



Asia-Pacific
Economic Cooperation

Understanding the Bio-Circular-Green (BCG) Economy Model

APEC SOM Committee
on Economic and Technical Cooperation
August 2022



The Asia Foundation

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Foreword

The COVID-19 pandemic is already responsible for at least 3.4 million documented deaths worldwide. For economies around the world, the impact has been staggering, with nearly every economy experiencing an economic slow-down in 2020-2021. The loss of life and economic suffering has contributed further to eroding the quality of life for families and communities, many of whom were already economically marginalized.

With massive post-COVID stimulus resources, there has never been a better opportunity for governments to further integrate environmental sustainability within their respective economies. Supporting a green, sustainable recovery is particularly important for APEC economies.

The Bio-Circular Green (BCG) Economy concept championed by the Royal Thai Government for its Asia Pacific Economic Cooperation (APEC) host year. It is a promising post-pandemic growth strategy where science, innovation and technology are applied to promote the efficient use of resources, maintain and restore our ecosystems, and reduce waste to build a system where government and business can thrive. It aims to contribute to the global efforts of comprehensively addressing all environmental challenges, including climate change, extreme weather and natural disasters, for a sustainable planet.

Thailand conducted an SCE self-funded project on Understanding the Bio-Circular-Green Economy Model for Strong, Balanced, Secure, Sustainable and Inclusive Growth in the Asia-Pacific. A Policy Dialogue was held in February 2022 to exchange ideas on how APEC can meet its sustainable economic growth objectives across existing APEC workstreams including through synergizing the three approaches of the BCG Economy Model and exploring potential partnerships across government, the private sector and academia. This report is an outcome of that project based on the background paper on BCG Economy Model, discussions at the Policy Dialogue and the questionnaire responses from APEC member economies.

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Introduction

The COVID-19 pandemic has exposed chronic development fault lines across the Asia-Pacific. Recent development gains have been undermined and the vulnerable have again been disproportionately affected by the economic downturn. However, the enormity of the shock has also created time for reflection.

Coupled with an increased acceptance of the risk that climate change and biodiversity loss pose to Asia-Pacific economies, a unique opportunity exists to transform society. A balanced, resilient and sustainable economy is needed to create a fair and just society that is inclusive of environmental and social aspects of progress and economic growth.

APEC economies recognize that a transition of this nature requires the right institutional conditions, and its members are working to support and establish them (see **Box 1**). For example, in 2020 APEC Leaders adopted the APEC Putrajaya Vision 2040 as the cooperative framework for an open, dynamic, resilient and peaceful Asia-Pacific community over the next two decades. In 2021, members agreed to implement the Vision through the Aotearoa Plan of Action. These documents outline members' strong commitment to achieving sustainability objectives and advancing a green agenda by promoting the inclusion of environmental and social aspects of progress within economic growth.

BOX 1 APEC FRAMEWORKS

APEC Putrajaya Vision 2040

Our vision is an open, dynamic, resilient, and peaceful Asia-Pacific community by 2040, for the prosperity of all our people and future generations. There are three economic drivers that support the vision including trade and investment, innovation and digitalization, and strong, balanced, secure, sustainable and inclusive growth (see ANNEX I: APEC Economic Drivers for further details).

On Strong, Balanced, Secure, Sustainable and Inclusive Growth:

To ensure that the Asia-Pacific region is resilient to shocks, crises, pandemics and other emergencies, we will foster quality growth that brings palpable benefits and greater health and wellbeing to all, including MSMEs, women and others with untapped economic potential. We will intensify inclusive human resource development as well as economic and technical cooperation to better equip our people with the skills and knowledge for the future. We will promote economic policies, cooperation and growth which support global efforts to comprehensively address all environmental challenges, including climate change, extreme weather and natural disasters, for a sustainable planet.

The Aotearoa Plan of Action

A plan for implementing the Putrajaya Vision 2040 recognizes the commitment of APEC members to promoting economic policies, cooperation and growth, which support global efforts to comprehensively address all environmental challenges, including climate change, extreme weather and natural disasters, for a sustainable planet.

Moving towards Economic Recovery and Resilience Report

In 2020, the APEC Business Advisory Council (ABAC) tabled a report to APEC Economic Leaders. The report recommended enabling lenders and investors to support businesses in the region, so that they progressively adopt more sustainable practices.

APEC is known as an incubator of ideas where member economies share experiences and best practices to promote sustainable economic growth, trade and investment, and prosperity in the Asia-Pacific region. As the 2022 APEC Host, Thailand is surfacing the Bio-Circular Green (BCG) Economy concept to encourage discourse on achieving sustainable APEC outcomes. The ultimate goal is to achieve a common approach (the proposed Bangkok Goals on BCG Economy¹), which will help to drive sustainability within APEC going forward.

In progressing balanced, inclusive, sustainable, innovative, and secure growth, APEC members will each have a unique pathway based on their economic, social and environmental context. By integrating three different economic policy approaches – the Bio-Economy, the Circular Economy, and the Green Economy – the BCG Economy concept provides a common framing for considering sustainability related policy responses. The use of a common framing can reduce the costs associated with investing in, coordinating and ultimately delivering sustainability outcomes across the APEC region, while giving members the autonomy needed to develop responses that respond to their specific environmental, social and economic context and challenges.

Challenges in delivering sustainable, balanced and equitable growth

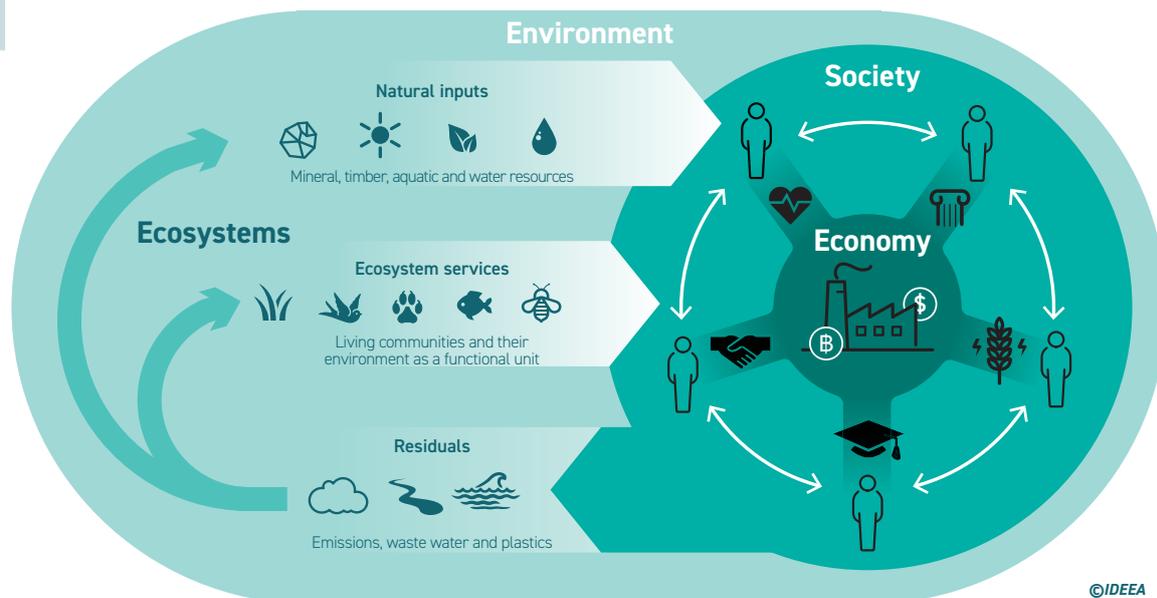
The need to implement policies that support sustainable and balanced economic growth has been discussed for many years and reflected in the outcomes of various international events and processes such as the Stockholm Conference of 1972, the Rio Summits of 1992 and 2012 and the adoption of the Sustainable Development Goals in 2015. The global trend towards embracing sustainable, balanced and equitable growth has been reflected in APEC's own sustainability related objectives described above.

Notwithstanding the commonly agreed Brundtland Commission starting definition of sustainability – “meeting the needs of the present without compromising the ability of future generations to meet their own needs” (Our Common Future, 1987), the design of appropriate responses to operationalize sustainability commitments is challenged by the existence of a multitude of concepts, frameworks and approaches that have emerged across the public and private sector.

At the heart of all approaches is a common understanding of the need to recognize the complex interactions between the environment, society and the economy. **Figure 1** provides a conceptual diagram of the integrated relationship between the economy, society and the environment. This nested systems presentation embodies the idea that ultimately, all economic and social interactions are dependent on the environment. This includes, among many other things, the food people eat, the technology businesses develop, the trade economies engage in, the tourism experiences of domestic and international visitors, the novel medicines developed by the science community, and the cultural ties that connect many households.

¹ One of Thailand's proposed Key Deliverables for APEC 2022, which is envisaged to be a Leader-level stand-alone document reaffirming APEC's commitments and guiding its sustainability and green growth agenda in a comprehensive and integrated manner.

FIGURE 1 THE RELATIONSHIP BETWEEN THE ECONOMY, SOCIETY AND THE ENVIRONMENT



Note: Adaptation of Figure 2.1 United Nations System of Environmental-Economic Accounting 2012 - Central Framework

Figure 1 not only highlights that we depend on natural inputs (such as minerals, timber, fish and water resources) and ecosystem services (such as carbon sequestration, flood protection and air filtration) but that our economic production and consumption generates residuals that flow back into the environment and impact the capacity of the environment to provide those natural inputs and services.

Recognizing this circular flow is fundamental but traditional economic policies have tended to ignore the external impacts of economic activity on the environment (commonly referred to as externalities) and failed to incorporate the long-term effects of these impacts on the economy.

Therefore, to deliver a comprehensive approach to sustainable and balanced economic growth, we need to develop a fresh, systemic approach to these aspects so that the system is resilient for the future. This includes how we manage natural inputs, how we regenerate ecosystems to benefit from their services, how we limit flows of residuals such as greenhouse gas emissions and how we keep products and materials in use.

Evidently, a key challenge in delivering sustainable and equitable growth is developing policies that address our relationship with the environment and maintain, enhance and protect ecosystems while also ensuring that economies continue to grow and thrive. Many approaches that are developed are not comprehensive, and therefore do not consider the full range of potential impacts that economic growth may be having on the environment. This is why the BCG Economy framework is both relevant and necessary.

Bio-Circular-Green (BCG) Economy

The overarching goal of the BCG Economy framework is to promote balanced and sustainable economic growth, shifting economies from prioritizing economic considerations over the social and environmental to a sustainable model where resources are regenerated, and their use is optimized alongside economic growth. The unique value add of the BCG Economy framework is that it synergizes existing sustainability approaches to achieve balanced and sustainable economic growth more efficiently.

The BCG Economy framework integrates three different policy response models: the Bio-Economy model, the Circular Economy model and the Green Economy model. While each of these models has a common purpose in terms of achieving sustainable economic growth that minimizes the impact on the environment, they each consider different parts of the environment-society-economy system presented in **Figure 1**. Specifically:

- **The Bio-Economy** involves the production of renewable biological resources and bio-based materials and converting them into value-added products using technology and innovation. The focus of the bio-economy is on the use of renewable biological resources and bio-based materials by the economy.
- **The Circular Economy** envisages a regenerative production-consumption system where product, service and system design choices enable the elimination of waste and pollution, existing materials are kept in use (reuse, refurbishment, repair, remanufacturing, recycling, composting), and natural systems regenerate because of reduced flows of residuals. The focus of the circular economy is to look at the overall system of production and consumption to ensure this it is regenerative and redesign the notion of residuals by designing waste and pollution out of the system.
- **The Green Economy** leverages ecosystem processes to benefit human beings in an equitable and inclusive manner without jeopardizing the sustainability of ecosystems. The focus of the green economy is on the way in which ecosystems provide inputs to society and the economy.

Together, these three models cover policy responses across the full extent of the complex relationships between the economy, society and the environment shown in **Figure 1**.

The BCG Economy framework recognizes that while the Bio-Economy, Circular Economy, and Green Economy are reasonably well understood as standalone approaches, there is a need for these concepts to be integrated. By adopting a more cohesive model, policy makers are better able to design and implement actions that tackle the challenges of environmentally sustainable economic development holistically.

Investing in BCG Economy outcomes

Policy responses to achieve various sustainable growth outcomes have commonly focused on specific environmental and social challenges – such as climate change, pollution, education, health and biodiversity. When seeing each of these as separate challenges, policy responses are most commonly framed in terms of how much it would cost to solve the challenge. This cost-based framing is evident in most environmental and social policy discussions such as whether a society can afford the cost of climate mitigation, or the cost of high-quality health and education.

In economic policy discussion however, the solutions to challenges of poor transport infrastructure or low productivity, for example, are more commonly framed in terms of investments by focusing on ways to stimulate investment in roads and ports, or in technology and equipment. Economic policy considerations are often framed through the lens of investment in assets that generate future returns. Extending this investment framing beyond economic policy is a key feature in applying the BCG Economy framework.

Making inclusive and sustainable investments is not a one-size fits all approach, and each transition pathway developed by the member economies will be different even though the overarching objective of balanced and sustainable economic growth will remain the same. A common framing on how economies invest, and how this is linked to different outcomes is needed if economies are to share information and maximize private and public investment to secure an optimal transition towards a BCG Economy.

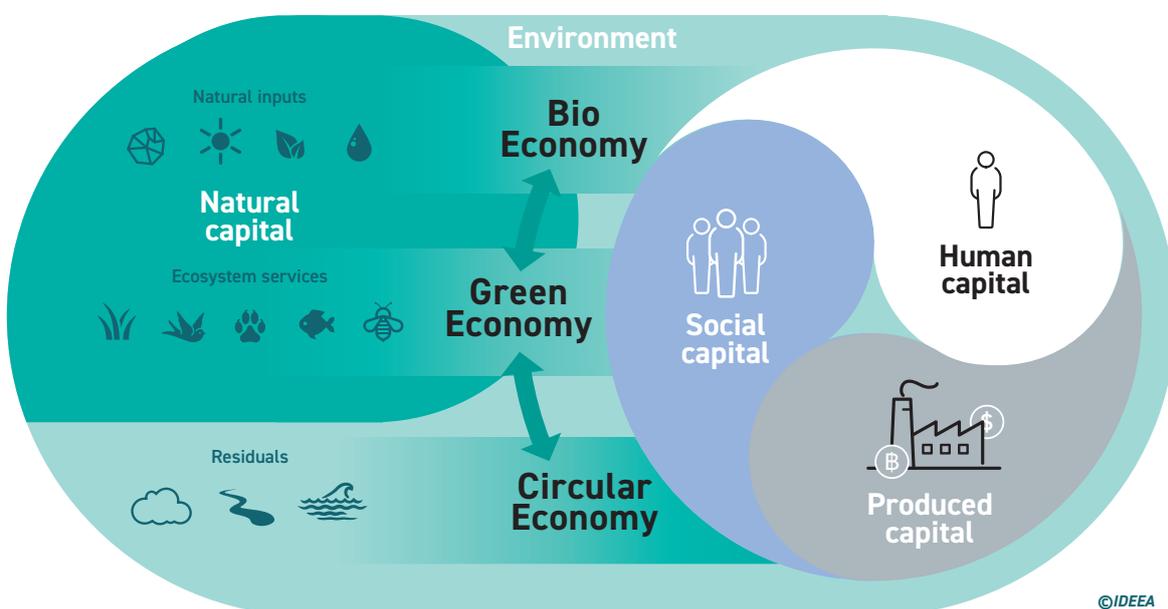
To give effect to an investment framing, it requires developing policies that maintain and enhance the stock of capital both now and in the future. The stock of capital refers to the complete set of resources that underpin economies and society and contribute to human wellbeing. The stock of capital consists of natural, human, social and produced capital.

Linking back to our nested environmental, social and economic systems we see that:

- The environment is described in terms of **natural capital** including the stocks of physical and biological resources found on earth, recognizing the limited capacity of ecosystems to provide ecosystem services.
- Society is described in terms of the combination of (a) **human capital** – the knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic wellbeing; and (b) **social capital** – encompassing networks, including institutions, together with shared norms, values and understandings that facilitate cooperation within or among groups.
- The economy is underpinned by inputs from all of these capitals as well as **produced capital** including all manufactured capital, such as buildings, factories, machinery, physical infrastructure (roads, water systems), all financial capital and all intellectual capital (technology, software, patents and brands).

Figure 2 transforms the conceptual diagram presented in Figure 1 into a working model of the BCG Economy that integrates the four types of capital. All policy actions undertaken to influence the BCG Economy can be represented as investments in capitals within a given context. These investments may include activities such as education to improve our human capital, supporting social networks to share information and technology, protecting and enhancing natural capital and building new infrastructure. Changes to human capital may initiate innovation opportunities to reduce waste and residuals going to the environment and support ecosystem regeneration, changes to social capital help speed up the sharing of new technologies which reduce our demand for natural inputs, and changes to produced capital improve how we use natural inputs facilitating the reuse and recycling of products in the economy.

FIGURE 2 THE BCG ECONOMY AND THE FOUR CAPITALS



Over time, the appropriate levels and qualities of the different capitals will change. For example, societies' needs will evolve and will place different expectations on levels of investment in the education of women, the state of biodiversity, the quality of air and water and the availability of public transports and overall concepts of wellbeing will be shaped by these changing expectations. As public discourse and policy settings also influence these expectations, there is a powerful combination of trends that can be informed by considering environmental, social and economic issues through an investment and integrated capitals lens.

Given the presence of multiple capitals in any single context, applications of the BCG Economy framework present the policy challenge of sustainability in terms of governments and business coordinating their investments in portfolios of capital such that they achieve a variety of bio, circular and green economy outcomes. The bio, circular or green economy approaches are all valid approaches to investing in the capitals; however, investments in the capitals will be optimized by leveraging the synergies across the approaches. The challenge that BCG is addressing is how can we coordinate investment in the capitals across the three approaches to best achieve the outcomes we desire.

Coordination of portfolios of capitals in practice requires specific consideration of context since many different portfolios will exist – i.e. each context will have different combinations of natural, human, social and produced capitals. This variation means that the same type of investment in different portfolios will have different outcomes.

The emerging view is that the best scale for discussing and understanding portfolios of capitals and implementing context-specific responses is the landscape and community scale. It is at this scale that the interactions among different types of capital investments and hence the context for investment is best reflected. Of course, all landscapes and communities will be connected to their surrounding areas, but it is reasonable to identify those places where the connections among different capital investments are strongest and build from there.

BCG Economy in practice

Recognizing that all APEC members have different capital portfolios, the BCG Economy framework supports members to approach sustainability independently considering their individual and unique contexts. However, there is value in adopting a common language (the BCG Economy framework) to secure the greatest benefit from information sharing, cooperation and coordination. Common descriptions of investment decisions (activities) and how they are linked to BCG outcomes at all scales, including community and landscape scales, are the foundation for describing BCG performance and for adaptive management.

BCG in practice is a partnership between the government, private sector and academia in which each partner has an opportunity to contribute to the coordination of activities and investments that leverage the capabilities of partners to achieve BCG outcomes. The following tables provide examples of different entry points for BCG potential activities and investments, namely for agriculture and food systems, energy efficiency and resilience, and resource management and innovation. The tables below reflect a common framing for describing activities and outcomes associated with the BCG Economy. Commonly, investments generate outcomes across each of the dimensions of the BCG Economy. While generating multiple outcomes is not essential for a single investment, the framework enables all outcomes to be placed in a common context and can therefore be used to identify opportunities to leverage an activity to provide additional outcomes.

Table 1 provides an example of activities (investments) in agricultural and food systems and the potential BCG Economy outcomes. For example, an activity which involves an investment in human capital is education to switch to regenerative food production by, for instance, reducing the reliance on synthetic fertilizers and protecting local natural capital (rivers and wetlands). Depending on the specific context, the bio-economy outcome is the protection of renewable biological resources; the circular economy outcome is a reduction in environmentally harmful residuals leading to healthier soils and a more resilient long-term food production system, and the green economy outcome is a sustainable river ecosystem and clean water.

TABLE 1 BCG ECONOMY INVESTMENT: AGRICULTURE AND FOOD SYSTEMS

Potential Activities	Bio-economy outcomes	Circular economy outcomes	Green economy outcomes
Natural capital Forest rehabilitation	Increasing the stock of renewable biological resources (ecosystems)	Improving the health and resilience of the natural capital system	Sustainable forest ecosystems Bird breeding areas, Pollination
Human capital Education to switch to regenerative food production by, for instance, reducing the reliance on synthetic fertilizers	Protecting renewable biological resources and making better use of food by-products that can be transformed into high-value non-food products such as biomaterials, organic fertilizers and animal feed	Healthy resilient soils, less waste and more efficient food production	Protecting renewable biological resources, reducing pollution and improving soils health
Social capital Support the creation of local farmer networks to share best practice on regenerative methods of production	Protecting renewable biological resources and harnessing the potential of by-products reuse at their highest level (eg. as upcycled food ingredients or as high value non-food products)	Less waste (nutrient) runoff going to the environment, improved regenerative farming practices and reduced input needs	Scale up green economy practices and businesses, resulting in higher and more stable local incomes as well as community wellbeing
Produced capital Internet of things (IoT) to monitor irrigation water use	Reduce the pressure on biological resources (water resources)	Reduce demand for natural inputs	Reduce the pressure on natural systems Higher and more stable local incomes

Table 2 provides an example of activities (investments) in energy efficiency and resilience and how they may achieve BCG Economy outcomes. Depending on the context, expanding both natural and productive forest areas increases local employment, provides alternative sources of energy (firewood) and enables the reuse and recycling of wood products in the economy. New technologies allow for the production of energy from green waste reducing the need for fossil fuels and removing waste from the environment.

TABLE 2 BCG INVESTMENT: ENERGY EFFICIENCY AND RESILIENCE

Potential Activities	Bio-economy outcomes	Circular economy outcomes	Green economy outcomes
Natural capital Forest expansion	Firewood for local communities	Re-use and recycle wood products	Sustainable forest ecosystems
Human capital Education to use less energy and improve the design of energy infrastructure	Production of bioenergy and biofuels from residuals	Increase use of renewable energy sources and production of bioenergy and biofuels from residuals	Protecting renewable biological resources from climate change and reduce greenhouse gases
Social capital Renewable energy interest group to support bottom-up approach to developing decentralized energy grid	Protecting renewable biological resources	Reduce waste from energy production	Protection of local ecosystems
Produced capital Production system to convert food waste to biofuels	Production of bioenergy and biofuels from residuals	Efficient use of residuals in the economy	Reduced pressure on ecosystems from residuals

Table 3 provides an example of activities (investments) in resource management and innovation in the economy and how they may achieve BCG Economy outcomes. Depending on the context, expanding wetland areas and supporting local wetland management groups increases local employment, provides alternative sources of biomass for innovative products. Investments in human capital to support new technologies and innovation are essential to ensure long-term sustainable productivity of the economy.

TABLE 3 BCG INVESTMENT: RESOURCE MANAGEMENT AND INNOVATION IN THE ECONOMY

Potential Activities	Bio-economy outcomes	Circular economy outcomes	Green economy outcomes
Natural capital Wetland rehabilitation	Harvesting “ecological biomass” (i.e. cattail) permanently removes the nutrients (i.e. phosphorus) taken up during growth and stored within the plant, and this biomass is then utilized for solid fuel, biocarbon and higher value biofuels, biogas and bioproducts	Place products on the market that can be kept in use and create systems and incentives that enable households to better dispose of their waste residuals	Create bio-products that work with the system and deliver on BCG objectives. Increased biofuel and reduced carbon emissions
Human capital Incentives to change consumer behavior, and stimulate business innovation in line with BCG	Create bio-products that work with the system and deliver on BCG objectives. Increased biofuel	Place products on the market that can be kept in use and create systems and incentives that enable households to better dispose of their waste residuals	Sustainable wetland ecosystems and increased tourism and local health benefits
Social capital Support local wetland management group	Protecting renewable biological resources	Less reliance on artificial inputs	Sustainable wetland ecosystems and increased tourism and local health benefits
Produced capital Production system design to support companies in making circular design and business model choices enabling resources to be kept in use	Production of bioenergy and biofuels from residuals	Efficient and effective use of products and materials residuals in the economy through multiple loops as appropriate to the product (for example reuse or composting)	Reduced pressure on ecosystems from residuals

The BCG Economy and APEC member economies

The SCE Policy Dialogue was intended to introduce members to the concepts of the BCG Economy Model with the wider aim of exchanging ideas on how APEC can meet its sustainable economic growth objectives across existing APEC workstreams including through synergizing the three approaches of the BCG Economy Model and exploring potential partnerships across government, the private sector and academia.

As part of the SCE Policy Dialogue, a short questionnaire was sent to all APEC member economies to help gain an understanding of their perceptions, interpretations and current activities relating to the BCG Economy Model. In total, 19 economies provided detailed responses to five questions (see questionnaire at end of this annex) resulting in a rich information base from which to build a shared understanding of the BCG Economy Model and its practical application. The findings are summarized under three headings:

- 1 Current BCG Economy related activities;
- 2 The role of stakeholders and private sector support; and,
- 3 Opportunities and challenges.

A more detailed synthesis of the survey findings is presented in **Annex III**.

Current BCG Economy related activities

APEC member economy questionnaire responses revealed that there is currently a wide range of policy actions underway that can be placed within the BCG Economy framework. While APEC members did not have distinct BCG policies, all members had various activities and areas of work within one or more of the BCG Economy components – i.e. bio-economy, circular economy or green economy. Table 4 shows the number of economies undertaking activities by different high-level policy theme within the context of different BCG Economy components. A number of policy themes emerged from the responses with the two key themes concerning waste (noted 25 times) and energy (noted 20 times).

TABLE 4 **BCG ECONOMY RELATED ACTIVITIES BY HIGH-LEVEL POLICY THEME***

High-level policy theme	Number of responding economies		
	Bio-economy	Circular economy	Green economy
Waste	7	16	2
Energy	6	5	9
Sector sustainability	6	3	7
Climate change	1	6	11
Technology and innovation	7	2	5

* The table records the number of times that a theme was noted in a response. Many responses noted a number of relevant themes within each component and hence the sum for a column is greater than the total number of responses. For example, 16 responses identified waste as a relevant policy theme for circular economy activities and some of those responses also identified energy and climate change as relevant policy themes.

A number of responses noted the importance of putting in place policies that improved environmental outcomes, promoted green and decent jobs, ensured an equitable distribution of benefits, and more broadly, recognized the importance of integration – the consideration of policies across the value chain and the use of holistic approaches in achieving sustainability objectives.

Role of stakeholders and private sector support:

Respondents recognized the relevance of involving multiple stakeholders across numerous sectors to advance sustainability objectives. Various arrangements were described including research hubs, industry partnerships and expert councils; and a range of approaches to private sector support were noted including R&D and tax incentives, investments in new technology and skills development. APEC members identified a number of possibilities for joint multi-stakeholder actions and saw the BCG Economy framework as well placed to motivate and give impetus to these possibilities.

Opportunities and challenges:

APEC members recognized the integrated and holistic nature of the BCG Economy framework as providing a wide range of opportunities including the development of new sustainable business models, more efficient and circular production processes and the attraction of additional foreign direct investment through sustainable finance arrangements. Depending on the context, collectively investing in these opportunities would be expected to

- i** Increase economic growth, trade and employment;
- ii** Broaden the economic base through new activities and products;
- iii** Secure a more resilient economy able to better withstand external impacts; and
- iv** Respond to environmental and social challenges including climate change, biodiversity loss and establishing an equitable and inclusive society.

While identifying many opportunities, APEC members also recognized a range of challenges that would be faced in implementing the BCG Economy Model, noting that these are faced in the implementation of all sustainability focused approaches. Four main types of challenges were identified:

- i** Dealing with the economics of transition and the need for upfront investment;
- ii** Establishing the social context to balance the needs of current and future generations and implementing long-term policy solutions;
- iii** Building appropriate governance arrangements to co-ordinate investment in the portfolios of capitals across sectors and regions; and
- iv** Ensuring the availability of high-quality data and information to support investment decisions.

The role of data and information

A common barrier to progress towards balanced and sustainable economic growth, as identified through the survey, is the availability and quality of data and information to underpin decision making. The traditional approach to the collection and organization of data on sustainability is to consider each dimension – economy, society and environment – separately with data often presented in the form of dashboards of indicators. This approach can be seen at global level with the 17 different Sustainable Development Goals and approximately 200 associated indicators. It can also be seen at the level of individual government programs in the form of monitoring and evaluation frameworks.

While the motivation for such indicator-based reporting is sound in seeking to track progress and performance in the achievement of sustainable economic growth objectives, there are three main limitations.

First, the variety of ways in which this approach can be implemented limits the comparability of data sets as well as the potential to convey clear messages on trends.

Second, the different solutions limit the coordinated investment in data and information such that each economy and program will usually develop its own indicators. While the SDG process is seeking to address some of these issues, there remains a significant lack of comparability and often the resources available for data and information support the use of indicators of inputs to policy responses (e.g. measures of expenditure, measures of number of people trained) rather than indicators of outcomes.

Third, although indicator-based approaches may have a broad scope and encompass measures concerning the economy, society and the environment, the selection of indicators is not based on an underlying framework. Consequently, the indicators do not directly inform users about the connections between the indicators such that the complex processes of a system can be well understood.

These challenges have been addressed through a range of data and information initiatives over the course of the past 20 years but additional and more targeted investment is required to secure the potential gains including improved comparability of data, greater co-ordination and alignment among existing data sets and improved interpretation of indicators. Table 5 provides a summary of the leading integrated approaches to sustainability measurement. All of them are based around the measurement of the four capitals and the use of general accounting structures concerning the recording of stocks and flows.

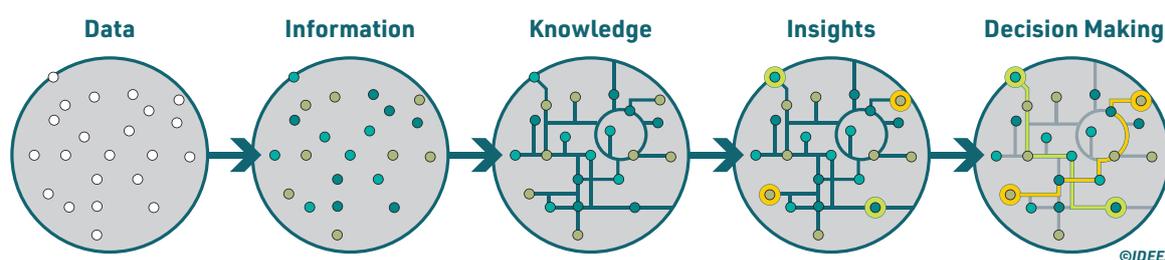
Significantly, by using accounting structures, these approaches enable a direct connection to the standard measure of economic growth, gross domestic product (GDP), which is itself measured using accounting principles. These integrated approaches therefore connect directly to the “Beyond GDP” measurement and policy discussion and are perfectly suited to supporting the implementation of the BCG Economy framework.

TABLE 5 LEADING INTEGRATED ACCOUNTING-BASED APPROACHES TO SUSTAINABILITY MEASUREMENT

Integrated Accounting-based Approach	Description
System of Environmental-Economic Accounting (SEEA) – United Nations	SEEA is the international statistical standard for the measurement of natural capital and the relationship between the environment and the economy. It is being implemented by many APEC members including Australia, Canada, Chile, China, Indonesia, Mexico, Philippines and United States.
System of National Accounts (SNA) – United Nations	SNA is the international statistical standard for the measurement of the economy, including GDP. It is applied in all APEC member economies.
Wealth Accounting – World Bank; UNEP	Wealth Accounting is a measurement approach that focuses on the value of natural, human and produced capital of countries and their role in underpinning sustainable economic growth and wellbeing.
Sector based approaches: <ul style="list-style-type: none"> ○ TEEB Agri-Food - UNEP ○ Measuring the Sustainability of Tourism (MST) - UN World Tourism Organization ○ Ocean and blue economy accounts – UN, OECD and Global Ocean Accounts Partnership 	Individual sectors have long tested various sustainability measurement frameworks. These three examples are the leading ones in terms of applying accounting-based approaches. All utilize the principles of the SEEA and SNA and encompass the capitals focus of wealth accounting.
Private sector approaches: <ul style="list-style-type: none"> ○ Natural Capital Protocol – Capitals Coalition ○ Social & Human Capital Protocol – Capitals Coalition ○ Taskforce for Climate-related Financial Disclosures (TCFD) – CDSB ○ Taskforce for Nature-related Financial Disclosures (TNFD) 	In parallel to government led measurement work, the private sector has spent much time developing sustainability measurement approaches. Four examples are noted here. They demonstrate the strength of the work undertaken in this area by the private sector. A range of initiatives are underway to align private sector and government led sustainability measurement.

While the availability of high-quality data and information is a key input for implementing the BCG Economy Framework, there is still the need for decision makers and analysts to interpret and apply the data in decision making. This connection between data and decision making is shown in Figure 3, with accounting playing a key role in organizing relevant data to support the generation of insights and decisions.

FIGURE 3 TRANSFORMING DATA TO DECISION-MAKING



Conclusion: A pathway forward

A balanced, resilient, and sustainable economy is needed to create a fair and just society, rather than a model that focuses solely on economic growth. Coupled with an increased acceptance of the risk that climate change and biodiversity loss pose to Asia-Pacific economies, a unique opportunity exists to transform society. The BCG Economy framework has been designed to take advantage of this opportunity.

A transition of this nature requires partnerships between the government, private sector and academia. Each partner has an opportunity to coordinate activities and investments that leverage the capabilities of partners to achieve BCG outcomes.

APEC is known as an incubator of ideas where member economies can come together to share their experience and best practices to meet sustainability objectives. Building on the findings from the questionnaire and the discussions undertaken as part of this SCE Policy Dialogue, the following four recommendations can be derived for APEC's consideration to advance work on the BCG Economy individually and collectively.

Recommendation 1: Establish a BCG Economy framework support system within APEC to identify opportunities to better align related policies with the BCG Economy framework. Initial focus of support could be placed on the two key policy themes identified in the survey: waste and energy.

Recommendation 2: Undertake and upscale BCG Economy related awareness and capacity building, knowledge sharing, co-ordination of research and expertise and the sharing of best practice, technical assistance and project implementation across the APEC members. This approach would recognize that APEC consists of member economies with diverse economic strengths and varying levels of technological advancement and ensuring a focus on those member economies who are new to green growth and other sustainability policies.

Recommendation 3: Invest in data and information systems to support the implementation of integrated approaches such as the BCG Economy framework and ensure a sound evidence base is established to design and monitor progress towards balanced and sustainable economy growth. The implementation of integrated accounting-based approaches, in particular the SEEA, should be given high priority across both the public and private sector.

Recommendation 4: Commence three pilot studies at the local level that test the principles of the BCG Economy Model for a selected theme, for example, waste, energy, agriculture and food systems or tourism.

Collectively, these recommendations recognize the importance of synergizing the BCG Economy Model and other sustainability approaches as a better way to invest in and promote long-term balanced and sustainable economic growth. The work also recognizes that there is no one size fits all solution and that sustainability approaches should be implemented in a comprehensive manner to achieve the best results. APEC can play a key role in supporting and securing these outcomes and, in doing so, advance APEC's wider sustainability agenda, as reflected in the Putrajaya Vision 2040 and its implementation plan, the Aotearoa Plan of Action (2021).

Annex I: Economic drivers of the APEC Putrajaya vision 2040

KEY ECONOMIC DRIVERS IDENTIFIED IN THE APEC PUTRAJAYA VISION 2040

1 Trade and Investment

1.1 Objective:

“ To ensure that the Asia-Pacific remains the world's most dynamic and interconnected regional economy, we acknowledge the importance of, and will continue to work together to deliver, a free, open, fair, non-discriminatory, transparent and predictable trade and investment environment. ”

1.2 Objective:

“ We reaffirm our support for agreed upon rules of the WTO in delivering a well-functioning multilateral trading system and promoting the stability and predictability of international trade flows ”

1.3 Objective:

“ We will further advance the Bogor Goals and economic integration in the region in a manner that is market-driven, including through the work on the Free Trade Area of the Asia-Pacific (FTAAP) agenda which contributes to high standard and comprehensive regional undertakings. ”

1.4 Objective:

“ We will promote seamless connectivity, resilient supply chains and responsible business conduct. ”

2 Innovation and Digitalisation

2.1 Objective:

“ We will pursue structural reforms and sound economic policies to promote innovation as well as improve productivity and dynamism. ”

2.2 Objective:

“ To empower all our people and businesses to participate and grow in an interconnected global economy, we will foster an enabling environment that is, among others, market-driven and supported by digital economy and innovation. ”

2.3 Objective:

“ We will strengthen digital infrastructure, accelerate digital transformation, narrow the digital divide, as well as cooperate on facilitating the flow of data and strengthening consumer and business trust in digital transactions. ”

3 Strong, Balanced, Secure, Sustainable and Inclusive Growth

3.1 Objective:

“ To ensure that the Asia-Pacific region is resilient to shocks, crises, pandemics and other emergencies, we will foster quality growth that brings palpable benefits and greater health and wellbeing to all, including MSMEs, women and others with untapped economic potential. ”

3.2 Objective:

“ We will intensify inclusive human resource development as well as economic and technical cooperation to better equip our people with the skills and knowledge for the future. ”

3.3 Objective:

“ We will promote economic policies, cooperation and growth, which will support global efforts to comprehensively address all environmental challenges, including climate change, extreme weather and natural disasters, for a sustainable planet. ”

Annex II: Detailed description of BCG Economy component concepts

Bio-Economy

Is at times also called 'bio-based economy' or 'knowledge-based bio-economy', which leverages the potential of biological resources from land and sea for the development and commercialization of goods and services. Where possible it may provide opportunities to substitute away from fossil-based activities to those based on living biomass, with biotechnology and knowledge-based innovations driving this process.

This includes technology to convert biomass into various products, from bioenergy and fuels to paper and commodities, as well as textiles, chemicals and pharmaceuticals; to create solutions for waste water purification and bio remediation; to improve crop performance using genetic manipulation; and to create new or more advanced pharmaceuticals.

Circular Economy

Is often defined in opposition to the dominant and prevailing global linear economy in terms of the physical flows of materials and energy. In the linear economy, resources are extracted, used and disposed of with their value and utility lost.

A Circular Economy is based on three principles, each driven by design to

- i Eliminate waste and pollution;
- ii Keep products and materials in use; and
- iii Regenerate natural systems.

The transition requires the work of all actors and creates creative innovation opportunities as we rethink the design of products, services and systems.

The Circular Economy is underpinned by a transition to renewable materials and energy and helps to tackle global challenges like climate change, biodiversity loss, waste and pollution. It aims to support the development of regenerative production-consumption systems.

Green Economy

In addition to promoting low-carbon (abiotic, lithosphere-originated) energy, the Green Economy advocates that ecosystem processes occurring in natural and semi-natural systems can be leveraged to the benefit of human beings without jeopardizing the sustainability of these ecosystems.

Such beneficial ecological processes, namely, ecosystem services largely support the functioning of our economy and society, but are often invisible or disregarded.

Central to Green Economy objectives is the desire to improve human wellbeing and social equity, while reducing environmental risks and ecosystem scarcities.

Annex III: Synthesis of BCG Economy Survey of APEC member economies

INTRODUCTION

As part of this study a short questionnaire was sent to all APEC member economies to help gain and understanding of their perceptions, interpretations and current activities relating to the BCG Economy Model. In total, 19 economies provided detailed responses to five questions (see questionnaire at end of this annex) resulting in a rich information base from which to build a shared understanding of the BCG Economy Model and how it may be implemented. This annex provides a synthesis of the key findings.

CURRENT ACTIVITY RELATED TO BCG ECONOMY

APEC member economy questionnaire responses revealed that there is currently a wide range of policy action underway that can be placed within the BCG Economy framework. While APEC members did not have distinct BCG policies, all members had various activities and areas of work within one or more of the bio economy, circular economy or green economy spaces. Indeed, in a number of cases, the same type of policy, for example, the development of renewable energy, was considered a bio-economy policy in some cases, circular economy in some and green economy in others. This reveals the merit of integrating all policies related to environmental sustainability and sustainable development under a common umbrella since their allocation under individual policy banners can hamper seeing clear connections, synergies and parallels.

Some key policy themes emerged in the responses. The two key themes concerned waste and energy, and in a number of cases the link between waste and energy. The theme of waste encompasses policies concerning reducing and eliminating the use of plastics; dealing with food and organic waste; improving recycling, recovery and reuse; construction waste; and the treatment of wastewater. The theme of energy encompasses policies concerning renewable energy; biofuels; reducing energy intensity; and increasing energy efficiency.

Other policy themes noted by members included:

- Development of sustainability in different economic sectors including agriculture, forestry, and fisheries; tourism; construction and building; procurement; and transport.
- Climate change mitigation and emissions reduction (as a separate line item to energy e.g., electric vehicle schemes).
- Investments in technology and innovation, for example in biomedicines, whole-of-life product cycles; resource efficiency; bio-design; and new sustainable business models.

There were also a range of responses highlighting ways in which policies might be enacted such as improving consumer information (awareness raising); the use of eco-labelling; establishing relevant standards and disclosure requirements (e.g. with respect to trade in environmental goods and services); and support for sustainable finance.

Finally, it was clear APEC members appreciated the potential of the BCG Economy Model to support reaching sustainable development objectives. A number of responses noted the importance of putting in place policies that improved environmental outcomes, promoted green and decent jobs, ensured an equitable distribution of benefits, and more broadly, recognized the importance of integration – the consideration of policies across the value chain and the use of holistic approaches in achieving sustainability objectives.

ROLE OF STAKEHOLDERS AND PRIVATE SECTOR SUPPORT

Respondents recognized the relevance of involving multiple stakeholders across numerous sectors to advance sustainability objectives. Various arrangements were described including research hubs, industry partnerships, expert councils, high-level forums; social dialogues as well as ensuring engagement with local communities, local governments and through international fora. Commonly, these types of arrangements are structured by policy themes or sectors such as waste and recycling, energy, sustainable agriculture and biodiversity.

A wide range of approaches were evident in public sector support for the private sector. These included direct funding including through overseas development assistance; R&D and tax incentives; awareness raising and education on sustainability solutions; investments in new technology; establishment of environmental markets; the setting of targets to give direction to private sector investments; skills development; and establishing sustainability taxonomies and measurement standards.

More broadly, APEC members identified a number of possibilities for joint multi-stakeholder actions towards ensuring a whole-of-society approach to sustainability. These included ongoing support for forums for discussion and exchange; enabling exchanges of data, information, evidence and solutions; recognizing the need for local engagement and engaging with youth; and building capacity among all stakeholders in understanding systemic connections across environment, society and economy. The BCG Economy framework is perfectly placed to motivate and give further impetus to these possibilities.

OPPORTUNITIES TO APPLY THE BCG ECONOMY MODEL

A general message received through the responses of APEC members to the questionnaire was the recognition of the integrated and holistic nature of the BCG Economy Model. With this recognition, APEC members were able to identify a wide range of opportunities to apply the model as listed below.

Depending on the context, collectively investing in these opportunities would be expected to:

- i** Increase economic growth, trade and employment
- ii** Broaden the economic base through new activities and products
- iii** Secure a more resilient economy able to better withstand external impacts such as the COVID-19 pandemic
- iv** To environmental and social challenges including climate change, biodiversity loss and establishing an equitable and inclusive society

The following specific opportunities were noted:

- Adopting and applying leading technologies and science to tackle sustainability challenges, for example in biomedicine, recycling and waste and emissions reduction
- Improving design and connection of value and supply chains
- Designing more efficient and circular production processes
- Designing more efficient governance, less red tape and greater streamlining of approvals processes
- Establishing new sustainable business models, including private-public partnerships
- Building richer, more integrated, international partnerships
- Attracting foreign direct investment through sustainable finance products
- Creating green jobs and developing skills and capabilities for sustainability
- Establishing inclusive and regionally relevant solutions, for example, concerning agrobiodiversity
- Improving data collection and co-ordination to build a new and extended evidence base
- Strengthening sustainability related regulation and enforcement

CHALLENGES IN APPLYING THE BCG ECONOMY FRAMEWORK

While identifying many opportunities, APEC members also recognized a range of challenges that would be faced in applying the BCG Economy framework. Many of these are faced in the implementation of all sustainability focused approaches. The various challenges may be grouped under four headings:

Dealing with the economics of transition

It was recognized that the costs of transition to more sustainable settings would require up-front investment and hence the lack of investment was a challenge to be overcome. Related to this general point were concerns about some members having small markets and insufficient economies of scale; the lack of human capital (skills and experience); the lack of common or standard approaches; complexity and working across supply chains in multiple locations and distances from markets; and the economic risks for early adopters.

Establishing the social context

There remains a clear understanding that making sustainability a widely accepted goal requires overcoming the social barriers to progress in this space. These barriers include balancing the needs of current and future generations; implementing long-term policy agendas; accepting short-term costs for long-term gains; raising awareness among business and the public about sustainability issues; driving behavior changes among consumers; navigating the variety of different approaches; and ensuring a just distribution of benefits across population groups and regions. There is the added challenge of COVID-19 and while responses to rebuild and recover may be couched in terms of sustainability, conveying this message is not straightforward.

Building appropriate governance arrangements

All responses noted the need for appropriate governance to implement the integrated approach embodied in the BCG Economy framework. Specific challenges raised may be placed within this heading include ensuring co-ordination across multiple sector and stakeholders; dealing with the legacy of existing systems and the effects of past actions; aligning policy and regulation within and across APEC economies; and putting in place coherent environmental pricing and incentives.

Ensuring the availability of high-quality data and information

While sustainability issues have been a consideration in policy and by policy-makers for many years, the evidence base to support action remains relatively fragmented. Ultimately, integrated policy solutions will require an integrated body of high-quality data and information to support their design, monitoring and evaluation. The responses highlight a number of data related challenges including the need for more integrated analysis of data, for example, concerning the benefits of BCG Economy approaches; the need for consistent approaches to the verification of new technologies; establishing mechanisms for sharing data, information and knowledge; creating spatially relevant, context specific information sets potentially applying new forms of data collection; and developing data about new, more sustainable, products and processes.

APEC'S ROLE IN PROGRESSING THE BCG ECONOMY MODEL

The final question concerned the potential for APEC to play a role in progressing the BCG Economy framework. The general tenor of the responses from APEC members was very positive and a number of responses highlighted the potential for APEC to take a visionary perspective in linking all three parts of the BCG Economy framework and demonstrating the benefits of more holistic and integrated approaches in responding to sustainability challenges.

Setting aside variations in context and recognizing that there are differences in the level of development, APEC members identified many ways in which APEC could leverage the BCG Economy framework to advance sustainability and the green agenda. These included using the BCG Economy framework to:

- Undertake a stocktake of existing measures concerning sustainability and green agendas covering themes such as waste, energy, agriculture and decarbonization
- Support implementation of the Enhanced APEC Agenda for Structural Reform (EAASR) and associated individual action plans, for example concerning investments in technology
- Advance APEC's sustainability agenda through implementation of the Putrajaya Vision 2040 and the Aotearoa Plan of Action (2021)
- Drive implementation of the 2030 Agenda for Sustainable Development committed to by APEC in 2016 – including achieving SDG targets and NDC targets (UNFCCC)
- Support increased knowledge-sharing and discussion especially for those member economies new to green growth and other sustainability policies
- Improve awareness and capacity building, technical assistance and project implementation
- Co-ordinate research and expertise and the sharing of best practice across many relevant fields, for example, digital and smart infrastructure, resource-use efficiency, environmental and natural resource monitoring, sustainable business models, and certification
- Accelerate the transition to sustainable outcomes through existing programs and strategies
- Encourage private sector engagement using APEC's role as a convening forum for all stakeholders
- Develop strategic plans/roadmaps/frameworks to guide action and implementation
- Avoid duplication and overlap and increase co-ordination of activities
- Socialize the concepts of BCG, sustainability and systems thinking and recognize the need for ensuring/securing nature positive outcomes
- Promote APEC's achievements on sustainability, for example, through symposiums, events, reports, and dissemination of case studies (e.g. fishing and aquaculture)
- Identify models and solutions that suit each member economy's circumstance

- Drive consideration of sustainability at domestic levels including in terms of co-ordination across all levels of government, and with a wider range of stakeholders including local communities and indigenous groups
- Align legal frameworks for action, for example concerning environmental markets (e.g. for carbon), trade in environmental goods and services, and disclosure and reporting practices.

APEC members also recognized that implementation of these areas of work could be supported by APEC's engagement with other regional and international organizations. The relevant organizations and networks noted in the responses included:

- **International organizations:** OECD (e.g. on sustainability and green growth); WTO (e.g. groups on FFSR, TESSD, IDP fisheries, agriculture); UNEP; UNIDO (e.g. on Circular Economy); UN and regional offices; IMF, ILO; FAO; World Bank; UNFCCC; Green Climate Fund
- **International Energy Agency (IEA);** International Renewable Energy Agency (IRENA); Multilateral Development Banks including ADB and IADB
- **Regional organizations:** ASEAN; East Asia Summit; Asia-Europe meetings; EU (e.g. on bioeconomy); Eurasian Economic Union
- **APEC's Specialist Regional Bodies (SRBs)** and other groups for example on standards and conformance (SCSC) and focus groups on climate change and clean air; energy efficiency (EWG-EGEEC); food safety
- **International multi-stakeholder fora:** International Bioeconomy Forum; International Advisory Council on the Global Bioeconomy; Regional circular economy coalition of Latin America; Global Alliance on Circular Economy and Resource Efficiency (GACERE)

BCG ECONOMY FRAMEWORK QUESTIONNAIRE

- 1** Does your government implement policies to promote any of the following economic approaches to advance environmental economic sustainability?
If YES, could you elaborate further on the policies implemented and/or goals, for example, to reduce emissions, to support green financing, research and development, dissemination of knowledge and technology?
If NO, are there any plans (indicate the timeline, if any) to put in place policies and regulations that facilitate and/or promote green and sustainable transition?
 - a Bio-Economy
 - b Circular Economy
 - c Green Economy
 - d Bio-Circular-Green Economy

- 2** Role of stakeholders
 - a What kind of partnerships, if any, does your government have with stakeholders (i.e. private sector, academia, youth, and social enterprises) on sustainability?
 - b What kind of support (policy, financial etc.) and incentives, if any, are provided for the private sector to transition towards zero waste and/or zero emissions?
 - c What kind of roles can stakeholders play to fill any gaps to ensure a whole-of-society approach to advance sustainability in tandem with growth and inclusivity?

- 3** What are the opportunities (for the government, businesses and general public) in applying the BCG Economy Model or similar economic approaches?

- 4** What are the challenges faced by your economy in applying the BCG Economy Model or similar economic approaches?

- 5** Application of the BCG Economy Model
 - a What can APEC do to leverage on the BCG Economy Model to advance the sustainability and green agenda? What should be the priority areas?
 - b How can other regional and/or international organizations play a role to complement APECs efforts?



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