, financial support, raising awareness, to technical regulation, standards and conformance. This panel aimed to highlight a selection of approaches.

MsPengiran Suridah Bte Pengiran Haji Sulaiman from Brunei Darussalam, Chair of ASEAN Consultative Committee on Standards and Quality (ACCSQ) presented on the new "Framework on Circular Economy for the ASEAN Economic Community (AEC)" which was one of the Priority Economic Deliverables under the Chairmanship of Brunei Darussalam in year 2021 for ASEAN. Standards and conformance are recognised as one of the "Strategic Priorities", which calls for standards harmonisation and mutual recognition arrangements of circular products and services. The Framework was expected to be adopted by AEC Council in October 2021.

In addition to ASEAN's regional approach, several panellists from various APEC economies were invited to share the good practices within their economies:

Malaysia: Mr Eddy Mazuanshah Ali Murad, Deputy Undersecretary, Environmental Management Division, Ministry of Environment and Water shared the new Malaysian Plastic Sustainability Roadmap, which is being developed to support the Sustainable Malaysia 2030 effort. The Ministry has mapped out the key challenges, and identified strategies such as increasing corporate action towards plastic circularity and sustainability; improving plastic recovery management; introducing policy, legal and institutional support; introducing financing opportunities; making market data available and accessible, enhancing R&D and technical support; and raising awareness, among others.

Singapore: Dr Sing Yang Chiam, Director of Singapore Battery Consortium, Lead of A*STAR Urban Green Tech Horizontal Programme Office shared the Agency of Science, Technology and Research (A*STAR)'s Urban and Green Tech Horizontal Programme, which acts as a one-stop platform that pulls together multi-disciplinary R&D capabilities in public and private sector to support national priorities in low carbon future, CE, and sustainable built environment. Another policy lever is through the formation of industry consortia - Singapore Battery Consortium (SBC), which intensifies development of emerging battery industry in Singapore to support clean and sustainable energy. SBC also contributes to standardisation through direct participation and events to exchange knowledge about the latest standards to support the industry.

Thailand: Dr Pongvipa Lohsomboon, Deputy Director-General of Thailand Greenhouse Gas Management Organization shared Thailand's new comprehensive Bio-Circular-Green Economic Model for Inclusive and Sustainable Growth on 4 industries: food and agriculture; medical and wellness; energy, material and biochemical; and tourism and creative economy. To support the BCG model, Thai Industry Standards Institute developed three standards namely Framework for Implementing the Principles of the CE in Organisations - Guide (based on BS 8001 standard); Circular Economy Management System for Organisation; and Plastics Recycling Traceability and Assessment of Conformity and Recycled Content Requirements.

Australia: Ms Antonella Bates, Director, Waste Collection and Resource Recovery, Environment Protection Division, Department of Agriculture, Water and the Environment shared Australia's National Waste Policy 2018 and National Waste Policy Action Plan 2019. To support the achievement of targets under the National Waste Policy Action Plan, the Australian Government is driving a \$1 billion investment in the waste and recycling industry, including by using financial initiatives such as public procurement (integrating sustainable procurement into Commonwealth Procurement Rules) and funding (e.g., Recycling Modernisation Fund). The *Recycling and Waste Reduction Bill 2020* bans the export of unprocessed waste for disposal overseas. DAWE is working with the industry to develop fit-for-purpose standards to harmonise the kerbside bin system.

Roadmap, framework and strategy are the most popular policy tools in the APEC region to support CE such as in Malaysia, Thailand, and Australia. At the regional level, ASEAN has just drafted a framework for circular economy under Brunei Darussalam's chairmanship. Other policy levers are R&D, convening and partnership in Singapore, and public procurement and incentives in Australia. Standards play critical roles in these examples, especially in the ASEAN framework and in Thailand where new Thai standards were developed to support national CE priorities.

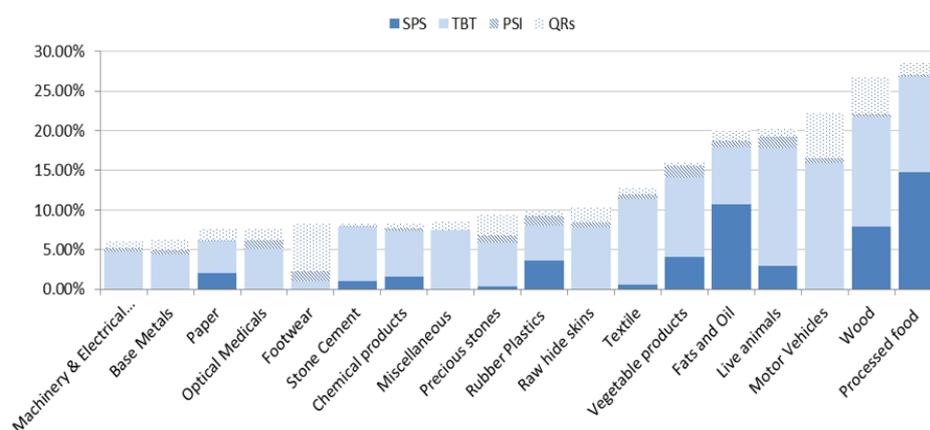
5.4.4 Panel 3: Standards and Conformance supporting International Trade, Sustainability and Circular Economy

This panel was moderated by **Ms Satvinderjit Kaur Singh, Researcher at the APEC Policy Support Unit (PSU)**. Standards and conformance are effective tools to achieve balance in sustainable development efforts and trade facilitation. Various international initiatives have set rules and guidelines in this area for government and stakeholders to improve coherence between trade and important legitimate regulatory policy goals, especially environmental protection, and circular economy.

The panellists of this session were invited to share their thoughts on the interplay between standards, circular economy and international trade.

Dr Susan Stone, Head of Emerging Policy Issues Division, Trade and Agriculture Directorate of the OECD shared that the OECD has been working on a series of CE initiatives, which includes Trade and Circular Economy initiative; RE-CIRCLE: resource efficiency and circular economy, a project that provides policy guidance; OECD Environment Working Paper relating to CE. Trade provides the economy of scale to support the development of CE. It needs to be supported by open market, consistent processes, consistent product and principle-based standards. The WTO Technical Barrier to Trade (TBT) agreement requires the use of international standards as a basis of technical regulations, standards and conformity assessment procedures. In addition, OECD data shows TBT due to inconsistent regulations or standards has high negative impact to trade especially in terms of added costs (Fig. 2). Hence, during the COVID-19 pandemic when essential resources are scarce, governments made efforts towards improving coherence through the development of common approaches and mutual or unilateral recognition of conformity assessment procedures to keep the trade flowing.

Effect on NTM on Prices



OECD Trade and Agriculture Directorate

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Fig. 2 Effect on NTM on Prices (OECD)

Mr Devin McDaniels, Economic Affairs Officer, Trade and Environment Division, World Trade Organisation (WTO) further underscored why CE strategies should consider trade due to economy of scale and specialisation. Among others, the WTO rules that support CE relevant to this conference is the TBT agreement, e.g., technical regulations or standards on recyclability of batteries for electric vehicles. TBT measures relating to CE is gaining more traction with over 440 notifications submitted to the WTO and a total of 30 Specific Trade Concerns (STP). Differences in standards, regulation and conformity assessment procedures can result in reducing producers' incentives to adopt consistent circular practices along the value chain, create additional costs or exports and result in trade barriers. The WTO continues to look at new initiatives to support CE, especially for plastics.

Ms Kwei Fern Chang, Chair of Asia Pacific Accreditation Cooperation (APAC) provided an overview of the international conformity assessment framework, in which international and regional accreditation bodies – including APAC, and their global mutual recognition arrangement (MRA) network that provides added assurance to the result of testing, inspection and certification activities for global acceptance. APAC has several MRA programmes supporting CE e.g., GHG validation and verification based on ISO 14065; Energy/Water Efficiency and Environmental Management System Certification based on ISO 50001 and ISO 14001; other programmes on electric vehicles, solar photovoltaic, eco labelling and sustainable farming.

Ms Jenna Larkin, Environmental Protection Specialist, the United States Environmental Protection Agency of the US presented on the agency's Environmentally Preferable Purchasing (EPP) Program. The US federal government is the largest single purchaser in the world, which can influence the sustainable product market and support several Biden-Harris Administration priorities on environment and climate change. Standards and ecolabels are recognised as effective tools to support the programme and trade within the US and across borders.

In this panel, the OECD and WTO shows the important linkages between standards, international trade, CE and the TBT agreement which requires the use of international standards for technical regulation. Their data indicates CE is gaining traction within the APEC

region and globally, especially the growing number of TBT measure notifications and specific trade concerns about CE. The OECD and WTO also have useful tools and information to support CE policy development for APEC economies. In addition to standards, the accreditation community also provides MRA programmes to support implementation of CE standards and support trade. The US EPA demonstrates how standards can be an important part of public procurement and trade to support CE policy.

5.4.5 Panel 4: Good Practices on Use of Standards and Conformance in Industry to Support Circular Economy in APEC economies

This panel was moderated by **Mr Dennis Chew, Regional Director of IEC Asia Pacific Regional Centre**. In emerging areas such as circular economy, businesses have been using standards and conformance to demonstrate and contribute their commitment to environmental protection and sustainable development. In addition, businesses benefit from customer confidence, increased efficiency, and improved market access, among others.

Malaysia: Mr Kian Seah, Chief Executive Officer of Heng Hiap Industries, and Dato' Adnan Pawanteh, Executive Director of Corporate Affairs, Nestlé Malaysia shared their organisations' strong interests and commitments to CE through several initiatives. Due to the lack of dedicated and relevant standards for CE, companies including Heng Hiap and Nestlé were innovative to mix-and-match existing standards to benchmark their CE claims. Examples of the standards used are ISO 9001, ISO 14000 series, ISO 22000, ISO 45001, ROHS & REACH, Ocean Bound Plastic, Global Recycling Standard, Green Label Singapore, etc. There are opportunities to work with these organisations to evaluate how to consolidate these standards with their implementation experience and to develop standards tailored to industry's need and address gaps.

Chinese Taipei: Mr Ron R.T. Horng, Vice President and Chief of Corporate Environment Division, Hon Hai (Foxconn) Technology Group shared that his company's approach with a comprehensive series of CE and environmental standards including UL 3600, UL 2799, UL 2789, UL 2809, EN 50419, RCS 2.0, and GRS 4.0, further supported by plastic material standards such as UL 94 and UL 746.

Japan: Mr Masayuki Kanzaki, Director, Carbon Neutral Department, Sustainable Management Promotion Organization (SuMPO) presented on the Ecoleaf environmental labelling programme developed by SuMPO based on ISO 14025, 14067, 14040 and 14027. The programme supports CE through carbon neutral activities. The use of existing ISO standards ensures transparency and credibility of the program. The programme directs the business entities' supply chain management toward CE and carbon neutral.

From the perspective of industry, CE is an up-and-coming trend. Many companies are already adopting CE to improve resource efficiency, productivity, acquire know-how, reduce environmental impacts, support social responsibility and corporate governance. Companies are motivated to go the extra mile and adopt voluntary standards to improve productivity, integrate fragmented supply chains, benchmark against the most stringent international targets especially the UN SDGs, to stay ahead of the curve and competition. These are important learning points for the MSMEs in the APEC region, and for policy makers who are interested in helping MSMEs.

CE can also be a new demand driver, creating new business opportunities in recycling, repurposing, refurbishing, repair, etc. As these opportunities are very new, the adoption of standards can help them build trust with customers and policymakers. Recycled materials,

especially plastics, can be made with lower cost through standards and conformance, to support the implementation of CE in APEC.

5.4.6 Breakout discussion

After hearing from the invited speakers, a breakout discussion was organised for the participants to reflect on their learning from the speakers over the past four sessions, and brainstorm ideas to support CE development within their economies. The participants were broken into small groups. Each group was assigned the same set of four questions, which were related to each of the four panels of this conference.

Each of the breakout groups was asked to identify a chairperson who will lead the discussion, a notetaker to jot down the key discussion points, and a presenter to present the findings to the plenary.

The questions and salient points of breakout discussion are:

5.4.6.1 What CE related standards are used in your economy and, what new standards should be developed?

The existing standards quoted in the breakout discussion are ISO/TC 323 and its ISO 59000 series of standards, ISO 14000 series of standards, BS 8001, standards related to recycling – material quality, and recycled plastic content.

The new standards that should be developed include CE definition and framework, standards that encourage the reduced use of plastics as recycling can be difficult to implement in some economies, waste collection process, measuring recycling rate, recycled product quality and safety, and eco-design.

5.4.6.2 What kind of policies should be implemented to contribute to CE and how can standards support?

There were a lot of ideas provided by the breakout group, some are similar to those shared by the conference speakers, e.g. roadmap and action plan, raising awareness and promote the benefits, financial incentive, waste segregation at source, etc.

The others include eco-design for product and environment evaluation, ecolabel for eco products, extended producer responsibilities, CE demonstration park and role models, promote industrial symbiosis, standalone CE policy that can be embedded in any other policies, encourage green consumption and exchanges, guidelines on adoption of CE and certification, CE Data collection and sharing.

There was also an idea more specific to standardisation that called for standards body to link all relevant ministries to develop CE policies.

5.4.6.3 How can standards and conformance play a role in the cross-border trade of CE related products and services, are there any experiences to share?

The participants generally agreed that standards and conformance support cross-border trade of CE, as differing standards can be an impediment to international trade while standards develop a common language and equal perception of products, build trust with consumers and encourage supply chains to accept recycled products, help consumers make informed decisions about the circularity of products and services. Standards ensure quality, safety, health,

environment and labour rights, improve businesses' competitiveness and reputation, create new business opportunities and job creation, and demonstrate the best practices of CE.

5.4.6.4 What are the benefits for industries to adopt CE related standards, any challenges?

The participants were able to share a long list of benefits, which can be listed below:

- It will give companies a competitive advantage
- More resource efficiency and less impact on environment. Encourage more eco-friendly products
- Regulatory compliance and customer demands
- A common language across borders
- Reduced cost
- Avoid greenwashing
- Re-strategise and make business more sustainable to industry
- Contribute to SDGs
- Benchmark SMEs with large enterprises

For the challenges, the participants generally agreed that costs of adopting standards is a major hindrance, especially for MSMEs. Others include availability of suitable standards, technical knowledge, worry about standards being used as technical barrier to market entry, and lack of resources and tools

5.5 Gender balance

5.5.1 Speakers

The number of female speakers was 10 out of a total of 24 speakers, which was 41.7% and exceeded the project target of 30%.

5.5.2 Participants

The number of female participants was 53 out of a total of 99 participants, which was 53.5% and exceeded the project target of 30%.

6. Post conference survey

6.1 Introduction

The purpose of this post conference survey was to collect feedback on the conference, attendee learnings from the conference, and other recommendations. After the conference, a post conference survey was conducted to collect feedback on the conference and attendee learnings from the conference, and other recommendations.

Unlike the pre-conference survey, all the attendees were asked to respond to the same set of questionnaire for post conference survey. The respondents were invited to share the level of satisfaction of the conference including quality and relevance of the objective, agenda and topics, speakers and their content, organising of the conference, materials distributed, time allocated, level of knowledge improvement, and whether the conference achieved the objectives. There were also open-ended questions about how the respondents will apply the learnings in their respective economies, areas of improvement, and what could APEC do in future.

6.2 Results

The total number of respondents was 29.

Vast majority of the respondents - 90% provided positive feedback about this conference. They either agreed or strongly agreed with the statements about the conference below (the other 2 available options were "Neutral" and "Disagree"). There was only 1 negative feedback that the timing of the conference is inconvenient for the participants from the Americas due to time difference of this virtual conference.

- The objectives of the conference were clearly defined
- The conference achieved its intended objectives
- The agenda items and topics covered were relevant
- There was gender balance of speakers at the conference
- The content was well organised and easy to follow
- The materials distributed were useful
- The speakers were well prepared and knowledgeable about the topic
- The time allotted for the conference was sufficient

Two third of the respondents shared the content was very relevant to them. Over 60% of the respondents felt their knowledge on this topic has increased after the conference.

In the open-ended questions, respondents shared that the key achievements of this conference include sharing of best practices, raising awareness about CE and the importance of standards, which aligns well with the objectives of this conference. Participants also found it useful to learn about the existing standards and trends used by various SDOs.

After the conference, most participants will use what they have learnt to develop new strategies and initiatives on CE supported by standards and conformance. Participants also suggested APEC to continue the sharing of good practices. The developing economies also expressed strong gratitude to be able to participate and learn in this conference.

7. Recommendations

The following recommendations were derived through the discussions, observations and feedbacks during the conference and surveys.

7.1 Continued sharing of good practices, exchange experiences and case studies about CE and standards

Many participants reflected that one of the biggest achievements of this conference was to learn about the good practices of CE in other APEC economies. Hence, APEC and APEC economies should conduct more activities to share these practices, exchange experiences and case studies about CE and standards.

7.2 Continue to raise awareness of CE and standards and conformance for CE

CE and the use of standards and conformance to support CE are beneficial to APEC economies. Conferences and initiatives like this help to raise awareness and encourage stakeholders to take action. APEC and APEC economies could consider organising more initiatives like this.

7.3 Initiatives to encourage harmonisation of standards and regulations related to CE and the use of recognised conformity assessment to support CE

Consistent standards and regulations support the international trading system, which in turn promote CE. APEC economies should harmonise technical regulation, standards and conformity assessment procedure, and base them on international standards as stipulated in the WTO Technical Barrier to Trade (TBT) agreement. Accredited and global mutual recognition arrangement (MRA) programmes administered by ILAC, IAF and APAC provide added assurance and trust of the tested, inspected and certified products and services.

7.4 More participation by APEC economies in international standards development activities to influence global CE standards

In addition to adoption of international standards to support harmonisation, there is also opportunity for APEC economies to participate and influence international standards relating to CE while they are still being developed.

7.5 Identification of gaps and propose new standards to support CE stakeholders in APEC region

APEC stakeholders have been implementing CE frameworks to achieve legitimate interests and stay ahead of the competition. As CE standardisation is still relatively new, there are a lot of opportunities to develop new standards to address pain points and needs. Standards bodies could work with stakeholders to identify these opportunities.

7.6 Technical assistance for standards related to CE especially for MSMEs

A lot of stakeholders, especially MSMEs from developing economies, need technical assistance to adopt CE and the relevant standards. Hence, APEC and APEC economies should explore initiatives to support them.

7.7 Development of APEC guidelines

To support technical assistance initiatives and to continue the excellent works of the APEC Policy Support Unit, APEC could consider developing guidelines to support CE development and use of standards and conformance.

7.8 Involvement of private sector in the development of CE policy and standards

Private sector players have been adopting CE frameworks and related standards to support business objectives, contribute to UN SDGs, and stay ahead of competition. They are often on the front line and are able to provide useful insights to help policymakers and standards developers in the APEC region.

7.9 Cross fora collaboration within APEC, and even beyond APEC such as OECD and WTO

CE is a comprehensive and cross-cutting framework, which requires collaboration among different APEC fora such as CTI, SCSC, PPSTI, CD, OFWG, TPTWG, among others. Beyond APEC, some international organisations such as the OECD and WTO have already developed useful tools and materials to support CE, which can foster collaboration within the APEC region.

Annex 1 – Conference agenda

Annex 2 – List of participants

Annex 3 – Details of pre-conference survey results

Annex 4 – List of standards referenced in this project