



**Asia-Pacific  
Economic Cooperation**

**Advancing** Free Trade  
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# **APEC Workshop on Promoting Green Garment and Textile Sector towards Inclusive and Sustainable Growth**

Summary Report

**APEC Committee on Trade and Investment**

November 2023





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Economic Cooperation**

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Produced by

Vu Lien Huong  
Multilateral Trade Policy Department  
Ministry of Industry and Trade, Viet Nam

For  
Asia-Pacific Economic Cooperation Secretariat  
35 Heng Mui Keng Terrace  
Singapore 119616  
Tel: (65) 68919 600  
Fax: (65) 68919 690  
Email: [info@apec.org](mailto:info@apec.org)  
Website: [www.apec.org](http://www.apec.org)

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# PROMOTE GREEN GARMENT AND TEXTILE SECTOR TOWARDS INCLUSIVE AND SUSTAINABLE GROWTH

21 - 22 September 2023

## Summary Report

### I. INTRODUCTION

On 21 and 22 September 2023, the APEC Workshop on *Promoting Green Garment and Textile Sector towards Inclusive and Sustainable Growth*, initiated by Viet Nam and co-sponsored by Indonesia; Japan; Korea; Peru; the Philippines; and Thailand, was held in Ha Noi, Viet Nam. Speakers and participants came from international organizations and research institutions and representatives from APEC member economies' relevant Ministries and government's agencies, companies and business associations that relates to garment/ textile and/or green economy in APEC economies and across the APEC region.

The Workshop aimed to provide an opportunity for stakeholders for sharing information, good practices and suggest recommendations on ways to promote green garment and textile sector towards inclusive and sustainable growth.

### II. BACKGROUND

Today consumers are becoming more aware of the need to protect the environment, and companies use these terms to promote their goods or services with eco-labels. Environmentally friendly (also eco-friendly, nature friendly, and green) are terms used to refer to goods and services, laws, guidelines and policies claiming to inflict minimal or no harm on the environment. In this context, green or environmental concerns have started to draw more and more attention in the garment and textile sector.

According to Geneva Environment Network<sup>1</sup>, fashion production makes up 10% of humanity's carbon emissions, dries up water sources, and pollutes rivers and streams; 85% of all textiles go to the dump each year, and washing some types of clothes sends significant amount of microplastics into the ocean. The fashion industry produces between 2 to 8 per cent of global carbon emissions. Textile dyeing is also the second largest polluter of water globally and it takes around 2,000 gallons of water to make a typical pair of jeans. If nothing changes, by 2050 the fashion industry will use up a quarter

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<sup>1</sup> <https://www.genevaenvironmentnetwork.org/resources/updates/sustainable-fashion/>

of the world's carbon budget. Textiles are also estimated to account for approximately 9% of annual microplastic losses to the ocean (UNEP, 2021).<sup>2</sup>

Environmental pollution and climate change are creating pressure during the development of the sustainable and green economy in general, green sector in particular, including garment and textile sector, towards inclusive and sustainable growth at both domestic and global levels. In other words, "greening" the garment and textile sector is a global trend that businesses must implement to achieve inclusive and sustainable development goals and increase exports.

Greening the garment and textile sector is essential for the sector to fully exploit opportunities arising from free trade agreements and participate deeply in the global value chain. For example, according to the President of Viet Nam Garment and Apparel Association, most fashion brands in the US, Japan and the European Union (EU) were now more demanding on the quality of products, adding that many importers required the production to be friendly to the environment, such as through water-saving and not using coal. They also required suppliers to use green and recycled materials to meet global consumer trends, meaning that manufacturers must be transparent in production and ensure product traceability, which was no longer an option but a mandatory requirement. These are all challenges, as well as a motivation for textile enterprises to improve themselves, seize opportunities and make an impressive transformation in the future. The use of clean energy in the journey of "going green" also helps reduce pressure on energy security, contributing to achieve inclusive and sustainable development.

Inclusive and sustainable growth is a long-time target of APEC economies. APEC 2022's theme is "Open. Connect. Balance." which relates to inclusive economies and sustainable economic growth, with the Bio-Circular-Green Economy Model as the overarching thinking.

Greening the garment and textile sector is one method used to achieve renewables, recycling and reducing waste, towards inclusive and sustainable growth. This 2-day Workshop is expected help economies and stakeholders to share information, good practices and give recommendations on ways to promote green garment and textile sector towards inclusive and sustainable growth.

### **III. OPENING REMARKS**

In the opening remarks, Mr Luong Hoang Thai (Director General, Multilateral Trade Policy Department, Ministry of Industry and Trade, Viet Nam) highlighted that in

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<sup>2</sup> <https://www.unep.org/news-and-stories/story/putting-brakes-fast-fashion>

the urgency of environmental pollution and climate change, shifting production from "brown" to "green" has become a global trend. The garment and textile sector is not outside this trend. In recent years, garment and textile products have been the main export commodity of many APEC economies, including Viet Nam. However, Mr Luong observed that this is also one of the economic sectors that creates more environmental and social risks. During the production process, the garment and garment industry needs to exploit, use and discharge a large amount of water, consume a lot of energy, leading to adverse impacts on water resources and contributing to increased greenhouse gas emissions. According to statistics from the United Nations Environment Program (UNEP), the fashion industry is responsible for 8-10% of humanity's carbon emissions – more than all international flights and maritime shipping combined. About 60% of all materials used by the fashion industry are made from plastic. Furthermore, 85% of all textiles go to the dump each year and washing some types of clothes sends significant amount of microplastics into the ocean.

In order to solve this problem, Mr Luong recognized that the "green" factor is no longer an option but is gradually being legalized in many economies. In early April this year, the European Commission (EC) proposed to apply several new ecological regulations for garment and textile products in the European market to implement a strategy on sustainable and circular textiles. According to the EC's proposal, garment and textile products exported to this market require a long lifespan, can be reused and recycled etc. Mr Luong also mentioned the United States and Japan are currently more demanding on product quality, whilst requiring garment and textile production to be environmentally friendly, such as saving water, using green and recycled materials to meet the global "green" consumer trend. Although this problem was recognized very early, due to technological and financial limitation, not all enterprises have the conditions to accelerate the "greening" process. Therefore, in addition to enterprises' own efforts, the Governments may need to have more specific support mechanisms to promote the development of their garment and textile sector.

Holding this Workshop is contributing to the collective effort towards achieving the Bangkok Goals on Bio-Circular-Green (BCG) Economy which was adopted by the APEC Economic Leaders in November 2022. The Workshop is expected to discuss and propose feasible and applicable initiatives, recommendations and policy solutions for APEC cooperation in the coming time.



## **IV. KEY ISSUES**

### **1. OVERVIEW ON GREENING THE GARMENT AND TEXTILE SECTOR**

To begin the session, Ms Nguyen Thi Hien Trang, Senior Manager, Act Renewable Company talked briefly about the connection between apparel sector and climate crisis. The sector creates 100 billion apparel items every year, the 2<sup>nd</sup> most polluting industry, it causes 8% global Green House Gas emission, 20% of all global wastewater and 15,000 types of chemical. After that, she mentioned about the decarbonization progress 2023 with 5 stages. The speakers presented more details about brands and suppliers decarbonization interface from brand strategy and target setting to supplier driven actions. She said that each region has a different set of rules and technology availability and each company has its own policy and resources. At the end of the presentation, the speaker emphasized on the deadline of 2030 outlook to deliver 1.5 degrees commitment. She raised some questions for consideration that included: How regulation landscapes develop?; How technologies develop?; Will companies be able to change mindset and move quickly? And How companies can get access to financing?

### **2. GOOD PRACTICES ON GREEN GARMENT AND TEXTILE SECTORS TOWARDS INCLUSIVE AND SUSTAINABLE GROWTH**

There were two speakers in the Session: Mr Chanchai Sirikasemlert, Executive Director, Thailand Textile Institute; Ms Caya Jenneli E, Supervising Science Research Specialist, Philippines Textile Research Institute.

- Mr Chanchai Sirikasemlert started his presentation by sharing that the garment and textile sector is a major contributor to the global economy, accounting for 2% of global GDP and employing over 75 million people but it causes 10% of global greenhouse gas emissions (1.7 million tons of CO<sub>2</sub> emitted annually) 20% of global water pollution. Therefore, the fashion and textiles industry already takes action on several sustainability challenges. The speaker also listed out some policy and regulation EU strategy for sustainable and circular textiles (adopted 30 Mar 2022). The Ecodesign Directive for Sustainable Products (ESPR), Waste Framework Directive (WFD). In the second part about the garment and textile go green, Mr Chanchai shared that The innovation of dyeing with natural dyes for uniform mercerization and durable dyes such as indigo, lac, Garcinia dulcis, Burma padauk, etc. is undertaken to reduce the use of harmful dyes and chemicals. Environmental-friendly design can find the solution of design with the lowest impact possible on the environment during the life cycle of a product. The circular economy can help to reduce the environmental impact of the textile and apparel industry. In the third part, the speaker introduce briefly about Thailand Bio – Green - circular economy model. At the end of the presentation, the speaker shared some success case stories

in Thailand that include SC Grand Company, Wishulada, Thai Taffeta.

- Ms Caya Jenneli E presented about Sustainable and Science, Technology, and Innovation (STI)-enabled Rebound Strategy for the Philippines Textile-Garment Sector. Firstly, the speaker introduced the Philippines Tropical (textile) Fiber (PTF) which are made from abaca, pineapple, banana, bamboo. After that Ms Caya talked about the fiber technology. Filipinnovation is the whole-of-government approach (WGA) to inclusive innovation, which will ensure policy coherence, alignment of priorities, and effective coordination in service delivery. About the frontier, the speaker mentioned about textile technology and innovation, infrastructure, human resource, policy and incentives, public/private investment. The speaker presented about some fiber innovation hubs, yarn production centers, silk research and production center, handloom weaving innovation center. She also shared that PTF are fabrics containing NTFs produced, spun, woven, or knitted, and finished in the Philippines and which have been tested and certified. At the end of the presentation, Ms Caya provided some information about the Protective Re-engineered Occupational Textiles R&D with its partnership, promotion and communication activities.

### **3. OBSTACLES IN GREENING GARMENT AND TEXTILE SECTOR TOWARDS INCLUSIVE AND SUSTAINABLE GROWTH – PERSPECTIVE OF THE PRIVATE SECTOR**

There were two speakers in the Session: Mr Sungho Joo, Team Manager, Korea Federation of Textile Industries; Ms Veronica Mae F. Baguio, Founder & Owner, Balik Batik, the Philippines.

- Mr Sungho Joo divided his presentation into three main parts: Background; Global SCT Trends; and Challenges and Opportunities. To begin, the speaker shared that the textile industry has transformed itself with ceaseless innovation, position itself as a key industry to drive in the future. The textile is the fourth largest contributor to climate change (global warming, water pollution, ecosystem destruction etc). Recently, many economies continue to develop policies for sustainability in textile industry. As sustainability regulations are increasing tightening, especially in advanced economies, eco-friendly materials and process technologies have become a key competitive and advantage in the global market. In the second part, the speaker talked about the Sustainability & Circularity in Textiles (SCT) with economy's schemes of the EU and China; Japan; Korea; and USA. About global players trends, Mr Shungho Joo said that some big brands have plans to use eco-

friendly textiles goal setting and the soaring recycled materials market. In the third part, the speaker talked about Korea textile industry perceptions by showing the result of a survey to 292 textile companies in Korea. He identified some challenges to the industry that include lack of awareness of circular economy, difficulties in supplying recycled materials and lack of a circular system of technology, industry, consumption and institution. About opportunities, the speaker mentioned about digital platform for fashion brands and supply chain, the dimension of key factors of obstacles of recognition, experience and objectivity.

- Ms Veronica Mae F. Baguio provided some information that 62 million tons of garment are consumed each year but only 20% being reused for recycled. About Balik Batik, this is a micro social enterprise that works with Filipino indigenous groups, weavers and artisans to make modern clothing pieces. their goal is to make traditional Filipino designs wearable any day, every day, by every Filipino. The speaker talked about some difficulties that the business has including cost of goods, availability of the fabrics, lack of awareness among buyers. With many options to purchase low cost clothing, most buyers opt for more affordable alternatives. According to the speaker, sustainable textiles are more expensive and also are limited in stock, as they are not mass produced. To step forward, Ms Veronica recommended that private sector and government can work hand in hand in promoting local garments and increasing the market; Youth advocates can be empowered to continue promoting green garment and sustainable textiles; and Social enterprises support network to help each other.

#### **4. OBSTACLES IN GREENING GARMENT AND TEXTILE SECTOR TOWARDS INCLUSIVE AND SUSTAINABLE GROWTH – PERSPECTIVE OF THE ACADEMIC SECTOR AND INTERNATIONAL ORGANIZATIONS**

There were 3 speakers in the Session: Dr Nguyen Van Thong, Member of Board Directors, Viet Nam Textile Research Institute JSC; Ms Saskia Anders, Team Lead, IGS Project, GIZ; Mr Hu Kehua, Deputy Director of Office for Social Responsibility, China National Textile and Apparel Council.

- Dr Nguyen Van Thong focused his presentation in three parts: Greening the textile industry - the problems of the textile supply chain; Practices in greening the textile industry; Obstacles in greening of the textile and garment industry and potential solutions. Firstly, he provided an overview about green textile in sustainable growth and current problem with textile supply chain and value chain. He mentioned about fast fashion, and drivers of change. In the second part, the speaker introduced briefly about Viet Nam garment and textile industry. Viet Nam belongs to the group of 5 largest textile exporting economies in the world: export value in 2019 reached

USD39 billion, in 2020 reached USD35 billion, in 2021 reached USD39 billion; by 2022 to reach USD44 billion. The industry has the second largest export turnover, contributing 10-15% to GDP. Main stages in the production chain: spinning, weaving, dyeing and sewing wear. The main textile materials are cotton fiber, polyester fiber, cotton yarn, polyester fiber and blended yarn. After talking about the obstacles and barrier to green awareness and knowledge, Dr Thong came with some recommendation such as: Raise awareness of business owners, employees and consumers about environmental sustainability; Tighten and strengthen regulations and sanctions related to environmental issues; The Government and related organizations create facilitated opportunities to bring SMEs into the supply chain of large enterprises; Make the relationship between brands and outsourcing companies two-way; NGOs act as intermediaries for the adoption of sustainable practices in the textile and garment sector; The enterprises revise the strategic vision, customer segments, core values, perceptions of the board of directors and all employees to reflect emphasis on improving environmental sustainability in the business.

- Ms Saskia Anders provided a snapshot about textile industry in Viet Nam which is A major export sector: ranks 2nd in Viet Nam (after electronics), and 3rd in the world (after China and Bangladesh). There is an uneven development between segments in the supply chain, more concentrated in downstream segment, apparel production heavily relies on imported fabrics. The speaker talked about some challenges to the industry that include new approach; Lack of information on regulations and obligations for international companies; Risk that “compliance” is being passed down the supply chain; Social and environmental improvements need time and investment; Identified risks cannot be mitigated alone. From the findings, the speaker concluded with some recommendation at policy level and company level. For the policy level, we need to implement the approved textile and footwear development strategy with a concrete actions, proper monitoring and evaluation, and engaging all relevant stakeholders and resources. Project and prepare for industry trends and new requirements, e.g. high quality recycled materials. Promote economy/sectoral branding or marketing to the world about Viet Nam’s readiness and competitiveadvantages of sustainability due diligence. For the garment and textile companies, need to discuss the implications and implementation plans with customers. Allocate sufficient resources to understanding and proactively complying with the legislative landscape. Seek out opportunities to engage policymakers to contextualize policy implications and shape their development and delivery.
- Mr Hu Kehua started his presentation by giving some figures about China textile industry which creates jobs for 22 million people, 230,000 enterprises, 1 trillion

value outputs. He also presented some reason why garment industry matters in greening. Turning raw materials into textiles is a major source of water pollution, contributing to 20% of industrial water pollution. The production of one cotton shirt requires 2700 liters, equal with the amount a person drink in 2,5 years. According to the speaker, environment control on traditional visible pollution to invisible pollution, the environment management in the textile industry should turn to chemicals environmental management. Clothing also accounts for 3% of global carbon dioxide (CO<sub>2</sub>) emission, in both its production and use phases. The industry's immense footprint extends beyond the use of raw material. GHG emission during the use phase of textiles are also significant. Washing and drying of clothing alone are estimated to account for 120 million tons of CO<sub>2</sub> equivalent. Mr Hu Kehua talked about the manufacturer decarbonization before 2030 from material to customer requirement. He shared that if no action is taken by 2050, the amount of plastic in the oceans will surpass the number of fish. Recently, stakeholders have explored and contributed a series of solution to improve the performance in their supply chain but got produce very little effect regarding their goals.

## **5. CASE STUDIES IN SOME APEC MEMBER ECONOMIES**

There were three speakers in the session: Mr Doni Primadi, Industry Supervisor, Center for Standardization and Industrial Services for Textile, Indonesia; Ms Nguyen Thi Hien Trang, Senior Manager, Act Renewable Company; Ms Veronica Mae F. Baguio, Founder & Owner, Balik Batik Company, the Philippines.

- Mr Doni Primadi introduced briefly about RECP which is Resource Efficient and Cleaner Production, a continuous process of improving the efficiency of use of natural resources (materials, water and energy). He provided more details about Review of RECP Implementation in Textile and Garment Industry including garment, dyeing finishing and spinning mills. The speaker shared that compressor energy saving opportunities, the leak rate for compressed air systems can reach 10% under normal conditions, As a guideline for best practices, every 1 bar drop in pressure will result in a 7 percent drop in energy usage. Besides, energy-saving is potential for electricity LED lamps have a lifespan of up to 50,000 hours, while tube lamps have a lifespan of around 6,000 hours, so using LED lamps does not require more frequent replacement and reduces maintenance costs significantly. About water saving, the company water consumption is limited to domestic use such as hand washing, drinking, use in toilets, on-site cooking, dishwashing and car washing. According to the speaker, the most significant RECP potential and management concern in spinning mill is the electricity consumption. Saving in electricity consumption means saving in production cost and reduction of GHG emissions. At the end of the presentation, Mr Doni Primadi concluded that RECP

is a new and creative way of thinking towards products and the production processes, RECP strategy comprises eight practices: good housekeeping, input material change, better process control, equipment modification, technology change, on-site recovery/reuse, production on useful by product, product modification.

- In this session, Ms Nguyen Thi Hien Trang introduced about Act Renewable, a German consulting firm on renewable energy strategy and procurement for corporates and supply chains. After that she mentioned on the reasons why we need to customized renewables energy strategy and case study on renewable strategy for corporate A with the committed targets to 100% renewable electricity by 2027, phase out the use of coal by 2025 and reduce 50% scope 1 and 2 emission by 2030. She also talked about market-specific financial data per technology, easibility calculation per technology for corporate A, prioritization of solutions per region based on feasibility and company's profile. The speaker listed out some challenges for the company when conducting the strategy such as ever-changing policies, evolving local regulations, complicated implementation landscape (authorities, service providers), variety of renewable energy solutions in different economies, expertise in RE project assessment and RE strategy, complex and challenging to navigate and keep updated. At the end of the presentation, Ms Trang suggested some solutions for RE transition toolkit: Regional specific data and feasibility tools embedded; Access to up-to-date market intelligence database in a few simple steps; Simplified, scalable, automatic, applicable for different company sizes and geographic coverage; Facilitate corporate's prioritization and decision-making; Renewable energy transition strategy customized to company's profile and business objectives.
- Ms Veronica Mae F. Baguio talked about Promoting Green Garments and Sustainability in the Philippines. The program includes transforming bamboo from fiber to yarn to fabric for textile production, the Philippines silk S&T which deals with the enhancement and revitalization of the sericulture value chain from silkworm germplasm maintenance all the way to silk product development. In the second part, she introduced the Panublix, a sourcing platform & marketplace connecting designers to regenerative tropical textiles and artisan craft so they can design for sustainable future. The program committed to building a data-driven production system that will ensure circular economy standards at every stage of the production process. After that, Ms Veronica showed some brands with key products and materials such as clothes, bags, accessories. RIOTaso is a play on the Tagalog term, RETASO, which means scrap fabric, and the creative mind behind the designs. Retaso creates one-of-a-kind bags made out of scrap textiles which has

both functionality and style in mind. KatHABI Fashion Innovation Event showcasing the latest innovations in textiles and apparel during the 2022 Domestical Science and Technology Week.

## 6. DISCUSSIONS

- A speaker informed that economies are paying more attention to the circular economy to move towards neutral carbon and net zero. However, in some developing economies, it seems that companies still do not have comprehensive understanding of those terms due to limited availability of reliable information. In this case, they are advised to invest time and human resources to learn about those topics first and then with proper awareness they would work to find a way for categorizing and tackling these issues systematically.
- Many brands and businesses choose to make presentation and organize training for both staffs and clients to raise awareness and promote sustainable and/ or responsible production, particularly in the textile and garment industry.
- Regarding effective policy making to support sustainable textile and garment industry, the speaker revealed that after a short period from 2018 to 2021, due to the intensive introduction of renewable energy, Viet Nam became the hot spot for development and investment in Southeast Asia. This is because the Government's policies and regulations were made more enabling and open for international investors and projects and the licensing process for those entities was also taking place quite smoothly.
- A lot of international investors and project developers came to Viet Nam with their concept, technologies and experience in the renewable energy industry, and land was reserved to develop renewable energy projects in Viet Nam. In the same direction, multiple rooftop solar projects were built and many agro-textile companies also launched new projects during that period of time. From 2021 to 2022, the incentive came to an end due to the changes in socio-economic situation.
- Besides, the competition among brands from different sectors like Samsung (electronics), Nike (apparel), etc. accelerates. As they set their agenda and carry out lobbying activities, their brands, activities and products have been prioritized.
- For facilitating sustainable and green development in general, the speaker also shared that her organization focused on two channels. First, setting up pilot programs that allow companies purchasing solar and wind energy. Second, building up a feasible strategy that pay attention to suppliers, especially those from China, to reach out to affordable renewable energy.

- Related to suppliers, it is advisable to put in place a supplier strategy so that the brands can select the right and suitable suppliers, who are really committed in the long time. In the case that they have good strategic suppliers, they can contribute to around 70-90% of emission reduction targets.
- If the production is located in many economies, companies are likely to face the challenges of regulatory environment and legal changes. In fact, regulations of different economies are too hard to predict. Then, supporting those companies to prepare good strategies to deal with policy changes and related unfavorable regulations should be considered. It is possible by building roadmap, making continuous improvement of business and production quality in the long run. In addition, enriching related experience, building in risk assessment and management, taking precautionary measures, putting in place sufficiently flexible strategies are recommended considerations for various types of business, especially in the textile and garment sector.
- Particularly related to selection of materials, the brands are working on development and compliance with standards to prevent or mitigate reverse impacts and deforestation for sustainable and responsible development.
- In Thailand, cotton is imported from the USA and Australia. Thailand only can produce yarns, synthetic cotton and fibers without any capability of cotton production. The spinning system in Thailand is based on short fibers spinning rather than long fibers spinning.
- In the Philippines, hand spinning is widely applied in the craft industry. Talking about industry development, it is difficult to find the right machinery and equipment for long fiber spinning even if the raw materials are available. In fact, developing natural fibers needs to go along with developing machinery and equipment. Then we go through a vicious circle that finding suitable machinery and equipment is also a challenging task because it again depends on the quality of raw materials in the agriculture sector. Some types of equipment have to be tailor-manufactured for specific products or raw materials and the price of those materials and fibers is quite high. Therefore, developing long fiber spinning is a long journey and requires a lot of investment and government support.
- In Thailand, the textile and garment industry must compete with other industries. The private sector is now focusing on the green textile industry, but the development of this sector seems to be rather slow. The speaker also assumed that with the growing concern for sustainable development and available resources, ASEAN has high potential to become the leader in natural fibers and textiles center with biomaterials.
- In the Philippines, a big funding program took place to develop yarns and associated technologies. They also prepared and introduced testing standards for production



and products. In terms of social responsibility, sustainability is taken into account even though no regulations and policies are institutionalized. Lifecycle assessment was embedded on all these technology developments and the government of the Philippines also supported an active participant in this dialogue to promote green production.

- For fibers, different markets require different specifications for fibers. With natural fibers, people could not control the quality and everything depends on difference in rainfall, environment, and crop. Thus, the standardization process for fiber is not easy to be scaled up in the industry.
- Another speaker shared that the technology for storing nanometer products has been developing to get ready for an industrial scale. The regulations and laws to support the technology are still under conversation.
- Regarding the transition to organic production and plantation, it is not an easy process, especially at the individual level, because it requires a huge amount of work. Therefore, people must utilize available resources in the ecosystem, build the capacity and try to develop the technology for supporting organic farming and plantations.
- Under the process of promoting the textile and garment industry, another important consideration is to conserve the social and cultural values of the indigenous communities.
- A lot of investments are needed to make a sustainable ecosystem inclusive, especially for the developing economies. At this stage, the harmonization of rules plays an important role. Korea already puts in place the regulations while the EU takes the very speedy actions over the regulations.
- Another speaker shared that their organization has research and development (R&D) projects for making better recycling, but they may face problems with fishing quality. As a matter of fact, fishing is now becoming greatly contaminated when catches come from the sea and seaside. Synthetic fibers manufacturers are not able to solve the whole problem. They must educate fishermen and people living in the vicinity of seaside to collect and claim for recycling, but they have limitation. Then, it is advised for the local and central government to cooperate with fishermen and fishing workers to facilitate more on recycling programs.
- The use of recycled material is necessary. Some companies such as Nike have already used recycled materials. In fact, the materials are not so easy to recycle because they are made from different components. To do recycling, the private sector companies need to cooperate to develop together mechanisms and facilities for recycling. The obstacle is that it is very costly in terms of capacity and manpower to oversight the recycling process. Therefore, the textile and garment industry could form coalitions to handle the recycling process.

- In Viet Nam, in 2019, the collaboration for packaging and recycling was formed to respond to the environmental protection requirements from buyers and buying economies.
- In the EU, eco-design plays a vital role in preventing more pollution from the textile and garment production. Therefore, to make the industry greener and more sustainable, people can start from the design, for example, to gradually increase the use of materials which are easy to recycle, such as 100% cotton and biodegradable polyester.
- In the United States, the Government has policies to facilitate imports of clothing products from Thailand and Korea and exports of secondhand products to Pakistan. The import-export of secondhand product for further usage is considered to be a good way for sustainability.
- However, it is essential to have a look at the commitments in FTAs, such as CPTPP, and properly handle the issue of rule of origin regulations and other related rules from different economies. The economies should have harmonized policies to avoid destroying the local textile industry.
- In Thailand, there are a lot of cultural textiles and garment products, and the community-based products standards are a bit lower than the industrial product standard. Quality improvement of the traditional and cultural products is required and the marketing of such products of Thailand is suggested to take advantage of social media such as TikTok or influencers because young generation tends to look at famous people when sourcing their clothing and fashion products.
- Counterfeit textiles are also an obstacle for the industry and markets. Setting the standard for textiles is important.
- Setting sustainable consumption patterns is difficult. In order to do that, some governments in the EU have come up with specific regulations and the consumers have to follow them strictly and then the green consumption culture could be formed on this basis.
- In the process of recycling textile and garment products, the textile wastes must be somehow fed back into the industry, perhaps as a raw material to process for the further recycling stages. Under the recycling process, it is needed to prevent as much as possible the release of hazardous chemicals and other environmental issues. It is a huge challenge.
- To upskill women leadership in this sector, one speaker suggested that women should have been offered more opportunity for deeper participation into the sector and receiving more trainings and support from the government and the industry.
- In Indonesia, incentive is provided to stimulate the use of modern and environmentally friendly machines and/or equipment to increase the

competitiveness of the textile industries and products, based on Regulation of Minister of Industry of Indonesia Number 18/2021 concerning the Machine and/or Equipment Restructuring Program in the Fabric Refining Industry and Fabric Printing Industry. The Government also promotes green product procurement, prioritizing green technology products and industries.

- In Asia, governments in some economies have already issued regulations on carbon trading market. In the EU, they set a limit on the level of carbon emission per product. Therefore, for any product to be imported into the EU, carbon emission per product will be checked and the importing companies will have to pay tax for carbon emission. This regulation is also piloted in some parts of Asia. In the textile and garment industry, the carbon credit standards are not yet ready. In the future, the governments should think of setting up a carbon credit program.
- In textile and garment factories, one of the most common solutions for green energy is rooftop solar. However, they face challenges related to dependence of solar thermal energy on the external environment and space limitation to set up. The use of biomass is not really efficient due to the high level of emission produced, but it could provide an option for coal phase-out. In Viet Nam and Thailand, biomass is available from large agriculture sectors. In Cambodia, 90% of biomass is from the forest, which is questionable to experts and other economies due to high risk of deforestation leading to non-acceptance of woody biomass in many economies. In Bangladesh, on the other hand, there is not much biomass so it is not an option for coal phase-out. Therefore, Bangladesh must resort to other alternatives, for example replacing coal with natural gas and finding suitable technology for low carbon emission solutions. Another option is using electricity from water, which is extremely expensive and in the case of hydrogen, it is still under the theoretical pilot phase and is only expected to come in the next 20 years. For many reasons mentioned above, coal phase-out now is a big issue.
- To expand the textile and garments industry globally, one important step is to have a guidance for making investment in other economies to overcome differences in the local consumption culture, regulations, conditions and markets. Economies should have a mechanism for the partnership between domestic industries and FDI investors to promote the investment in the textile and garment sector.
- To promote sustainable and green development in textile and garment sector, a database will be very useful and necessary to calculate the carbon footprint. In this case, a platform to evaluate carbon emission from production and collaboration with brands is necessary. Many international brands are trying to explore models to collect transparent raw data and find green ingredients for their products.

## V. RECOMMENDATIONS

During the final session, there were 3 panelists in this Session: Mr Chanchai Sirikasemlert, Executive Director, Thailand Textile Institute; Mr Hu Kehua, Deputy Director of Office for Social Responsibility, China National Textile and Apparel Council; Ms Caya Jenneli E, Supervising Science Research Specialist, the Philippines Textile Research Institute.

- Mr Chanchai Sirikasemlert came up with some recommendations. For the online platform, there are many benefits of using an online platform such as: (1) Accessibility: Online platforms can be accessed from anywhere in the world, at any time; (2) Cost-effectiveness: Online platforms can save business money on rent, utilities and other overhead costs; (3) Scalability: Online platform can be scaled up or down easily to meeting the needs of a businesses; (4) Flexibility: Online platforms offer a high degree of flexibility. The speaker also emphasized that the circular textile economy is the future when using renewable textile products, helping to push the economy forward by using resources effectively and reduce environmental impact aiming for sustainability.
- Mr Hu Kehua gave an example of China's textile industry which has established the world's most complete industrial chain. There are more textile investment and cooperation in sustainable industrial park to benefit the community and society in the target economy. He said that APEC need to have an APEC Sustainability case study and guidelines for textile industrial park investment. Guidelines covers the whole investment Life cycle that includes planning, construction and operation. The guideline will help to promote the environmental management experience of the advanced textile industry parks; guide the environmental management of regional textile industrial parks; and improve the sustainable development level of the regional textile industry.
- In this Session, Ms Caya Jenneli E shared that we need to be clear on the concept of sustainability in our academic institution because it molded into us and we are trying to navigate he realm of sustainability when trying for growing. This idea should be the principle over the plans. Second, we could formulate, continuously update, and share sustainable data collection and results. Until now, the library of environmental impact and environmental resource are authenticated users, the software that generated by categories or industry agnosticism technologies. In our economy, we have a few data in terms of emission that get from the industries existing. To the speaker, we need to focus on data, drives, policy, innovation and

action. Lastly, Ms Caya Jenneli E recommended that APEC needed to formulate a region and global level harmonized priority research and development agenda.

Participants also shared overall views and recommendations on (i) take-aways from the Workshop, (ii) what economies/ APEC should do in term of policies and actions.

***Sharing on what the participants have achieved from the workshop sessions***

- A group of participants shared that they received in-depth understanding from industry experts and sustainability actors and learned methodologies for sustainable and renewable energy activities.
- From the workshop, they learned from GIZ about obstacles and were clearly explained about social aspects as well as how to solve those problems.
- The workshop was a chance for building a network of textile and garment sustainability advocates, who can collaborate with each other.
- Participants could also identify significant next steps to promote a sustainable green textile and garment industry.
- Some participants shared that the workshop provided a great opportunity for technical exchanges of information and linkages in the textile and garment sector.
- Textile and garment have been improved through decades, but they affect the environment. In fact, textile and garment industries consume a lot of waste-water.
- They also acknowledge differences in the progress and development of each economy in this sector and found that developing a green economy, green textile and garment are important.
- Some economies launched several policies and/ or guidelines on green production in this sector. However, enforcement and implementation have not yet been structured.

Participants also learned about some problems as follows:

- Compliance of companies with environmental sustainability standards is limited due to the lack of awareness, resources and incentives.
- Even though SMEs and NGOs are assisting to solve those problems, they still need support, including training and financial support to provide guidance to other companies.
- There have been some developments of sustainable textiles, but the final market awareness is not balanced with what is being produced.

***Brainstorm/ explore possible ways and suggest recommendations to APEC and member economies***

- To promote proven green technologies and infrastructure for developing textiles.
- To continue expanding the network that has been developed to learn best practices from one another.
- To create a networking platform to market small brands and make them well-known, especially in the developed markets.
- To involve young ambassadors/ celebrities/ influencers to promote sustainable textiles.
- To support the standardization of a green industry.
- APEC economies should take into consideration inclusive, sustainable, and socially responsible development of the textile and garments industry. It is still a great idea, despite of insurmountable challenges. The key thing now is to keep on going and trying to find a solution.
- The promotion of textiles and garments is highly required, especially for SME textiles and garments to develop this sector.
- The governments and industry should pay attention to development and promotion of the rural and green products by deepening their knowledge and technical aspects, developing infrastructure and relevant supporting policies.
- It is proposed to take advantage of Free Trade Agreements (FTAs) negotiations to support this sector and economies are suggested to become more open for collaboration and cooperation in this sector.
- It is necessary to encourage recycling of textile and garment products.
- It is proposed to make use of existing approaches to analyze the industry and identify priority areas where improvement can be significant.

In order to implement those recommendations, various resources are required, including:

- Financial and funding sources to support the development of green technologies and the compliance of related entities.
- Capacitating advocates with project management skills to ensure continued development and collaboration.
- Establishment of policy dialogue platform and policy support from the Governments, NGOs, and industry.

## VI. CONCLUSIONS

In her closing remarks, Ms Pham Quynh Mai (Viet Nam's Senior Official to APEC) observed that the Workshop's participants have had great opportunities to learn various perspectives from relevant stakeholders, including academic and international organizations, business communities, and so on, on how to promote green the garment and textile.

Since the textile and garment industry is a huge global business and has high environmental impacts which have an effect on climate change, the industry has been under increasing pressure to change toward more inclusive and sustainable. This sustainable transformation is expected to need fundamental changes at all levels in the garment and textile system such as deceleration of manufacturing and consumption, new business models, new design strategies, extended producer responsibility, and reverse logistics, etc. Therefore, new knowledge is needed at all levels in the industry from policy making, materials, design and manufacturing practices, garments' lifetimes, new business models, and conscious consumer behavior.<sup>3</sup>

Acknowledging the importance of enhancing capacity for APEC member economies as well as addressing the challenges in the transition, the Workshop has come up with a number of recommendations with a view to promoting green garment and textile towards inclusive and sustainable growth. These recommendations might include, but not limited to:

- (i) Raise awareness of business owners, employees and consumers about environmental sustainability.
- (ii) Support business with access to knowledge, skills, green financial sources, and systems, and so on.
- (iii) Government should play more leading roles in providing guidance and capacity building to relevant stakeholders such as improving policies, standards, regulations, management tools, bringing together stakeholders to share knowledge and develop solutions.
- (iv) Promote to establish an ecosystem that engage all stakeholders such as governments, associations, NGOs and professional agencies, etc.
- (v) Online platforms should be harnessed to promote green garment and textile thanks to its easy accessibility, cost-effectiveness, scalability, and flexibility;

In that sense, it would significantly contribute to implement Bangkok Goals on Bio-Circular-Green (BCG) Economy endorsed by the APEC Leaders in 2022. Through the sharing, each and every member economy's participants could have a more in-depth

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[https://www.mdpi.com/journal/sustainability/special\\_issues/sustainable\\_textiles\\_garments\\_context\\_circular\\_economy](https://www.mdpi.com/journal/sustainability/special_issues/sustainable_textiles_garments_context_circular_economy)

knowledge of the issues, hence promoting further efforts to realize green economy, subject to their specific domestic circumstances and long-term development strategies.

By hosting this Workshop, Viet Nam wishes to join and strongly support APEC's common efforts in pursuing green economy, sustainable and inclusive growth and development.



## VII. ANNEX 1: RESULTS OF THE PRE-WORKSHOP SURVEY

1. Is garment and textile industry in your economy going green now? If Yes, please answer the next questions.

**Indonesia; Chinese Taipei; Thailand; Viet Nam: Yes**

**Malaysia:** Malaysia textile`s industry has yet to go fully green as to date. We encourage Malaysian manufacturers to embrace green economy/ESG by providing clear guidelines and enablers for companies, including small and medium enterprises (SMEs).

2. What is the benefit(s) of eco-friendly garment and textile in your economy? (You can choose more than one answer)

The Survey was sent out to all participants before the Workshop and the Organiser received 40 responds.

Question	Number of respond
A. Use less water	40
B. Use renewable energy to manufacture goods	38
C. Use recycle/eco-friendly fabrics	40
D. Eliminate disposing in unethical ways	40
E. Fair labor practices and fair wages for employees working in factories	25
F. Other (Please specify)	<p><b>Chinese Taipei:</b> Realization of Sustainable Fashion Supply Chain to save resources</p> <p><b>Thailand:</b> Improved health both employee and consumer, Increased brand value and make higher price for eco-products.</p>

3. What challenges garment and textile companies in your economy are facing now when going green? (You can choose more than one answer)

**The Survey was sent out to all participants before the Workshop and the Organiser received 40 responds.**

<b>Question</b>	<b>Number of respond</b>
A. Guarantees and warranties (make promises and might not be able to keep them, resulting in a breach of contract).	27
B. Underestimate of budgets to make green products.	40
C. Regulatory challenges	34
D. Non-performance of maintenance	30
E. Other (please specify)	<b>Chinese Taipei:</b> Rapid changes in laws and regulations

**4. Please share some policies and regulations your economy is applying on promoting green garment and textile towards inclusive and sustainable growth.**

**Indonesia**

As general, the Green Industry Standard is regulated as Minister of Industry Regulation No. 39/2018; and for Garment and textile products are regulated as Minister of Industry Regulation No. 40/2022 regarding Green Industry Standards for the Fabric Finishing and Fabric Printing Textile Industry.

Indonesia has a specific institution to handle the transition process and create a sustainable industry including by using resources effectively and efficiently. The scope consists of green industry standardization and facilitation such as Minister of Industry Regulation No. 40/2022 regarding the green industry standardization for Textile Industry. The regulations regarding green industry certification procedures are regulated as Minister of Industry Regulation No. 39/2018.

**Malaysia**

Malaysia will soon launch the iESG Framework to strengthen ESG adoption process by all the manufacturing sectors. The Framework will focus on four central components: Standards, capacity building, financing and market mechanism, each with its own transition programmes.

**Chinese Taipei**

- ISO(CNS) 14067:2018

**Thailand**

- The Bio-Circular-Green (BCG) Economy Model is a new economic model for inclusive and sustainable growth that capitalizes on Thailand's strengths in biological diversity and cultural richness. There was introduced by the Thai Government as a strategy for the domestic development and post-pandemic.

**5. If possible, can you list out implication(s) of those policies and regulations.****Malaysia**

- Support manufacturing firms to learn, be agile and adopt ESG practices;
- Transform challenges into opportunities; and
- Foster symbiotic public-private partnership for value creation.

**Thailand**

- Bioeconomy involves the production of renewable biological resources and the conversion of these resources into value added products.
- Circular economy aims at reusing and recycling materials to maximize the value of limited resources.
- Green economy determines to keep economy, society and the environment in balance, leading to sustainable develop

**6. Can you share some good practices/ case studies of green garment and textile in your economy?****Indonesia**

The Ministry of Industry had carried out several efforts toward green industry. There are:

- Exploring collaboration with stakeholders, both domestic and international, to initiate studies as a reference for green industry policy formulation;

- Government Funded for Green Industry Certification Program, including for Textiles Industries;
- Capacity building programs and raising awareness is also done for green industry as general;
- For the record, in 2022, the Ministry of Industry held a green Industry award program, and several textile industries joined.

### **Chinese Taipei**

- **Chinese Taipei Sustainable Textile**
- **Tzu Chi Foundation's Products Made From Recycled Bottles;**  
(<https://www.youtube.com/watch?v=V6UooJg0gfo&t=16s>)
- **Recycling of Sea Debris, The Reuse of Fishing Nets**  
([https://www.cpdc.com.tw/en/news\\_detail/0/74](https://www.cpdc.com.tw/en/news_detail/0/74) ;  
(<https://www.zeczec.com/projects/thecircularproject> )
- **Chinese Taipei EPA Establishes World's First Government-Supported Marine Recycling Certification System**  
(<https://www.youtube.com/watch?v=hzGkIVbmTrY&t=23s> )

### **Thailand**

- Moreloop is a startup enterprise that is committed to making the circular economy a reality. They are a featured seller in the Quality Surplus Fabric Online Marketplace and are recognized for their exceptional climate-smart and eco-inclusive approach to sustainability.
- Moreloop is working to create a more sustainable future for the fashion industry and beyond, one where environmental impact is minimized and ethical practices are the norm. The company is a leading example of how the fashion industry can be made more sustainable.
- Moreloop has won several awards for its sustainable fashion business model, including the SEED Low Carbon Awards (SEED Awards) 2021. SEED was founded as part of a global partnership between the United Nations Environment Programme (UNEP), the United Nations Development Programme (UNDP) and the International Union for Conservation of Nature (IUCN). These awards are a recognition of Moreloop's commitment to sustainability and its innovative business model.
- Here are some specific examples of how Moreloop is working to make the fashion industry more sustainable:

- They collect surplus fabric from garment factories and sell it to designers and makers, who can then use it to create new products. This helps to reduce textile waste.
- They upcycle surplus fabric into new products, such as bags, homewares, and accessories. This helps to extend the life of the fabric and reduce the need for new materials.
- They work with brands to develop sustainable fashion collections. This helps to raise awareness of sustainability in the fashion industry and encourage consumers to make more sustainable choices.
- Moreloop is an inspiring example of how businesses can make a positive impact on the environment. Their work is helping to create a more sustainable future for the fashion industry and beyond