



BIO-CIRCULAR-GREEN ECONOMY MODEL:

Resilient and Sustainable
Development Initiatives for
International Collaboration

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CHALLENGES AND OPPORTUNITIES FOR THAILAND



**CLIMATE
CHANGE**



**ECONOMIC
CRISIS**



**EPIDEMIC/
PANDEMIC**



**AGEING
SOCIETY**



**SOCIAL
DIVIDE**



**POLLUTION AND
ENVIRONMENTAL
DEGRADATION**

STRENGTHS	WEAKNESSES	MEGA TRENDS
Food security (World kitchen)	Low export value of food and agricultural products	Demand for high quality and safe goods/services
Health security	Rely on imported medicine and medical supplies & equipment	Growing market of health products and services
Wealth of natural resources and culture	Quantity tourism, not quality tourism	Rise of sustainable development

THAILAND'S BIO-CIRCULAR-GREEN ECONOMY (BGC) MODEL



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 resources



NSTDA



Green economy



Determines to keep economy, society and the environment in balance, leading to sustainable development



FOOD AND AGRICULTURE



MEDICAL AND WELLNESS



ENERGY, MATERIAL AND BIOCHEMICAL



TOURISM AND CREATIVE ECONOMY

BIODIVERSITY



CULTURAL DIVERSITY

01 Policy and Management

02 Science, Technology and Innovation

03 Participation from ALL Sectors

ADOPTING BCG MODEL FOR SUSTAINABLE DEVELOPMENT OF THAILAND

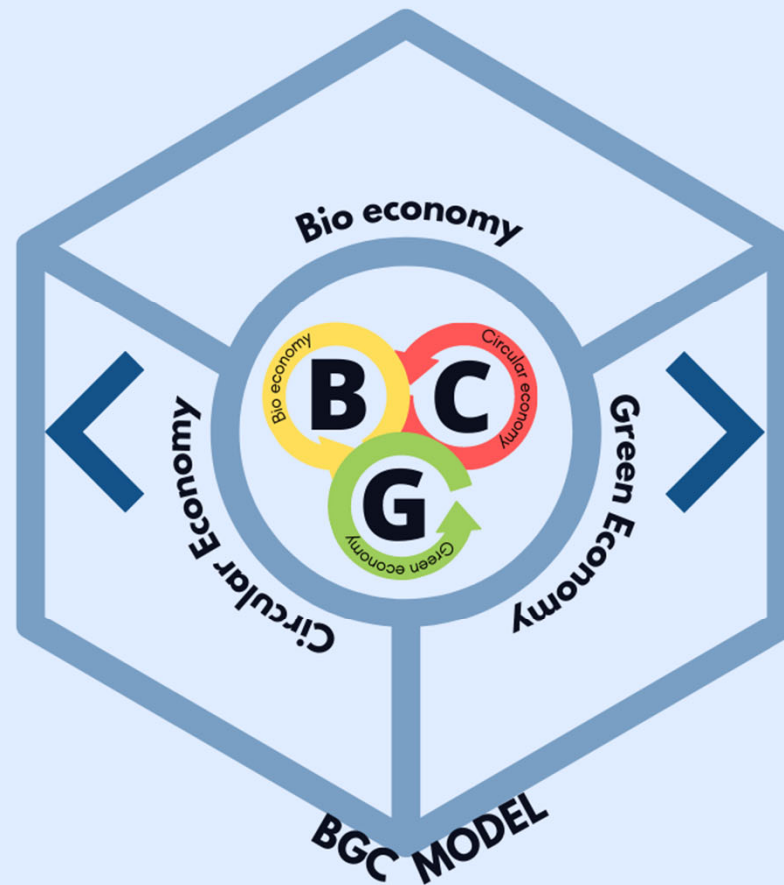


Thailand's 20-Year National Strategy (2017-2036)

Strategy 1:
Well-being of Thai people and society

Strategy 2:
National competitiveness, economic growth, and income distribution

Strategy 5:
Sustainability of national biodiversity, environmental quality, and natural resources



Sustainable Development Goals (SDGs)

1 NO POVERTY	2 ZERO HUNGER	3 GOOD HEALTH AND WELL-BEING
10 REDUCED INEQUALITIES	12 RESPONSIBLE CONSUMPTION AND PRODUCTION	13 CLIMATE ACTION
14 LIFE BELOW WATER	15 LIFE ON LAND	17 PARTNERSHIPS FOR THE GOALS

Inspired by Thailand Board of Investment (BOI)

2021 – 2027 BCG ACTION PLAN



VISION Growth of sufficiency and quality economy with STI
raise income/life quality/conserves, restores, manages, utilizes and increases biodiversity

01



Building the sustainability of natural resource and biodiversity

02



Strengthen local economy

03



Create ability to respond for changing

04



Enhance sustainable competitive for BCG industrial level

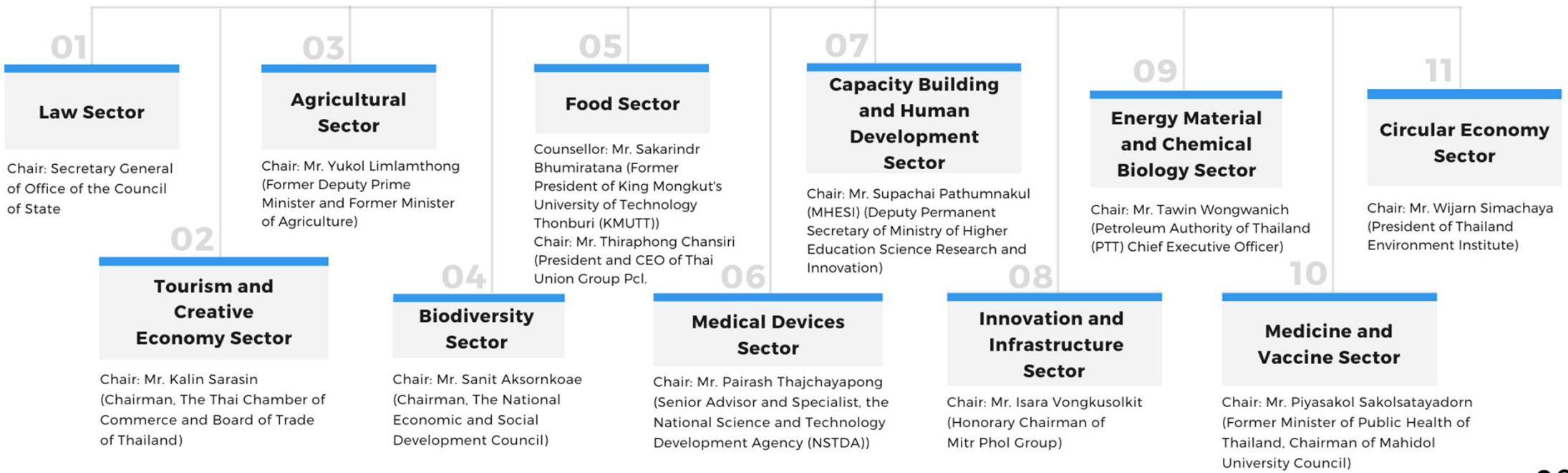
THE COMMITTEE OF BIO CIRCULAR GREEN ECONOMY

**Executive board
Committee**

- The Chairman: H.E. General Prayut Chan-o-cha
- The Vice Chairman: H.E. Don Poramudwinai
- The Vice Chairman: H.E. Anek Laothammatas
- Secretary of Committee: Dr.Narong Sirilertworakul (NSTDA)

**National BCG
Driving
Committee**

- The Chairman : H.E. Anek Laothammatas
- The Vice Chairman: Prof. Sirirung Songsivilai
- Secretary of Committee: Dr.Narong Sirilertworakul (NSTDA)



13 Mechanisms to drive BCG Policy

● 01

Create digital repository of bioresources, cultural capital and local wisdom

● 02

Replenish national resources

● 03

Develop BCG corridor

● 04

Transform agricultural system

● 05

Improve quality and safety of street food and local food

● 06

Build a biobased economy

● 07

Create demand for innovative goods and services derived from BCG model

● 08

Promote sustainable and green tourism

● 09

Promote the development and manufacturing of sustainable goods and services

● 10

Raise the standards of products and services

● 11

Support BCG startups

● 12

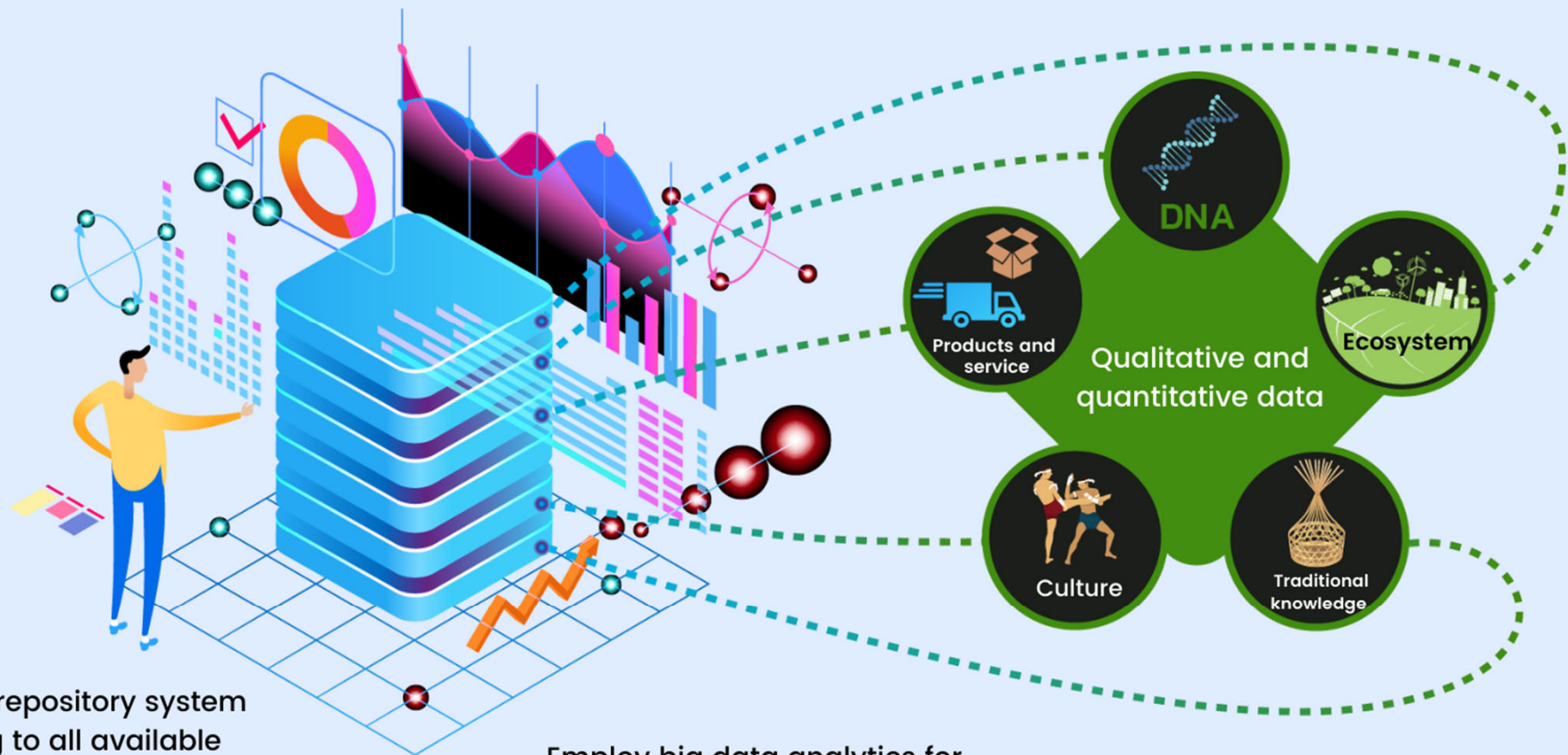
Develop manpower to support BCG model

● 13

Promote international collaboration

01

Create digital repository of bioresources, cultural capital and local wisdom



Develop a repository system connecting to all available databases

Employ big data analytics for

- the planning and management of conservation and restoration
- the utilization to build BCG economy, local economy, and tourism industry

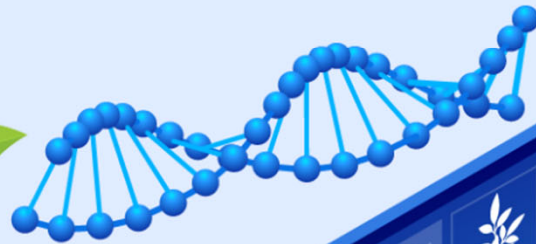
02 Replenish national resources through quadruple helix approach



Establish a program offering carbon credit to enterprises engaging in the forestry carbon projects on the government's land at the ratio Public : Private = 10 : 90 (carbon taxes in some European countries range from 40-80 USD/ton.)



Carbon credit is an amount of greenhouse gases that can be reduced by the Clean Development Mechanism (CDM). Carbon credit can be purchased from entrepreneurs in developing countries on CDM project called "Emissions Trading".



Accelerate research and development in plant and animal breeding and resource monitoring and management.



03 Develop BCG corridor



Build a regional economic corridor in each part of the country by connecting regional demand and supply.



Employ BCG approach - modern agriculture, processing, tourism, trade and investment and linkage between domestic and global economy - to develop and improve products and services.



04

Transform agricultural system



Increase farmers' access to knowledge and technology.



Focus on premium and safe products by emphasizing plant breeding research, safety and quality standards, good farm management and logistics management system.




Raise agricultural GDP by diversifying agricultural products with options such as seed, fruits, ornamental plants, timber, insects, herbal plants and livestock.


Promote integrated farming at the provincial level by employing BCG approach, such as Ratchaburi Model



05 Improve quality and safety of street food and local food



 Promote food machinery and Good Hygiene Practices (GHP) compliance

 Fresh, clean and safe food products



06

Build a biobased economy by employing advanced technology to develop and produce high-value products

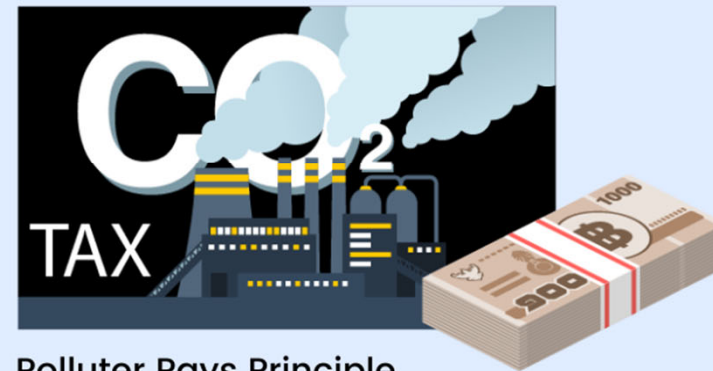


07

Create demand for innovative goods and services derived from BCG model



Establish BCG-related labeling such as carbon footprint labeling, green labeling and environmental labeling



08

Promote sustainable and green tourism

📍 Launch new tourism model such as Happy Model

'Happy Model' intends to attract tourists with the following components:

1. Eat Well: Healthy, safe and delicious local food
2. Live Well: Accommodations with top services and amenities to support 'Work from Anyway'
3. Fit Well: Each province organizes various kind of activities such as biking and mountain climbing
4. Give Well: Sharing local culture/knowledge through 'Storytelling'

📍 Develop sustainable and green tourism with BCG concept and carbon neutrality



📍 Form tourism clusters of primary and secondary cities.

📍 Establish a one payment system to support tourism database for analysis and future planning.



09

Promote the development and manufacturing of sustainable goods and services



Employing green technologies and circular economy concept

10

Raise the standards of products and services to comply with international requirements by investing in infrastructure



R&D infrastructure



Translational research infrastructure

Quality infrastructure system for supporting standardization, testing, certification and accreditation of BCG products/services such as organic products, biochemical products, drugs, vaccines, medical devices, and supplies.



Revise laws and regulations

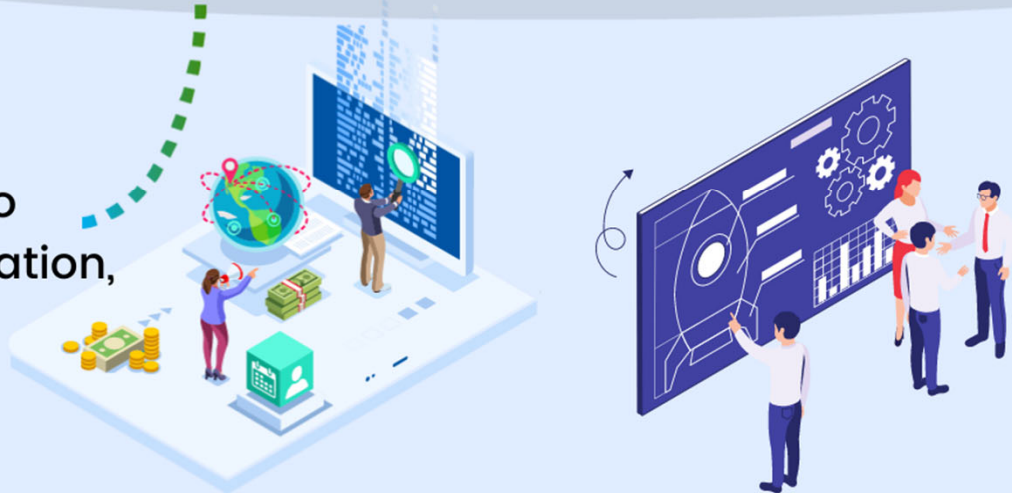
11 Support BCG startups

Improve technological and business skills of entrepreneurs

Provide access to financial sources and government experts



Increase access to technology, innovation, and government infrastructure



12 Develop manpower to support BCG model in all levels



Community and grassroots



Deep tech



SMEs



Startups and Tech Entrepreneurs

13

Promote international collaboration in all facets, including knowledge creation and talent mobilization



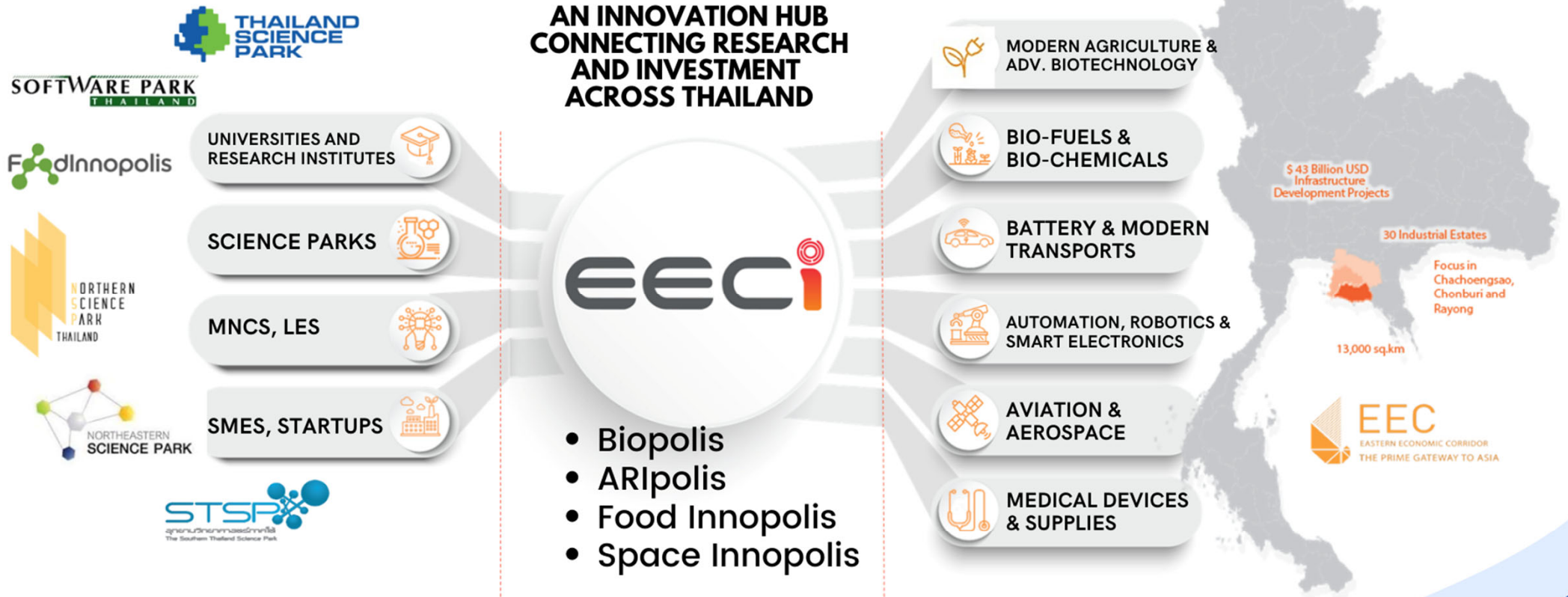
Establish research, trade and investment networks, and investment at the regional and global levels



Enrich Thailand's innovation ecosystem with measures such as incentive to attract foreign investment and international talent and SMART visa program.

Smart Visa is a special visa designed to attract highly skilled talents and investors who wish to work or invest in the 10 targeted industries in Thailand. 5 categories of Smart Visa: 1. **Smart T (Talent)** for highly skilled professionals; 2. **Smart I (Investor)** for investors; 3. **Smart E (Executive)** for senior executives; 4. **Smart S (Startup)** for technology-based startup entrepreneurs; and 5. **Smart O (Other)** for spouse and legitimate children of the main Smart Visa holders.

EECi: Innovation Infra Supporting S-Curve Industries



BCG IN ACTION: BIOREFINERY



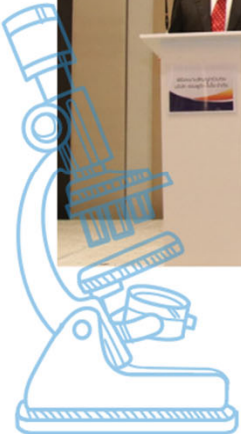
A joint investment between NSTDA and Bio Base Europe Pilot Plant (Belgium) to establish BioBase Asia Pilot Plant to operate Biorefinery Pilot Plant at EECi, providing R&D and upscale services of biochemicals production.



BCG IN ACTION: MEDICAL AND WELLNESS



A joint investment between NSTDA, Thaifoods Group Public Company Limited and a group of investors and researchers in a new biotech startup Genepeutic Bio aiming to manufacture and commercialize CAR T-cell therapy for treating leukemia patients.



Towards the green and carbon neutral society:

Introduction of carbon neutrality measures to promote clean energy, greenhouse gas reduction, reforestation and circular design.



- The Federation of Thai Industries (FTI) and Thailand Greenhouse Gas Management Organization (TGO) is developing Thailand Carbon Credit Exchange Platform to facilitate carbon trading under the Thailand Voluntary Emission Reduction Program (T-VER). The platform is expected to be ready in January 2022.
- The Department of Marine and Coastal Resources and the Royal Forest Department announced a regulation offering 90% carbon credit to enterprises participating in the forestry carbon projects.



BCG IN ACTION: AGRICULTURE

BCG Subcommittee on Agriculture and the Ministry of Agriculture and Cooperatives promote the transformation of agricultural system to embrace BCG concept using public private people partnership (4P) approach in 5 provinces: **Ratchaburi, Lampang, Khon Kaen, Chanthaburi and Phatthalung.**

Goals for Sweet Young Coconut

- 2% increase in economic value.
- 400 new GAP-practicing farmers (accounting for 1600 ha. farmland)/year.
- 50 new GI products (accounting for 80 ha. farmland)/year.
- Eco-friendly farming practices.



Ratchaburi Model



Goals for Sugarcane

1. 2% increase in economic value.
2. Reduce sugarcane burning
3. Increase product value by upcycling waste materials by 10%



Goals for Pig



- 5% increase in economic value.
- Upcycling and value creation of by-products.

Goals for Dairy Cattle



- 3% increase in economic value.
- Eco-friendly farming practices.

GLOBAL TRENDS FOR SUSTAINABLE GOALS

Biden's Executive Order on Tackling Climate Crisis at Home and Abroad



EU Green Deal

Canada Linking recovery to climate goals



Green Recovery



Japan pledged to be carbon neutral by 2050

South Korea's Green New Deal, with the goal of net-zero emissions by 2050



China pledged to reduce net carbon emissions to zero by 2060

BCG INITIATIVES IN ASEAN

SINGAPORE

SC GREEN PLAN

The Singapore Green Plan 2030 is a national sustainability movement which seeks to rally bold and collective action to tackle climate change.

It is a living plan which will evolve as we work with Singaporeans and partners from all sectors to co-create solutions for sustainability. Let's work together to make Singapore a green and livable home.

City in Nature

- Develop over 100 km² of new parks and enhance almost 100% of existing parks with high-quality amenities and nature landscapes by 2030.
- Age-friendly green spaces by 2030.

Green Government

- Public sector will lead on sustainability.
- Be exemplary in taking sustainability into consideration in public procurement, asset management and 2025 ahead of environmental goals.
- Decrease and avoid emissions and greenhouse gases through green procurement.

Sustainable Living

- Develop Green Office & Schools
- Reduce air-conditioning energy-related emissions of all floors
- Reduce household electricity consumption of all other emissions from schools
- At least 20% of schools to be carbon neutral by 2030.
- 70% of shopping malls to be net-zero carbon by 2030.
- Make cycling path network to 1,000 km by 2030, from 400 km in 2020.
- Expand rail network to 500 km by early 2030s, from around 200 km today.
- Green Citizenship
- Reduce water and consumption
- Reduce amount of waste to landfill per capita per day by 50% by 2025, and 20% by 2030.
- Reduce household water consumption to 120 litres per capita per day.

Energy Reset

- Develop energy efficiency
- New, denser and low-regulation to make new 2020, with all new and low-regulation to be of energy-efficient models from 2020.
- Further review road traffic options to bring about road for low-emission electric cars.
- At least 1000 electric vehicles (EV) charging points by 2025, with 6 EV-charging points by 2022.
- Greater Infrastructure & Buildings
- Green 80% of Singapore's buildings by Green Plan Road by 2030.
- 30% of new buildings by Green Plan Road to be Zero Carbon Buildings by 2030.
- Lead to zero-green buildings to net 80% improvement in energy efficiency from 2020 levels by 2030.
- Sustainable Towns & Districts
- Reduce energy consumption in HDB blocks by 10% by 2030.

Green Economy

- Sustainability as New Engine of jobs and growth
- New Electrical Sustainability Programme to help local enterprises adopt sustainable practices.
- Equip Singapore to be a carbon services hub and a leading centre for green finance in Asia and globally.
- Empower young talents to be a sustainable energy and climate jobs.
- Leverage opportunities in sustainable solutions to create good jobs for Singaporeans.
- New investments to be Carbon and Energy Efficient.
- Seek new investments to be energy efficient in order to improve energy efficiency.

Resilient Future

- Sea-level rise and Coastal Resilience
- Adapt to sea-level rise and coastal erosion
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SG GREEN PLAN

MALAYSIA

National Policy, National Green Technology Policy (NGTP)

- Launched on 24 July 2020 to harness Green Technology as a driver to accelerate the national economy and promote sustainable development. The emphasis is on four focus areas of green initiatives: energy, building, transportation, and waste management.
- Criteria of Green Technology:
 - It minimises the degradation of the environment;
 - It has zero or low greenhouse gas (GHG) emissions;
 - It is safe for use and promotes a healthy and improved environment for all forms of life;
 - It conserves the use of energy and natural resources; and
 - It promotes the use of renewable resources.
- The four pillars of green technology are:
 - Energy**: Seek to attain energy independence and to promote efficient utilisation.
 - Environment**: Conserve and improve the impact on environment.
 - Economy**: Enhance the national economic development through the use of technology.
 - Social**: Improve the quality of life for all.
- The National Energy Efficient Action Plan (NEEAP 2016-2025):
 - The NEEAP, announced on 6 January 2016, is a catalyst for Malaysia's adoption of energy efficiency in the public and private sectors.
 - The target of NEEAP is to save electricity and reduce electricity demand growth. It seeks to attain efficient energy usage and conservation over the next 10 years.
 - NEEAP target (2016 - 2025): National energy savings in 10 years of 52,233GWh (8% reduction), which will contribute to CO2 reduction of 37,792 kilotonnes.

The Eleventh Malaysia Plan (2016-2020) strategies:

- Explores new Renewable Energy (RE) sources and enhances capacity of RE personnel.
- RE target of 20% in national power generation energy mix by 2025.
- Promotes the use of RE sources based on the national target by 2020, which are as follows:

2014: Biomass 22%, Solar 5%, Wind 5%, Hydro 5%, Geothermal 5%, Nuclear 5%, Coal 40%, Gas 30%, Oil 10%.

2020: Biomass 17%, Solar 17%, Wind 17%, Hydro 17%, Geothermal 17%, Nuclear 17%, Coal 38%, Gas 24%, Oil 12%.

INDONESIA

THE ROADMAP IS PRESENTED IN FOUR PARTS:

PART 1 Indonesia's Growth Trajectory
builds the case for moving to a growth trajectory that is more resource and environment friendly, and socially equitable.

PART 2 Green Growth Opportunities by Sector
presents various opportunities for green growth, as illustrated by current projects in key economic sectors.

PART 3 Mainstreaming Green Growth in Policy, Planning, and Ir
describes the overarching policy and planning framework needed for green growth methods, tools, and indicators to measure and monitor green growth performance.

PART 4 Delivering Green Growth for the Nation
presents an action plan to deliver green growth in Indonesia in the short, medium, and longer term, to 2050.



PHILIPPINES

National Climate Change Action Plan 2011-2028

The graphic features a map of the Philippines in the background, overlaid with the text 'National Climate Change Action Plan 2011-2028'. To the left is the logo of the Climate Change Commission, which includes a globe and the text 'CLIMATE CHANGE COMMISSION'.

PRIORITIES	OUTCOMES
1. Food security	The objective of the national strategy priority on food security is to ensure availability, stability, accessibility, and affordability of safe and healthy food amidst climate change.
2. Water sufficiency	In light of climate change, however, a comprehensive review and subsequent restructuring of the entire water sector governance is required. It is important as well to assess the resilience of major water resources and infrastructures, manage supply and demand, manage water quality, and promote conservation.
3. Ecological and Environmental stability	Ecosystem resilience and environmental stability during the plan period is focused on achieving one immediate outcome: the protection and rehabilitation of critical ecosystems, and the restoration of ecological services.
4. Human security	The objective of the human security agenda is to reduce the risks of women and men to climate change and disasters.
5. Climate-friendly industries and services	NCCAP prioritizes the creation of green and eco-jobs and sustainable consumption and production. It also focuses on the development of sustainable cities and municipalities.
6. Sustainable energy	NCCAP prioritizes the promotion and expansion of energy efficiency and conservation; the development of sustainable and renewable energy; environmentally sustainable transport; and climate-proofing and rehabilitation of energy systems infrastructures.
7. Knowledge and capacity development	The priorities of the NCCAP on knowledge and capacity development are: <ul style="list-style-type: none"> Enhanced knowledge on the science of climate change; Enhanced capacity for climate change adaptation, mitigation and disaster risk reduction at the local and community level; and Established gendered climate change knowledge management accessible to all sectors at the national and local levels.

ASEAN BCG Network

ASEAN BCG Network is a **coalition of public, private and non-government organizations** in ASEAN with strong interest in BCG.



Aiming to **strengthen ASEAN capacity in research, development and technology diffusion** to enable the adoption of **applicable technologies for sustainable development.**

The Network will **serve as a gateway to catalyze collaboration within ASEAN as well as other non-ASEAN organizations** in research, technology demonstration, technology localization and commercialization on BCG.

Upcoming Activities:



Launch Network



BCG Seminar

UPCOMING EVENT



17 - 21 January 2022

ASEAN Innovation Roadmap :
BCG on Global Digital World towards
Inclusive and Sustainable Growth

 air atm 2022



17 January 2022
at Bangkok



**Official Launching
ASEAN BCG Network**

APEC 2022: Thailand

Theme: Open Connect Balance



Five strategies

1. freedom of trade and investment,
2. advancing a digital society,
3. people's well-being,
4. food and agriculture security, and
5. sustainable growth and responsibility (including development of the Bio-Circular-Green economy, or BCG).



Three key points

1. trade and investment facilitation,
2. restoring connections in APEC, especially travel and tourism and sustainable growth promotion, highlighting reduction of inequality, and
3. environmental protection by using digital technology and innovations for tangible results.



Bangkok Goals on BCG

1. Goal such as
 - climate change mitigation, adaptation, and resilient/ net zero emission/ carbon neutrality;
 - zero waste/ sustainable consumption and production;
 - preservation and conservation of environment and biodiversity/ sustainable management of resources;
 - increased application of science, technology, innovation and digitalization;
 - social inclusion/ human resource development;
2. Suggested action areas for each Goal, in relevant economic sectors, such as energy, agriculture and food, forestry, fishery, tourism, and finance.

UPCOMING EVENT

APEC BCG Conference



22 February 2022

09:00 - 15:00 (Bangkok Time)



Session I: Introduction of
Bio-Circular-Green Economy Model

Session II: Towards Sustainability





APEC BCG BUSINESS FORUM

in conjunction with Thailand Tech Show



Objectives:

1. To encourage the application of the concept of BCG Economy in the development of the country and create added value to the existing resources of each country
2. To initiate collaboration in research, development and innovation, including business cooperation in the APEC economic zone

Activities:

- ◆ **CEO talk**
- ◆ **10 Technologies to Watch 2022**
- ◆ **BCG-Techmart Exhibition**
- ◆ **BCG Business Pitching and Business Matching**
- ◆ **EECi showcase**

BCG ACTIVITIES BY NSTDA/MHESI


**Launch ASEAN
BCG Network**

organize during the ASEAN event hosted by MHESI (Thailand)


**APEC
Conference on
BCG Economy**


**ASEAN BCG
Network**

Workshop for Network Implementation Plan


BCG Seminar

Sharing the ideas for Better Community to Better World


**APEC BCG
Business forum**



**Green Growth
Strategies
VS
BCG Economy
Model**

 The New Energy and Industrial Technology Development Organization, NEDO, JAPAN

**ASEAN Bio-
Circular-
Green
Economy
Knowledge
Sharing
Series**

 ASEAN Centre for Sustainable Development Studies and Dialogue - ACSDSD

**BCG series I
Research
community**



Forschungszentrum Jülich, Germany

**BCG series II
Industrial
community**

Forschungszentrum Jülich, Germany

**BCG series III
Local
community**



Forschungszentrum Jülich, Germany

COLLABORATION FOR IMPACT



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