



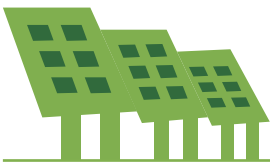
Collaboration in pursuit of Green Productivity in Asia-Pacific Region



**Center of Excellence on Green Productivity
Asian Productivity Organization**

亞洲生產力組織綠色卓越中心

Center of Excellence on Green Productivity, Asian Productivity Organization



The Asian Productivity Organization (APO), founded on May 11, 1961 with its secretariat located in Tokyo, Japan, aims to promote sustainable socio-economic development in the Asia-Pacific region through increased Productivity. To respond to the need of Member Economies to develop rapidly, the APO is committed to adopting new initiatives to effectively carry out its organizational functions, one such example being the pivotal role played by the "Center of Excellence (COE)."

Ever since the constitution of APO, the China Productivity Center (CPC), appointed by the Government of the Republic of China (ROC) and serving as the National Productivity Organization of Taiwan, has implemented APO activities and served as an bridge between Taiwan, the APO Secretariat and its Member Economies. In view of the global impact of climate change, so as to lead the way in the promotion of sustainable development among Member Economies, the CPC representing Taiwan submitted a request to APO in 2013 to establish the Center of Excellence on Green Productivity (COE on GP). With a view to use this platform for cooperation on Green Technology as a means of exchange with APO Member Economies and to dispatch experts to set up "Green Technical Service Teams" for the establishment of Demonstration Sites. Not only will this enhance Green Productivity amongst Member Economies, but will also create favorable conditions for Taiwan's pre-eminence in the Export of Green Technology overseas.

The APO currently consists of 21 Member Economies (listed in alphabetical order):

Bangladesh, Cambodia, Republic of China, Fiji, Hong Kong, India, Indonesia, Islamic Republic of Iran, Japan, Republic of Korea, Lao PDR, Malaysia, Mongolia, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, Turkey, and Vietnam.

SERVICES

Develop Green Productivity Exchange Platforms, set up Green Technical Service Teams, share and promote ROC's Green Benchmark Practices, Policies and Regulations, as also provide Green Technology Solutions through Expert Diagnostic Services, the Building of Demonstration Sites, and other relevant services.



INDIA

- **2014–2017:** Held Green Technology Talent Training and completed the APO's "E-Waste Precious Metals Recovery Technology" and "Solar Power System" demonstration projects in partnership with the National Productivity Council (NPC).
Participated in Wastech India from 2014 to 2016 and in the 2019 Noida EAW Water Technology Expos, sharing ROC's environmental protection policies and knowhow in green technology, as well as project achievements in collaboration with NPC, the Environmental Protection Administration's (EPA) Fund Management Board and business organizations from Taiwan and India.
- **2018-2020:** Promoted the exchange of "Industrial Wastewater Treatment and AIoT Smart Monitoring Technology" between Taiwan and India by accelerating businesses, built five technology demonstration sites and developed applications for business models for Common Effluent Treatment Plants (CETPs) in the Mayapuri area of Delhi and in the Ranitec Industrial Zone of the state of Tamil Nadu.
- **2017-2020:** Conducted the Smart City & Green Technologies Forum of the Taiwan-India Industrial Collaboration Summit, and enhanced cooperation in green & smart technology by encouraging the signing of MOUs between representatives of Taiwan and India industries, conducting skill enhancement workshops, and promoting transfers of technology.

INDONESIA

- **2017:** Conducted a solar energy technical training course with the Ministry of Manpower, the Ministry of Industry, and other Indonesian authorities.
- **2018-2019:** Facilitated industry-academia cooperation between Taiwan and Indonesia by building two Taiwanese-made solar energy systems as training aids at the Vocational Training Center of Serang (BBPLK Serang) and by transferring one solar energy training course to the Indonesian Ministry of Manpower.
- **2019-2021:** It is anticipated that a Taiwanese-made solar microgrid pilot system will be built in a rural community in Sorong, Indonesia to verify the benefits of such applications.

LAO PEOPLE'S DEMOCRATIC REPUBLIC

- **2014:** Held the "Green Energy Technology Educational Training" event for government officials with the Department of Small and Medium Enterprise Promotion (DOSMEP) of the Lao Ministry of Industry and Commerce (MoIC) and the Institute of Renewable Energy Promotion (IREP) of the Lao Ministry of Energy and Mines.
- **2015-2016:** Facilitated industrial cooperation between Taiwan and Laos by building the first public-sector solar energy generator system of Laos in Vientiane, jointly commissioned by Taiwanese and Lao officials and the APO Secretariat.
- **2017:** Invited Lao officials to Taiwan to conduct the "Taiwan-Laos Green Energy Industrial Cooperation Forum" and share market information regarding Laos.
- **2018:** Facilitated industrial cooperation between Taiwan and Laos by completing a green energy demonstration project in an elementary school in an off-grid rural community in Luang Prabang, developing the use of green microgrids in such communities.
- **2019:** Held the "Taiwan-Laos Renewable Energy Cooperation Workshop" in Vientiane, Laos.
- **2019:** Helped Taiwanese businesses to install a 14 MW floating solar energy system in Vientiane.

MALAYSIA

- **2015:** Began exchange and cooperation by conducting a green productivity and green factory workshop jointly with the Malaysia Productivity Corporation.
- **2018-2019:** Established communication channels with the Malaysian Green Technology Corporation (GreenTech Malaysia) to help green energy businesses in ROC find appropriate business opportunities for green technology in Malaysia.

PHILIPPINES

- **2014:** Jointly held the "Taiwan-Philippines Green Energy Industry Workshop" with industry associations in the Philippines to advocate applications for green energy.
- **2015-2016:** Held a series of training courses on solar-diesel hybrid power plant technology jointly with the National Power Corporation (NPC) of the Philippines.
- **2015:** Worked with the NPC to jointly design the first solar-diesel hybrid power plant on an outlying island in the Philippines.
- **2016-2017:** Promoted Taiwanese businesses that comprise the Global Off-grid Industry Development Alliance (GOIDA) by facilitating the signing of an MOU for a pilot program between the outlying island microgrid investment team and the Renewable Energy Association of the Philippines (REAP).

THAILAND

- **2017:** Signed an MOU with the 3R Foundation, promoting bilateral exchanges in the management of industrial resource recovery.
- **2018:** Signed an MOU with Thammasat University, Thailand, to installing the equipment or technology demonstration sites for teaching and research proposes, creating a platform for industry-academia cooperation.
- **2018:** Facilitated the policies exchange and site visits in waste management industries.
- **2019:** Participated International E-Waste Management Network (IEMN) Conference to facilitate bilateral cooperation between Taiwan and Thailand.

VIETNAM

- 2017: Facilitated the signing of an MOU between the Taiwan Optoelectronic Semiconductor Industry Association (TOSIA), the Vietnam Standards and Quality Institute (VSQI) and others to implement an LED smart lighting demonstration project in the grounds of the Institute.
- 2018: Led Taiwanese businesses to participate in the Taiwan Expo held in Ho Chi Minh City, promoting business opportunities between Taiwan and Vietnam in the field of environmental technology.
- 2018: Worked with the Environmental Science Institute (ESI) under the Ministry of Natural Resources and Environment of Vietnam to conduct the "Taiwan-Vietnam Environmental Protection Industry Conference-Industrial Fly Ash Disposal and Recycling" event, enhancing relations between Taiwanese and Vietnamese officials and industries.
- 2019: Jointly held the "Taiwan-Vietnam Circular Economy Forum" in Ho Chi Minh City with the Small and Medium Enterprises Development Support Center 2 under the Ministry of Science and Technology of Vietnam, and held the "Taiwan-Vietnam Solar Energy Circular Economy Industrial Cooperation Conference" with the Ministry of Industry and Trade of Vietnam to facilitate bilateral cooperation between both Taiwan and Vietnam.

GO GREEN, GO SMART SUSTAINABLE TECHNOLOGY FOR A SUSTAINABLE FUTURE



SUCCESS STORIES OF THE GREEN TECHNICAL SERVICE TEAMS



Establishing Solar Power System at NPC-AIP



Undertaking a Public Private Partnerships (PPPs) Strategy Meeting with NPC India



Jointly holding workshops on new developments in Effluent Treatment for Tanneries with ILIFO Foundation

INDIA

E-Waste Precious Metals Recovery Technology, Solar Energy and Energy Storage Applications, Industrial Wastewater Treatment and AIoT Smart Monitoring Technology

In response to the international trend towards carbon reduction, the Government of India has implemented Zero Liquid Discharge (ZLD) regulation for specific industries in water shortage areas which has brought enormous business opportunities to green industries. The Green Technical Service Team in India consolidates Taiwan's advantages in green technology, links industrial, official, educational and research organizations in both Taiwan and India, shares ROC's Environmental Protection and Recycling Policies with India and promotes exchange and cooperation in the field of Recycling Technology.

Subjects of cooperation include E-Waste Precious Metals Recovery Technology, Solar Energy and Energy Storage Applications, Industrial Wastewater Treatment and AIoT Smart Monitoring Technology. The "Green Smart Technology" demonstration sites promote adherence to the policies and regulations of the Government of India, reduce operating costs, and promote forward-looking technologies that are both efficient and environmentally friendly, pursuing a sustainable, low-carbon society as a starting point for a future of mutual benefit with India.

INDONESIA

Green Microgrids in Rural Communities, Solar Energy

Indonesia is the world's largest archipelago nation and the Government of Indonesia is encouraging infrastructure development in off-grid rural communities and outlying islands in order to balance urban and rural advancement. The Green Technical Service Team, in collaboration with Taiwanese power system integrators and academic units, successfully made an application for an APO demonstration program and completed a solar energy demonstration system for training seed teachers in 2019. It is anticipated that a pilot solar micro-grid system will be completed in an off-grid rural community in 2021. It is hoped that industry-academia cooperation between Taiwan and Indonesia will demonstrate how green energy systems can be successfully integrated, promote the use of green and smart technologies in Indonesia and create a vision of mutual benefit.

Surveying the economic circumstances and electricity usage of people in off-grid rural communities in Indonesia



Industry-academia cooperation guiding seed teachers in Indonesia

Installation of the solar energy teaching demonstration system

Solar energy demonstration system initiation ceremony at the Lao Ministry of Industry and Commerce



Surveying the economic circumstances and electricity usage of people in off-grid rural communities in Laos

Conducting a Taiwan-Laos cooperation workshop to promote green energy policies

LAO PDR

Green Microgrids in Rural Communities, Solar Energy

While approximately 80% of the hydroelectric power generated by Laos is exported to neighboring countries, extreme weather in recent years has prompted the Government of Laos to explore the use of renewable energy sources to minimize the hydropower generation gap between dry and rainy seasons, and to promote green electrification in rural communities. The Green Technical Service Team has headed in-depth exchanges between Taiwanese green energy businesses, the Government of Laos, and state power authorities. The team has introduced solar energy technology, its applications in green microgrids, promotion methods for green energy policies, etc. through projects such as the solar energy system for the Ministry of Industry and Commerce and through the establishment of the Luang Prabang microgrid demonstration site. Our hope is to help Laos develop and improve green energy policies and enhance energy resilience.

MALAYSIA

Renewable Energy, Energy Storage, Resource Recycling, Smart Cities

In recent years, the Government of Malaysia has set various environmental policy objectives while actively promoting green technology policies and low carbon cities projects in addition to setting various environmental policy objectives. The Green Technical Service Team will align its efforts with the Malaysian government's environmental policies and promote Taiwan's advanced green technology, recycling policy system and technical knowhow through technology sharing, establishment of APO demonstration sites or invitations to businesses to invest in Malaysia. The goal is to create demand in the Malaysian market for relevant products and services, while assisting Taiwanese businesses introduce technology or products related to renewable energy, energy storage and smart cities into Malaysia.

Discussing future cooperation between Taiwan and Malaysia with the Chairman and representatives of the Malaysia Productivity Corporation



Investigating the needs assessment for Smart Highway Management in Malaysia

Visiting representatives of the Energy Commission of Malaysia to gain an understanding of Malaysia's energy policies



PHILIPPINES

Solar Energy, Hybrid Power Systems

Private companies are able to undertake power generation projects in rural communities and on outlying islands in the Philippines owing to the liberalization of the power market and sustainable power generation is encouraged. The Green Technical Service Team has jointly held technical training courses with Taiwanese power companies, research units and the National Power Corporation (NPC) of the Philippines and jointly designed the technical specifications of the first solar-diesel hybrid power plant in the Philippines, promoting bilateral cooperation. The Green Technical Service Team also led experts to conduct a study of the power situation on the outlying islands of the Philippines, promoting cooperation between green energy industry associations in both Taiwan and the Philippines which resulted in an agreement to jointly develop green power on these outlying islands. It is hoped that this will facilitate the export of Taiwanese power technology and products and boost both power development and economic development on the outlying islands of the Philippines.

Surveying the economic circumstances and electricity usage of people in off-grid rural communities on the outlying islands of the Philippines



Cooperating with the NPC on specialist technical training courses



Facilitating the signing of a MOU between industry associations in Taiwan and the Philippines

Exchanging policies bilaterally and ideas to promote environmental education



Establishing the cooperation for waste management companies



Creating a platform for industry-academia cooperation



THAILAND

Renewable Energy, Resource Recycling Technology, Waste Management

The importance of environmental protection in Thailand has rising emphasis in recent years, and the government is actively strengthening waste management, resource recovery and applications for renewable energy. As a result, the Green Technical Service Team in Thailand has promoted cooperation between resource recycling businesses in Taiwan and Thailand by introducing management models for integration of information systems and exchanges of waste disposal equipment. In year 2019, the Team facilitated Taiwanese companies in Thailand to establish recycling stations and participated in the 9th annual meeting of the International E-waste Management Network.



VIETNAM

Environmental Protection, Circular Economy Policies

The manufacturing industry in Vietnam has developed in recent years and has actively sought investment from overseas. However, highly polluting industries have also been imported and this has had an impact on the local environment. As a result, Vietnam is gradually establishing new environmental protection regulations for industrial investment. In order to help Taiwanese manufacturers explore opportunities for cooperation in Vietnam's environmental protection industry, the Green Technical Service Team has long maintained good relations with the Ministry of Industry and Trade, the Ministry of Natural Resources and Environment, SMEDEC 2 and other official agencies in Vietnam. The Team has also conducted bilateral workshops for the exchange of environmental protection and circular economy policies between Taiwan and Vietnam, hoping to assist Vietnam in creating a robust environmental protection industry chain and to support Taiwanese manufacturers interested in the Vietnamese market, resulting in a win-win situation.

Inviting Vietnamese officials to Taiwan for technical exchanges



Visiting Vietnamese environmental technology companies to discuss cooperation



Holding Taiwan Vietnam technical forums on circular economy technology