



ISSN:2615 - 9600
English Edition III-

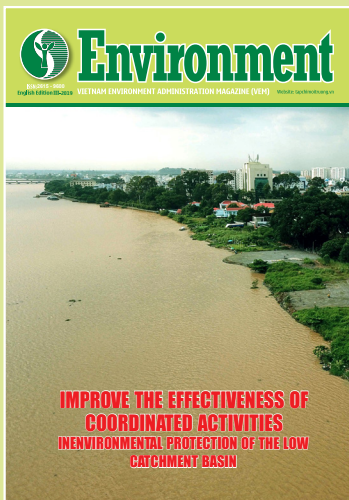
Environment

VIETNAM ENVIRONMENT ADMINISTRATION MAGAZINE (VEM)

Website: tapchimoitruong.vn



**IMPROVE THE EFFECTIVENESS OF
COORDINATED ACTIVITIES
IN ENVIRONMENTAL PROTECTION OF THE LOW
CATCHMENT BASIN**



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PUBLICATION PERMIT

Nº 1347/GP-BTTTT - Date 23/8/2011

Photo on the cover page:

Đồng Nai River, that run through
Biên Hòa City

Photo by: VNA

Design: Hoàng Đan

English edition III/2019

Price: 30.000VND

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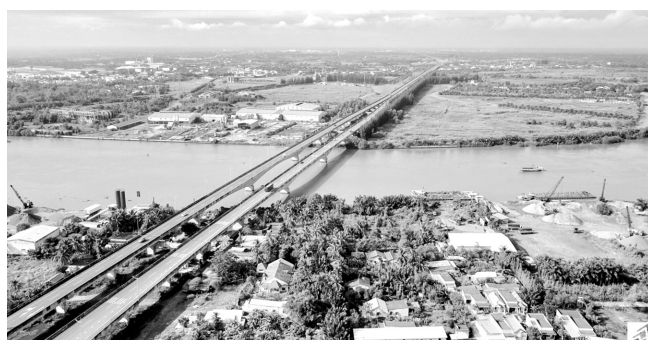
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Review the National Environmental Protection Strategy to 2020



▲ *The Consultation workshop on Assessing the implementation of the NEPS until 2020 and outline of the Strategy in the period of 2021 - 2030*

On November 15th, 2019, the Ministry of Natural Resources and Environment (MONRE) organized the Consultation workshop on Assessing the implementation of the National Environmental Protection Strategy (NEPS) until 2020 and outline of the Strategy in the period of 2021 - 2030. The Institute of Strategy and Policy on Natural Resources and Environment under MONRE is the focal point to perform the task of investigating and evaluating the results of implementation of the NEPS till 2020, with a vision to 2030 and formulating a NEPS till 2030, with a vision to 2040.

The main purpose of the Workshop is to introduce the results of the evaluation and propose the Strategy outline for the period 2021 - 2030 and at the same time consult the delegates to improve the effective of implementation the National Strategy. The NEPS to

2020, with a vision to 2030 was promulgated by the Prime Minister in 2012 with 4 orientations for the contents, environmental protection measures and 6 groups of overall solutions.

So far, the international situation as well as Vietnam's environmental protection viewpoints have changed, Vietnam's environmental quality is showing signs of recession, therefore, the evaluation of this Strategy to set the orientation from 2021 to 2030 is necessary. The NEPS in the 2021 - 2030 period will aim to prevent the trend of pollution and environmental degradation, gradually improve the quality of the environment and solve pressing environmental issues; prevent the decline of biodiversity; improve capacity, take steps to actively adapt to climate change, promote low-carbon economy, aiming to achieve the country's 2030 sustainable development goals.

In addition, the Strategy should set a vision to 2045, which is the Vietnamese environment of good quality, equivalent to that of other developed countries in the region; ensure the people's right to live in a clean environment; biodiversity and natural resources are preserved and restored; proactively adapting to climate change, developing low-carbon economy becomes the mainstream■

GIA LINH



Improve the effectiveness of co-operation in environmental protection at the low catchment basins

THE 13TH MEETING OF THE ENVIRONMENTAL PROTECTION COMMISSION OF THE LOW CATCHMENT BASIN OF THE ĐỒNG NAI RIVER TOOK PLACE ON NOVEMBER 22ND, 2019 IN BÀ RỊA - VŨNG TÀU PROVINCE

In the 2019 - 2020 terms, the Commission worked with the Ministry of Natural Resources and Environment (MONRE), other Ministries and Government agencies, and local authorities of provinces and cities to make further investment and improve the monitoring system and database for the management of surface water. The Commission and its counterparts developed and implemented plans and projects, constructed facilities to upgrade the sewage networks for local areas, and enhanced co-operative activities for provinces and cities to deal with environmental issues they have in common.

Besides, environmental issues were handled comprehensively and spontaneously, and positive results were made. Professional units of local authorities worked better together to share their lessons and experiences so that the environment was better protected.

Deputy Minister of MONRE Võ Tuấn Nhân highly appreciated the Commission had made good efforts in its term 2019 - 2020 with assistance of 11 cities and provinces in the region: Đồng Nai, Bà Rịa-Vũng Tàu, Hồ Chí Minh City, Bình Dương, Bình Phước, Long An, Tây Ninh, Lâm Đồng, Đắk Nông, Ninh Thuận and Bình Thuận. The implementation of the Master plan on environmental protection for Đồng Nai River's low catchment basin until 2020 brought some positive results in deal with environmental pollution and improve the quality of water of the Đồng Nai River network. The activities included the installation of the monitoring system and the development of a shared database, the administration of waste sources, the development of legal policies on environmental protection; the upgrade of the sewage networks for urban areas, the manage-

ment of waste water that is disposed by industrial parks; and the settlement of environmental issues in shared areas of the provinces and cities. But there remained obstacles, for example, local authorities did not connect well and environmental violations were still found at business and production sites.

According to Deputy Minister Võ Tuấn Nhân, the 11 authorities of provinces and cities in the Đồng Nai River's low catchment basin, with assistance of Ministries and Government agencies, must make further efforts and work harder with the commission chairman to boost the region's socio-economic growth and better improve environmental condition for the river basin.

At the 13th meeting, a ceremony was held to transfer the Chairmanship of the Commission for the fifth term 2020-21 from the Chairman of the Bà Rịa - Vũng Tàu People's Committee to the Chairman of the Long An People's Committee. Speaking at the ceremony, the new Chairman Trần Văn Cẩn said the regional provinces and cities must develop a shared monitoring system and focus on improving the sewage networks for industrial parks, industrial zones and residential areas. The Chairman also asked the provinces, cities, Ministries and government agencies to co-work better so that the Đồng Nai River's low catchment basin has better environmental conditions and localities in the region can achieve sustainable socio-economic development.

THE 11TH MEETING OF THE ENVIRONMENTAL PROTECTION COMMISSION OF THE LOW CATCHMENT BASIN OF THE NHUỆ - ĐÁY RIVERS TOOK PLACE ON NOVEMBER 29TH, 2019 IN NINH BÌNH PROVINCE

The meeting was attended by the Chairman of the Environmental Protection Commission of the Low Catchment Basin of the Nhuệ - Đáy rivers, Chairman of the Ninh Bình People's Committee Đinh Văn Điển, Deputy Minister of Natural Resources and Environment Võ Tuấn Nhân, Vice Chairman of the Hà Nội People's Committee Nguyễn Doãn Toàn and 150 representatives from other provincial people's committees, provincial departments of natural resources and environment (DONREs) and other Ministries and Government agencies.

The Commission Chairman cum Chairman of the Ninh Bình People's Committee Đinh Văn Điển said at the meeting that the Commission in the 2019 - 2020 term had worked closely with the MONRE, other Ministries and Government agencies, five provinces and cities in the low catchment basin to implement the Master plan for environmental protection of the low catchment basin of the Nhuệ - Đáy rivers. The plan concentrated on dealing with environmental issues and managing sources of waste that the provinces and cities in the



▲ The ceremony that transfers the chairmanship of the Environmental Protection Commission of the Low Catchment Basin of the Nhuệ-Đáy rivers to Chairman of the Hà Nội People's Committee from Chairman of the Ninh Bình People's Committee.

region were facing. On August 13th, 2019, the Commission issued Document No. 70/UBND to implement the Project on environmental protection of the low catchment basin of the Nhuệ - Đáy rivers. The focus of the project included the implementation of environmental protection plans in provinces, inspection and management of waste sources in local areas, the development of a waste source database in the basin, reviewing, evaluating and managing large-scale sources of waste water that were likely to have big environmental issues and impacts, the management of solid waste and projects with chances to create serious pollution in local areas and enhancing co-operation among local authorities on environmental protection.

According to the Office of the Commission, the quality of water was poor at the stretches that run through urban areas and production facilities. On Nhuệ River, the quality of water was often low and a large number of stretches, such as the one flowing through Hà Nội, were heavily polluted with the water quality index (WQI)

below 25 especially in the dry season. Meanwhile the rainy season provided an extra amount of water for the river flow, so the percentage of polluting substances in the water became lower, making the quality of water average. On Đáy River, the quality of water was better with most of the monitoring stations posting their WQIs higher than 51 and the quality of water improved along the river from Hà Nội to Ninh Bình. Some stretches of the river running through Ninh Bình Province may provide water for living purposes but the water must be processed before being delivered. At the upstream of Đáy River, which runs through Hà Nội, the water was heavily contaminated due to the city's production and living activities, thus the river was used for transportation only. The quality of water in the rivers that are in Hà Nội such as Tô Lịch, Kim Ngưu and Lừ was always low and heavily contaminated with WQIs ranging from 16 to 25. At other sites of the City such as Nghĩa Đô, Cầu Mới and Cầu Sét, the quality of water was average with WQIs lying between 26 and 50 and the water can only be used for transportation.

To resolve the issue, MONRE had worked with cities and provinces in the low catchment basin of Nhuệ - Đáy rivers to list out all sources of waste water. Up to date, 85 percent of all industrial zones had finished constructing their collective waste water treatment plants and strictly followed the rules on environmental protection; less than 30 per cent of all industrial parks had been developing their collective



waste water treatment plants - except Hà Nội where 60 percent of all industrial parks had developed collective treatment plants. Meanwhile, waste water released by craft villages was not gathered and processed, 65 percent of waste water coming in Nhuệ and Đáy rivers was from households and 43 of all 45 production facilities had completed processing environmental pollution.

Besides, MONRE had proposed the Prime Minister approve the development of a new Commission of Low Catchment Basin, of which the Environmental Protection Commission of the Low Catchment Basin of the Nhuệ - Đáy rivers is a member. The Ministry had developed and submitted to the Government the draft Decree No. 40/2019/ND-CP dated August 13, 2019 to adjust the Decree instructing the implementation of the Law of Environmental Protection. The Ministry had also carried out the Program to completely handle polluting public facilities in 2016-20, which was approved by the Prime Minister under Decision No. 807/QĐ-TTg on July 3, 2018 - the program included the construction of a waste water treatment plant for the low catchment basin of the Nhuệ - Đáy rivers. In addition, a database was developed for sources of waste under Decision No. 140/QĐ-TTg dated January 6, 2018 and Circular No. 76/2017/TT-BTNMT was released on December 29th, 2017 to evaluate the ability of rivers and lakes to absorb and load waste water.

Provinces and cities in the low catchment basin of the Nhuệ - Đáy rivers had also issued a lot of regulations that dealt with waste water and household waste, fees of waste collection, transportation and management, and solid industrial waste. In the meantime, hundreds of projects, facilities and management units were developed and implemented such as the plantation of upstream forest in Hòa Bình Province, construction of waste treatment plants for craft villages in the provinces of Hà Nam, Ninh Bình and the capital of Hà Nội, installation of sewage system for hospitals, and the promotion of microbiological and biochemical products to help Hà Nội households process waste water before it was dumped into Tô Lịch River.

However, during the implementation of the project to improve the environmental conditions of the Nhuệ - Đáy rivers' low catchment basin, there were some difficulties and challenges. Local people and pro-

duction facilities still violated the environmental protection rules in a number of areas as the waste water they disposed was of very poor quality. Meanwhile, funding for local authorities to perform environmental duties was low and the communication or connection between local authorities themselves and Government agencies had not met the expectations despite making improvements. Local Governments had not collected data on sources of waste frequently and people's awareness was modest about environmental protection.

Deputy Minister of MONRE Võ Tuấn Nhân spoke highly of the activities the commission had accomplished in its fifth term of 2019 and there were some improvements in performing tasks to improve the quality of water and protect the environment in the low catchment basin of the Nhuệ - Đáy rivers. The Environmental Protection Commission of the Low Catchment Basin of the Nhuệ - Đáy rivers would need to improve its performance in the fifth term of 2020. To do so, Deputy Minister asked participants of the meeting to discuss following topics: the administration of waste sources, inter-provincial polluted sites, assessment of rivers' capacity to absorb and load waste water, provincial co-operation in dealing with inter-provincial polluted sites, and assessment of the Development plan for Nhuệ and Đáy rivers in 2008 - 2020 and the future plan for the region.

At the meeting, participants discussed the fifth-term Project on environmental protection of the low catchment basin of the Nhuệ - Đáy rivers, addressed the challenges provinces and cities in the basin had to face and suggested solutions to improve the performance of the Environmental Protection Commission of the Low Catchment Basin of the Nhuệ - Đáy rivers in the future. According to participants, the organization and operation of the commission must be integrated into the new Commission of Low Catchment Basin under a MONRE draft proposal, which had been submitted to the Prime Minister for consideration, while the commission must enhance the supervision of the implementation of the Master plan on environmental protection of the low catchment basin among local authorities. Participants also recommended MONRE hasten the process of collecting data from sources of waste, develop a plan to manage sources of waste water, and publish details of waste sources on the internet. The Ministry of Construction was required to instruct provinces and cities in the low catchment basin of Nhuệ and Đáy rivers to quickly develop their waste water treatment plant and sewage network for residential areas and industrial zones until 2030, develop a plan to manage solid waste in the basin of Nhuệ and Đáy rivers. The Ministries of Finance, Planning and Investment were recommended to finance the Program on dealing with heavily-polluting public facilities in 2016-2020, give incentives and financial support to infrastructure development projects and private firms. Provinces and cities in the low catchment basin must tighten the state administration of environmental protection, focusing on raising awareness of waste source owners, business and production facilities, and people to protect the environment. They were also required to launch projects at seriously-contaminated sites and see water management as a national security issue.



▲ Deputy Minister of MONRE Võ Tuấn Nhân, leaders of 2 provinces Đồng Nai, Bà Rịa-Vũng Tàu, representatives of DONREs at the 13th meeting of the environment protection commission of the low catchment basin of the Đồng Nai River

At the meeting, the Chairman of the Hà Nội People's Committee received the transfer for the chairmanship of the Environmental Protection Commission of the Low Catchment Basin of the Nhuệ - Đáy rivers from the Chairman of the Ninh Bình People's Committee.

ON DECEMBER 6, 2019, THE ENVIRONMENTAL PROTECTION COMMISSION OF THE LOW CATCHMENT BASIN OF THE CẦU RIVER IN THÁI NGUYÊN PROVINCE ORGANISED ITS 15TH MEETING FOR THE TERM 2019 - 2020

Among attendees were the Chairman of the Environmental Protection Commission of the Low Catchment Basin of the Cầu River cum Chairman of the Hải Dương People's Committee Vương Đức Sáng, Deputy Minister of MONRE Võ Tuấn Nhân, Vice Chairman of the Thái Nguyên People's Committee Lê Quang Tiến, leaders of provincial departments of natural resources and environment, senior managers of provincial people's committees and representatives of ministries and Government agencies.

In 2019, the Commission worked with provincial people's committee in the low catchment basin of the Cầu River to check the progress of the Project on the environmental protection for the river's low catchment basin, inspect the activities of business and production facilities in Phong Khê paper village and Phong Khê Paper

Industrial Park, thus raising their awareness about environmental protection. The Commission had also helped ministries, local authorities and Government agencies accomplish facilities and projects worth thousands of billions of dong to deal with solid waste and waste water.

Highly appreciating the efforts of the Commission, Ministries, government agencies and six provinces in the basin region: Bắc Kạn, Thái Nguyên, Bắc Giang, Bắc Ninh, Vĩnh Phúc and Hải Dương, Deputy Minister Võ Tuấn Nhân said there were positive results and the quality of water in the river improved after the Master plan on the environmental protection of the low catchment basin of the Cầu River had been implemented. However, there were still obstacles in the project implementation and Deputy Minister hoped meeting attendees would discuss solutions to help the region achieve higher socio-economic growth in the future.

At the meeting, participants evaluated the results of the Cầu River project 2016-2020, addressed problems and proposed solutions to protect the environment of the river's low catchment basin after the project ends in 2020. Provincial authorities in the basin region needed to make assessment of projects and tasks assigned by the provincial people's committees and outline a future plan for the region. MONRE would need to co-operate with relevant ministries, government agencies and local authorities to promote inter-region and inter-province projects to resolve environmental issues for the basin, keep checking the quality of water in the river and instruct local authorities to implement policies related to the Law of Environmental Protection. Other Ministries and agencies would need to execute tasks to implement the Master plan on environmental protection of the low catchment basin, evaluate the results of the implementation of 2020 project, and suggest solutions to protect the basin region after the project ends in 2020■

PHẠM TUYỀN - HƯƠNG TRẦN



MONRE gains progress in administrative reform in the field of environment

The Ministry of Natural Resources and Environment (MONRE) has made strides in administrative reform, shown by the reduction of time spent on processing administrative procedures in the field of environment. Speaking at a conference on administrative reform, Deputy Director of the Việt Nam Environment Administration (VEA) Nguyễn

Hưng Thịnh said, the MONRE altered several administrative procedures.

Among them, 24 procedures related to environmental projects including certificate adjusting plans and strategies were abolished. Six administrative procedures were issued to enhance the effectiveness of public consultation in the process of appraising environmental impact assessment reports. A total 22 procedures were amended and replaced to reduce conditions and time for processing documents.

Deputy Director Nguyễn Hưng Thịnh said processing time of some procedures have seen significantly reduced compared to previously. In terms of evaluating environ-



▲ People submit the administrative procedures at the Department of the Hải Phòng's Natural Resources and Environment

mental impact assessments, the procedure had been shortened to between 15 and 25 days for different kind of projects. The MONRE has promulgated seven procedures in the field of environment, focusing on appraising and approving the reports on environmental impact assessment, checking and certifying the completion of environmental protection works, and licensing scrap imports and hazardous waste releasing licences.

Project owners will be guided to submit administrative procedures through the online public service system and they will be able to monitor the progress of administrative procedures. Project owners whose administrative procedures lag behind will be apologised to, be given a reason for the delay and the results will be rescheduled.

The MONRE targets that 90 per cent of administrative procedures be submitted via the online public service system by 2020. ■

VŨ NHUNG (VNS source)

Promote the role and resources of religions in environmental protection and climate change response

VÕ TUẤN NHÂN
Deputy Minister of MONRE

Along with the process of socio-economic development, our environment is under increasing pressure due to the increase in the size of the economy and the population, the level of industrialization and urbanization and resource exploitation, emerging of pollution and waste sources. In addition, Việt Nam is one of the five countries most severely affected by climate change; the adverse effects of climate change are increasing at an alarming level, with more complicated and rapid developments than forecast, which has affected food security, water resources and people's lives. Therefore, if we do not pay adequate attention to environmental protection and climate change response, we will face great challenges in terms of pollution, environmental and biodiversity degradation and great potential climate change impacts, threatening the country's sustainable development goals.

To solve the above environmental and climate change issues, it is necessary to have contributions of the whole political system, the community and every citizen, of which the important role of religious organizations is indispensable. As a part of the great national solidarity, over the years, 14 religions in Việt Nam with more than 25 million dignitaries, monks, followers and nearly 26.000 worshipping facilities have promoted patriotism, solidarity, commitment, social and national responsibility sharing, actively participating in responding to patriotic emulation campaigns and movements, contributing to the implementation of guidelines, laws and policies of the Party and the State on environmental protection and climate change response.

ACTIVITIES IMPLEMENTED TO PROMOTE THE ROLE AND RESOURCES OF RELIGIONS IN ENVIRONMENTAL PROTECTION AND CLIMATE CHANGE RESPONSE

Implementing the Program of coordinating, strengthening, mobilizing the participation of religions in environmental protection and climate change response

In order to implement the Party and State's policies on environmental protection and climate change response, on December 2nd, 2015, the Standing Committee of the Central Committee of the Vietnam Fatherland Front (VFF), the Ministry of Natural Resources and Environment (MONRE) and representatives of religions signed a Coordination Program on environmental protection and climate change response (2015 - 2020) in order to promote the role of religions in participating in environmental protection and climate change response; to disseminate the Party's guidelines, the State's laws and policies on environmental protection and climate change response, mobilizing dignitaries and people of all religions to actively participate in implementing emulation movements and campaigns to protect environment and respond to climate change at households and in the community.

Right after the Program was signed, the Standing Committee of the Central Committee of the VFF and the MONRE issued Guideline No. 46/HD-MTTW-TN&MT to guide the Central Committee of the VFF, the Department of Natural Resources and Environment (DONRE) the religions in the provinces and cities implementing this Coordination Program. In 2017 and 2018, the Standing Committee of the Central Committee of the VFF and the MONRE have jointly organized five regional Conferences to implement the Coordination Program on a national scale in provinces of Quảng Ninh, Sóc Trăng, Nam Định, Bình Định and Hậu Giang.

Up to now, 63/63 provinces and cities across the country have signed and implemented the Coordination Program or Plan among the VFFs at all levels, the natural resources and environment sector and religious organizations in the area. In addition, each religion has also actively implemented and integrated the contents of environmental protection and climate change response into its annual program of activities; to issue Prospects, Messages and Appeals to grassroots organizations and followers in response to the Program on participation in environmental protection and climate change response.



▲ *The Signing Ceremony of the Coordination Program in the period of 2016 - 2020 between the MONRE and the Central Committee of the VFF in environmental protection*

Propagating, mobilizing, raising awareness and capacity of environmental protection and climate change response for the contingent of religious officials and religious communities

Recently, the MONRE has cooperated with the Standing Committee of the Central Committee of the VFF to implement many activities of propaganda, advocacy, awareness and capacity raising on environmental protection and climate change response for the religious organizations in the whole country in diverse forms such as: Organizing seminars and conferences to thoroughly grasp the content of the coordination program; incorporating the content of environmental protection and climate change response into annual religious work guidelines, in Congratulatory Letters to religions in important ceremonies; composing propaganda and print materials, publishing many leaflets on environmental protection and climate change response to distribute to worshipping facilities, the front working boards at all levels; mobilizing dignitaries and followers to attend meetings to celebrate the Inter-

national Day for Biological Diversity (May 22), the World Meteorological Day (May 30), the World Environment Day (June 5); propagating through mass media such as newspapers, radio, websites of the Fatherland Fronts of provinces and cities. At the same time, during the important ceremonies, annual preliminary and review conferences of activities of religions or visiting, congratulatory occasions, the leaders of the VFF Committees at all levels have propagandized and mobilized religious organizations to actively participate in environmental protection and climate change response and suggested religious dignitaries actively mobilize followers to implement environmental protection and climate change response, thereby raising the awareness and sense of responsibility of religious organizations, dignitaries, positions, religious followers to firmly grasp and strictly implement the Party's guidelines and policies and the State's legal policies on environmental protection and climate change response.

The VFFs of provinces and cities have actively coordinated with the natural resources and environment sector to develop many specific programs and plans or integrate the program to promote the role of religions in environmental protection and climate change response into the program of "All people participating in environmental protection" associated with the campaign "All people build new rural areas and civilized cities"; to organize the "National Day of Solidarity"..., to strengthen the capacity of environmental protection and climate change response for the contingent of officials, especially officials engaged in religious work, mobi-

lizing people from all walks of life, followers of all religions to participate in environmental protection and climate change response. In addition, the Fatherland Fronts at all levels also provide guidance, training and assistance to the religious communities in self-rescue skills and help each other handle on-site extraordinary events due to storms, floods, flash floods, droughts, forest fires; the communities share and help people at risk of natural disasters, epidemics and other difficult situations in the communities.

Supporting religions in developing and expanding model participating sites in environmental protection and climate change response

The MONRE and the Standing Committee of the Central Committee of the VFF have coordinated to develop 3 models of religious sites to participate in environmental protection and climate change response at the central level at Pháp Bảo Pagoda (Hố Chí Minh City), Pháp Vân Pagoda (Hà Nội) and Hải Đức Community Support Center (Thừa Thiên - Huế Province); to support to develop 14 pilot models of 14 religions in localities from the resources of the Program of "All people participating in environmental protection" in 2017.

The DONREs of provinces and cities have also coordinated with the VFF Committee to propagandize, mobilize and help religious organizations to develop and replicate pilot models on environmental protection and climate change response; to guide, train and support religious communities and residents to implement measures to protect environment in their production activities and daily life such as using renewable energy, planting and protecting trees in residential and public places, religious facilities.

Many religious sites have had effective models, good practices; there have been nearly 1.000 models of religions participating in environmental protection and climate change response so far. A number of practical and effective models and clubs on environmental protection and climate change response have been implemented such as: "Green, clean, beautiful" parishes and worshipping facilities; the model of communities/solidarity groups/religious autonomy groups participating in envi-

ronmental protection and climate change response; the model of "Classification and treatment of domestic waste at households and religious establishments"; the model of "restricting burning of votive papers in worshipping facilities"; the model of "Parishioners Club participating in environmental sanitation every Friday"; the model of "Parishioners collecting and classifying waste, packaging and plastic bottles"...

Mobilizing resources of religious organizations for environmental protection and climate change response; supervising the implementation of policies and laws on environmental protection and climate change response

The VFF Committees at all levels has mobilized various resources of religious organizations, enterprises and followers towards socialization such as contributing spirits, knowledge, labor days and money or donating land to support the implementation of thousands of activities, hundreds of models on environmental protection and climate change response in localities.

The natural resources and environment sector of provinces and cities have coordinated with the Fatherland Fronts of the same level and religious organizations to strengthen their coordination to propagandize and mobilize dignitaries, positions, followers and people to intensify supervision and detection of emerging issues in the implementation of legal policies on environmental protection and climate change response of agencies, organizations, enterprises and households in the area.

ASSESSING A NUMBER OF ACHIEVED RESULTS AND SHORTCOMINGS, LIMITATIONS

In general, the activities of propaganda on environmental protection and climate change response that have been coordinated in recent years are in accordance with the doctrine and laws of the religions and the general situation of each locality, which is enthusiastically responded by the religions. The religious organizations have raised awareness and responsibility of the religious community on environmental protection and climate change response through promoting propaganda and preaching among the masses and followers about environmental protection and climate change response. The religious organizations have developed many models suitable to the specific conditions of each locality and each religion, bringing practical effects, contributing to a dramatic change in awareness and attitudes, behaviors and habits of dignitaries and followers of different religions in environmental protection and climate change response. With many specific and practical activities, the roles, responsibilities and contributions of dignitaries and followers of different religions with the task of environmental protection and climate change response in each residential area and throughout the country have been increasingly improved, making significant contributions to ensuring the sustainable development of the country.



In addition to the achieved results, the work of environmental protection and climate change response in the past time still has some shortcomings and limitations, including: The compilation and release of documents related to environmental protection and climate change response suitable with the characteristics of religions, each locality has not yet met the requirements, causing difficulties for propaganda. There are few seminars, training and retraining courses to raise awareness, knowledge and experience. Some religious organizations have just stopped at propaganda to raise awareness of dignitaries, officials and followers within certain worship facilities, religions and residential areas but have not been proactive in developing specific action plans suitable to the characteristics and conditions of their religions to become a widespread movement. The allocation of funding for implementing environmental protection and climate change response activities is still not enough and timely, the budget has not been distributed to support the pilot models of religions; the mobilization of resources from socialization for environmental protection and climate change response, natural resource protection is still limited, mainly from the State budget. The roles of the religious organizations have not been fully promoted, the resources of religions in environmental protection and climate change response activities have not been exploited properly and are still limited.

SOME SOLUTIONS TO CONTINUE PROMOTING THE ROLES AND RESOURCES OF RELIGIONS IN ENVIRONMENTAL PROTECTION AND CLIMATE CHANGE RESPONSE ACTIVITIES

To continue promoting the roles and resources of religions in environmental protection and climate change response activities, in the coming time, it is necessary to implement well the following solutions:

Firstly, to continue developing, finalizing and synchronizing mechanisms, policies and legal documents on climate change response, natural resource management and environmental protection, with a focus on the involvement of religions.

To develop a favorable legal framework for religious organizations to par-

ticipate in environmental protection and climate change response activities. In particular, it is necessary to provide specific regulations to enhance the roles, responsibilities, positive contributions of dignitaries and followers of religions to the task of environmental protection and climate change response at all levels and residential areas; to provide sanctions and measures to encourage and promote the roles of religious organizations in the prevention of environmental incidents in the localities.

To research and develop mechanisms to support material facilities and funding for religious organizations to facilitate their administration and management, together with the State, to carry out environmental protection and climate change response activities, to allow religious organizations to participate in providing public services in the field of environmental protection, promoting religious organizations to contribute resources to the country's development.

Secondly, to promote propaganda, advocacy, awareness raising and strictly implement the Party's guidelines, the State's policies and laws on environmental protection and climate change response to dignitaries, followers, religious organizations.

To continue organizing the compilation and providing religious communities and residents with documents on the current state of environmental pollution, negative impacts of climate change in the world, in the country, the localities and residential areas; policies and laws of the Party and the State, provisions of the religions' rules and doctrines on environmental protection and climate change response.

To strengthen coordination to organize conferences and training courses to propagate and disseminate laws, raise awareness about environmental protection, rational use of natural resources and climate change response for people of religious organizations.

To guide, train and support religious communities and residents to strictly implement the provisions of the law on environmental protection in daily life and production activities such as: eating hygienic food; constructing environmental sanitation facilities; planting and protecting greeneries at residential and public places, religious establishments; protecting biodiversity; sustainable livelihoods; not cutting trees or destroying forests; organizing production, cultivation, husbandry, business... without causing pollution to the environment; eliminating habits causing pollution, environmental degradation, biodiversity decline and increasing climate change

The localities need to create conditions, guide and mobilize the religions to participate in environmental protection and climate change response activities in accordance with the ability and capacity of dignitaries, officials and followers, consistent with the cultural and ethical values of the religions and peoples. The religious dignitaries and officials should promote their exemplary roles and encourage their followers to abide by the State's policies and laws and actively respond to the general

movements of socio-economic development, environmental protection and climate change response.

To resolutely fight and prevent acts of violating laws, abusing the religions, environmental issues for self-seeking, inciting division of people, division of peoples, disturbing security and order and opposing the State and obstructing the country's sustainable development process.

Thirdly, to continue expanding and developing new models, advanced examples of religious organizations participating in environmental protection and climate change response, focusing on developing domestic waste separation models at source; limiting the use of disposable plastic products, non-biodegradable plastic bags.

To review and assess current models to serve as a basis for replicating and developing advanced models and examples of effective environmental protection and climate change response in residential areas that are suitable for features and conditions of each religion and each region. In particular, to focus on developing models of environmental protection and climate change response associated with patriotic emulation movements such as new rural development, civilized cities, building green - clean - beautiful environment; to strengthen the establishment of self-governing communities and religious establishments in using natural resources, environmental protection and climate change response; to promote the movement and models of waste separation at source, restrict the use of disposable plastic products, non-biodegradable plastic bags in daily life and production of religious organizations and population communities.

To strengthen activities to visit, learn and share experiences on developing and maintaining the pilot models of religions on environmental protection and climate change response.

The MONRE, the VFFs at all levels and the religions need to coordinate and review financial mechanisms to allocate funding from the State budget and mobilize from other lawful sources to support the implementation of activities, developing effective models to promote the roles of the religions in environmental protection and climate change response.

Fourthly, to promote the role of social supervision and criticism in developing and implementing policies and laws on environmental protection and climate change response of the religions.

The Fronts at all levels and religious organizations, especially at grassroots levels need to regularly collect people's opinions; to promote the strength of the community in the implementation and supervision of the implementation of policies and laws on environmental protection and climate change response, especially giving opinions on the consultancy on the environmental impact assessment reports of the programs, projects, socio-economic development planning and plans related to population communities; to monitor and supervise the observance of the Law on Environmental Protection of production, business and service establishments in the localities in order to propose timely handling of acts of causing environmental pollution and degradation and infringing upon natural resources and to resolve conflicts of interest on environment protection and climate change in residential areas.

At the present time, it is recommended that the religious organizations focus on promoting the role of social criticism, contributing ideas to the content of draft laws and policies on environmental protection that the State and Government are directing the implementation such as: the Law project amending and supplementing a number of articles of the Law on Environmental Protection; the Decree guiding the implementation of the Law on Environmental Protection (amended); the legal framework on solid waste management in the direction of the unified State management of solid waste nationwide and the Provincial People's Committees with a comprehensive responsibility for waste issues and waste treatment in the localities; amending and supplementing the Decree on sanctioning of administrative violations in the domain of environmental protection in the direction of increasing sanctions and strictly handling violations of the law on environmental protection; finalizing the system of regulations on environmental protection to proactively prevent environmental conflicts and disputes that cause political instability, social disorder and insecurity...

In order to harmonize the problem between socio-economic development and environmental protection in the context of environmental and climate change problems in our country that has been under great pressure and challenges today, it is required to have efforts of all levels, sectors, socio-political organizations, communities and every citizen, in which the promotion of the religions' roles and resources will create a great spillover effect in the society, gathering the power of the great solidarity of the entire nation, together with the Party, the State and the political system, to implement solutions to tackle environmental pollution and respond to climate change, creating synergy in the national sustainable development■



Orientation of solid waste management based on circular economy model approach

ASSOC. PROF. DR. NGUYỄN THẾ CHINH

Director of Institute Strategy and Policy on Natural Resources and Environment

In economic activities, solid waste is generated from production and consumption process. Solid waste management is implemented in many different forms; in Việt Nam, the most common is collection, transportation, landfilling and discharging into the environment. This management method has caused environmental pollution and wasted raw material sources utilized from waste. So which management model will be more appropriate (reduce, reuse, recycle (3R), cleaner production, sustainable consumption...) to achieve economic goals and solve environmental problems? A new, effective and feasible approach is not only to apply international experience, but also to stem from the previous practice of Việt Nam, which is the solid waste management approach based on circular economy model.

THE CURRENT STATE OF SOLID WASTE GENERATION AND MANAGEMENT

Generation and management of solid waste in the country

Together with the increase in population, the development of manufacturing industries and the increase in consumption has increased the amount and composition of waste. Regarding domestic solid waste generated in Việt Nam, which includes common domestic waste and hazardous domestic waste, it has different characteristics depending on specific geographical areas. Domestic solid waste in urban areas in Việt Nam currently accounts for more than 50% of the total domestic solid waste in the country, accounting for 60 - 70% of the total urban solid waste. The generated domestic solid waste amount is estimated at 25,5 million tons/year, of which urban domestic solid waste accounts for about 38.000 tons/day and rural domestic solid waste accounts for 32.000 tons/day.

Domestic solid waste generated in the period of 2013 - 2017

No	Year	Volume of urban domestic solid waste generated (tons/day)	Volume of rural domestic solid waste generated (tons/day)
1	2013	30.000	22.000
2	2014	32.000	25.000
3	2015	34.000	27.000
4	2016	37.000	29.000
5	2017	38.000	30.000

Source: Compiled by MONRE

From the above table, from 2013 to 2017, the urban and rural solid waste generation amount increased steadily over the years, proving that there has been no effective management approach to reduce the waste generation amount.

In Việt Nam, hazardous solid waste is often mixed with common domestic solid waste and taken to landfills, including: Electronic devices, pharmaceuticals, used chemicals, batteries... Although the amount generated is not much, there is a potential risk to human health. Other types of solid waste such as construction solid waste accounting for 25% of the total solid waste in Hà Nội, Hồ Chí Minh City and 12 - 13% in An Giang, Bắc Giang, Hải Phòng; Industrial solid waste mainly arises from industrial zones and clusters; Industrial hazardous waste accounts for 15 - 20% of industrial solid waste, mainly generated in light industry, metallurgy and chemicals; Medical solid waste arises from medical activities, with the amount of about 450 tons/day, of which 47 - 50 tons are hazardous waste; The generated agricultural solid waste amount includes 14.000 tons of pesticide and fertilizer packaging, 76 million tons of straw, 47 million tons of livestock waste. In addition, there are some other specific types of solid waste such as electronic waste and marine plastic waste - the two "hot" issues in Việt Nam, but there are currently no official statistics on the generation of these types of waste. According to a 2012 World Bank study, in middle-income countries like Việt Nam, the amount of plastic waste generated accounts for about 12% of total waste. Việt Nam is considered as one of the countries generating the highest amount of marine plastic waste in the world.



Thus, the generated solid waste amount in the country is quite large with the trend increasing steadily over the years, the amount of solid waste in urban areas is higher than in rural areas, some types of solid waste, especially electronic waste and marine plastic waste, are increasing rapidly. It is worth noting that domestic solid waste in Việt Nam has mixed characteristics, in which many types of waste, including hazardous waste, are landfilled. From the above practice, it is necessary to have an appropriate management approach to minimize the amount of solid waste, aiming to achieve zero solid waste discharge to the environment.

Generation and management of imported solid waste

Recently, enterprises of some countries in the world have taken advantage of the policy on allowing the import of scrap as raw materials for production to transport solid waste into other countries, especially developing countries, including Việt Nam. In Việt Nam, there is a quite great demand for solid waste such as steel, plastic, paper for recycling as raw materials for domestic production.

From the above table, the volume of solid waste import in scrap form in 2018 has increased by 1.308,1 thousand tons, compared to 2017. It is due to the prohibition of importing scrap into China, therefore, countries that previously exported solid waste to China such as the US, Japan, South Korea, Canada..., now have shifted to export to Việt Nam. Notably, for plastic waste, only in the first 6 months of 2018, Việt Nam has imported 274,7 thousand tons of plastic scrap, an increase of more than 200% over the same period in 2017 (the first 6 months of 2017, 132,4 thousand tons were imported). Under this circumstance, since July 2018, Việt Nam has strengthened the management, inspection and control of imported solid waste products in scrap form; therefore, in the last

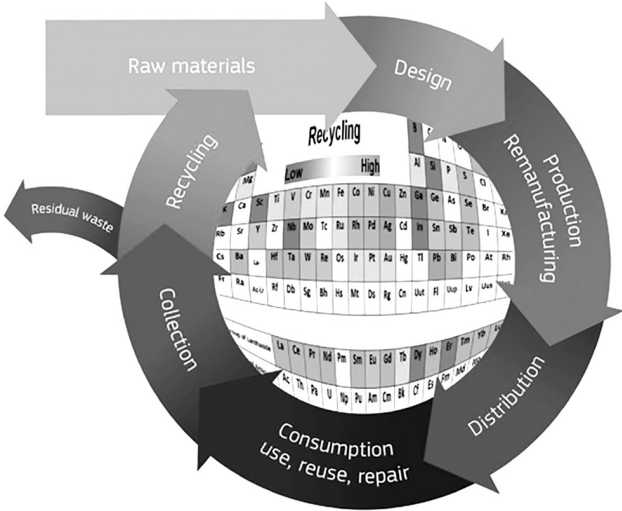
6 months of 2018, the total amount of plastic solid waste imported into Việt Nam is only 107,1 thousand tons, a decrease of 250% compared to the first 6 months. However, the number of containers containing solid waste scrap left in ports has increased due to the failure to meet the import conditions prescribed by Việt Nam.

Thereby, it also reflects the fact that domestic production requires a large amount of input materials, namely scrap solid waste (plastic, iron, steel, paper and other scrap materials) that need to be cleaned to be up to the prescribed standards, which shall bring about economic benefits.

ORIENTATION OF SOLID WASTE MANAGEMENT BASED ON THE CIRCULAR ECONOMY MODEL

The circular economy is a feasible approach to address the relationship among economic growth and economical and efficient use of natural resources and environmental protection towards a zero-waste economy, which is to replace the linear economy approach. This means that the exploitation and use of natural resources can only take place once, after that, the materials are recovered and reused, recycled in sectors and fields of economic activities. The circular economy is interpreted based on the principle of the law of conservation of matter and energy, compared to the 3R approach, the circular economy is more expanded.

Simulation of the circular economy model operation



Source: (Fabrice Mathieux, 2017)

Scrap imports in 2017 and 2018

Year	Plastic scrap (thousand tons)	Paper scrap (thousand tons)	Iron and steel scrap (thousand tons)	Other scrap (thousand tons)	Total (thousand tons)
2017	385,5	1.441,8	4.816,0	1.302,9	7.946,2
2018	381,8	2.063,2	5.741,5	1.067,8	9.254,3

Source: General Department of Vietnam Customs



From the figure above, the management approach based on circular economy model is based on economic efficiency, consistent with the operation of the market economy institution, which therefore will be the driving force for enterprises to invest in this model, if there is the right orientation and appropriate policy mechanisms, the circular economy will gradually replace the linear economy.

In solid waste management, the approach based on circular economy model will be highly feasible, especially solid waste such as plastic, steel, paper and other types of input solid waste for production, creating products that are demanded by the market.

OPPORTUNITIES AND CHALLENGES OF SOLID WASTE MANAGEMENT BASED ON CIRCULAR ECONOMY IN VIỆT NAM

Opportunities: Approaching and implementing the circular economy is a global trend, with success proven in many countries such as Sweden, Denmark, Finland, Canada, Japan, China, Singapore... Especially, in some Nordic countries such as Denmark and Sweden, the circular economy model has brought high efficiency, thorough handling of solid waste landfilling, even leading to lack of solid waste for production inputs.

Facing the situation of large solid waste generation and lack of appropriate treatment approach, solid waste landfilling still being the main form of waste handling, the implementation of the circular economy model towards zero waste generation is a great opportunity to deploy a solution, in line with the Party's policy on sustainable development.

Encouraging and creating mechanisms for the development of the private sector is consistent with the market economy institution. This will be an opportunity for private investors to invest in implementing the circular economy models in solid waste treatment.

Việt Nam has been in the process of implementing the Industrial Revolution 4.0, which is a good opportunity to develop models in solid waste treatment associated with high technology.

Reality shows that the shortage of resources, along with the great demand to import solid waste in scrap form, is an opportunity to rise the implementation to a

higher level in the direction of developing the circular economy models.

Challenges: *First*, the implementation of the circular economy model in solid waste management requires proper awareness in the implementation process, from the design to the implementation in sectors and fields, enterprises, people and state management levels to create consensus.

Second, the solid waste management based on the circular economy model requires waste separation at source, which has not been done in our country. Solid waste still a mix of many different components, even with hazardous waste.

Third, the legal framework does not exist to implement the circular economy in general and the solid waste management based on the circular economy model in particular.

Fourth, for the strategies, planning and implementation plans related to solid waste, the concept of solid waste management model based on the circular economy is yet to be established.

Fifth, as solid waste is generated from many different sectors and fields, the implementation of solid waste management approach based on the circular economy model requires the coordination of many stakeholders.

PROPOSING THE ORIENTATION OF SOLID WASTE MANAGEMENT BASED ON THE DEVELOPMENT OF THE CIRCULAR ECONOMY MODEL IN VIỆT NAM

First, to implement solid waste management based on the circular economy model, it is necessary to have a clear legal framework for the formation and development of the circular economy models in general and the solid waste management based on the circular economy in particular. The countries that have experience in implementing the circular economy all have clear laws and regulations. Việt Nam should have a roadmap, and to formulate a law on the development of the circular economy models.

Second, it is necessary to conduct an extensive research on the solid waste management based on the development of circular economy model. First of all, it is necessary to select the preferred type of waste, the implementation method, then to



▲ Hòa Bình canal bridge with raw materials made from recycled Tiger beer bottle caps in Phú Thành Commune (Phú Tân, An Giang)

replicate (the circular economy model should first be done for plastic, iron and steel, paper wastes).

Third, the implementation of solid waste management based on the development of circular economy models needs to evaluate and consider the successes and failures of the existing models that are similar to the criteria of the circular economy model (such as 3R); at the same time, to supplement, finalize and make appropriate choices for each sector and field.

Fourth, to create a mechanism to form market driving forces based on the criteria of investment efficiency, encouraging enterprises and people, especially the private sector, to invest in implementing the circular economy model for solid waste.

Fifth, to enhance information exchanges and learning from international experiences, especially countries that have successfully implemented the circular economy model for solid waste, then to transfer and apply it in the actual context of Việt Nam. As the circular economy models are associated with high technology and the Industry Revolution 4.0, it is necessary to create mechanisms and policies for clean technology development, reduction, reuse and recycling of waste. Waste must be a resource in the economy, both in terms of production and consumption.

Sixth, the implementation of the approach based on the circular economy model for solid waste management requires policies and tools for waste separation at source, avoiding the currently long-lasting situation as the waste is not separated before transporting to the treatment site.

In general, the solid waste management based on the circular economy models in Việt Nam requires the understanding of the model's nature, clearly distinguishing the circular economy model from the existing solid waste management models such as 3R, noting the solid waste management models similar to the criteria of the circular economy to upgrade and develop the circular economy model for solid waste management. In particular, to develop the circular economy models for solid waste management, it is necessary to clearly identify the opportunities and challenges of the formation and development process■

•VEM: Could you please tell us a little bit about the current situation of domestic solid waste management in Việt Nam today?

Dr. Hoàng Văn Thúc: In recent years, along with the socio-economic development, the strong population growth and the rapid urbanization in our country have led to an increase in the amount of solid waste generated, including both the composition and nature of solid waste that has been causing difficulties for waste management and treatment, especially for domestic solid waste which has a significant impact on the environment.

According to the results of the survey and assessment of the VEA, currently, the volume of domestic solid waste generated nationwide is more than 61.000 tons/day, of which more than 37.000 tons/day and more than 24.000 tons/day are generated in urban areas and rural areas, respectively.

Recently, the management of domestic solid waste in Việt Nam has not been applied with the form of integrated management and has not been paid much attention to in terms of solutions to minimize, reuse, recycle and recover energy from waste, as a result, the volume of domestic solid waste to be landfilled is high, thereby not saving the land, and has been a risk of environmental pollution. On the other hand, the separation of solid waste at source only takes place in some localities and has not been replicated nationwide. In addition, the issues of infrastructure, equipment and specific collection facilities for each type of waste are not yet appropriate, leading to inefficient waste separation at source.

The collection and transportation of domestic solid waste are implemented differently between urban and rural areas, among localities and even among areas within the same locality. In urban areas, the waste generated by households is usually collected by the collection units at a certain time, manual vehicles are used by the collectors to transfer waste to the gathering places, from which it is transported to the treatment facilities or transshipment terminals before being moved to the treatment facilities. In rural areas, many localities have self-governing groups and women's unions that collect waste at a certain frequency and transport them to gathering places so that the functional units shall collect, transport and transfer them to the treatment facilities. However, in many cases, waste is not collected or not collected thoroughly, leading to the formation of temporary landfills, causing environmental pollution.

Meanwhile, landfills are often far away from residential areas, which increases transportation costs. Currently, the fees charged upon households and individuals for domestic solid waste collection, transportation and treatment only partially cover waste collection cost; there is not enough money to pay for the cost, as well as to maintain transporting activities; the transportation capacity of some localities is still limited, without specialized equipment and means of transport, resulting in leakage and spillage of waste into the environment.

At the same time, the implementation of solid waste management planning in localities is still slow; the mobi-



Unify the awareness and action on policies and solutions in domestic solid waste management



▲ Dr. Hoàng Văn Thúc
- Deputy General Director of VEA

In recent years, the environmental pollution caused by a large amount of domestic solid waste generated in localities across the country is a challenge that Governments of all levels, sectors and localities need to focus on solving. In order to make a substantial change in the domestic solid waste management, improve environmental quality and contribute to improving the quality of people's lives, the Ministry of Natural Resources and Environment (MONRE) is actively implementing specific activities to strengthen the management and control of domestic solid waste throughout the country.

To better understand the current situation of domestic solid waste management in Việt Nam and the urgent solutions to control the environmental pollution caused by domestic solid waste, the Vietnam Environment Administration Magazine (VEM) had an interview with Dr. Hoàng Văn Thúc - Deputy General Director of Vietnam Environment Administration (VEA) on this issue.

lization of investment resources for construction of solid waste treatment facilities and plants has many difficulties. The investment in solid waste management and treatment is still inadequate; though many solid waste treatment facilities have been built and operated, their facilities, capacity and treatment efficiency have not met the requirements. In particular, many unsanitary landfills and incinerators have not yet met environmental technical standards, causing environmental pollution due to the generation of secondary wastes such as wastewater, gaseous emissions and solid waste.

•VEM: Recently, in the process of implementing policies and laws on domestic solid waste management in localities, what are the difficulties and limitations and their causes?

Dr. Hoàng Văn Thúc: According to current regulations, the State management of solid waste is not uniformly assigned to one agency but to many Ministries and branches involved in the management, including: MONRE, Ministry of Construction (MOC), Ministry of Health (MOH)... The overlapping of the State management functions in the field of solid waste leads

to many difficulties in the implementation of policies and laws on solid waste management.

Besides, in the current legal documents, there is still a lack of guidance on appropriate technology selection and technical guidance on domestic solid waste collection, storage and treatment. Solid waste recycling activities are still scattered, spontaneous and lack the management and control of the competent authorities on environmental protection in the locality. The majority of recycling facilities are small in scale, the level of technology investment is not high, the majority of technologies are outdated, the machinery and equipment are obsolete, which causes environmental pollution. The construction of modern waste treatment facilities and sanitary domestic solid waste landfills requires large investment capital, while many localities do not have enough capital to invest; the mechanisms to promote socialization of domestic solid waste collection and treatment are inadequate and have not yet attracted resources. Many imported solid waste treatment technologies are not suitable with the features of domestic solid waste in Việt Nam (not yet separated at source, low calorific value, high humidity). Meanwhile, domestically-manufactured equipment and technologies for treatment of solid waste are not yet comprehensive or complete and have not been manufactured on an industrial scale; the inspection and supervision process of the construction and operation of some solid waste treatment facilities is yet to be strict...



▲ The Deputy Minister of MONRE Võ Tuấn Nhân and the MONRE Delegation visited the domestic waste-to-energy plant model of Cần Thơ (Thới Lai District, Cần Thơ City) on March 5th, 2019

•**VEM:** *In your opinion, do the current domestic solid waste treatment technologies in Việt Nam meet the treatment requirements?*

Dr. Hoàng Văn Thức: Currently, in Việt Nam, the most common technology for domestic solid waste treatment is landfilling, besides, there are composting, burning and recycling. The current waste treatment rate by the treatment methods is as follows: 71% of total waste (equivalent to 43 thousand tons/day) is treated by landfilling method (excluding waste and ash from compost processing facilities and incinerators); 16% of total waste (about 9,5 thousand tons/day) is treated at compost processing factories; 13% of total waste (about 8 thousand tons/day) is treated by incineration method.

The domestic solid waste treatment technologies being applied (both domestic and foreign technologies) are increasingly diverse, but their actual effectiveness has not been fully assessed. Although a number of domestically- developed technologies have been applied in recent years and brought about certain initial results, these technologies are mostly undertaken by private enterprises, so the improvement of technologies as well as the application in reality still faces many difficulties. Foreign technologies used

in Việt Nam face difficulties due to unseparated solid waste at source, high humidity, tropical weather conditions; the amount of received solid waste is lower than the designed capacity or is unstable, the investment capital is quite high, leading to high treatment costs.

In localities, most of the landfills receive domestic solid waste that are not separated at source and have high organic content, so their stability is low, occupying a large area of land and generating a large amount of leachate. Some unsanitary landfills have been a source of environmental pollution, affecting health, as well as production and living activities of surrounding communities.

•**VEM:** *In order to enhance the effectiveness and efficiency of the State management of solid waste in the coming time, what are the solutions to control the pollution caused by solid waste?*

Dr. Hoàng Văn Thức: On February 3rd, 2019, the Government issued Resolution No. 09/NQ-CP, which assigns the MONRE as the focal point to unify the State management of solid waste. Following the Government's direction in Resolution No. 09/NQ-CP, the MONRE quickly issued a Plan to implement the Resolution; to organize the review of legal documents related to solid waste management, including assessing the organization and apparatus from the central to local levels in solid waste management; to inspect and evaluate solid waste management in the whole country to capture the current situation of solid waste generation and treatment; to organize the State management workshops on solid waste, workshop on solid waste management and treatment technology models to exchange and discuss the current State management situation,



the current solid waste management and treatment technology models in Việt Nam; to promote propaganda on solid waste and prepare to organize a national conference on solid waste management. The Ministry is implementing the task of preparing environmental protection planning, including the content of solid waste planning.

In order to enhance the effectiveness and efficiency of the State management of solid waste in the coming time, it is necessary to concentrate on implementing well the following solutions:

Solutions on organization, management, mechanism and policy: To strengthen the organizational system for solid waste management from the Central to local levels; To revise the functions, tasks and the State management of solid waste of the Ministries to implement a consistent State management solution on solid waste; To review and clearly define the responsibilities of the People's Committees from the provincial to the district and commune levels, the responsibilities of professional agencies, socio-political organizations, socio-professional organizations, production, business and service establishments and community in waste management; To study and formulate incentive and support mechanisms and policies, encourage the collection, transportation and investment of waste treatment facilities suitable to local socio-economic development conditions; To develop mechanisms to encourage private economic sectors to participate in construction investment and directly manage, exploit and operate waste treatment projects (after projects are completed, their effectiveness, stability and sustainability must be ensured); To encourage reuse, recycling and recovery of energy from waste (such as biomass recovery models from food waste; methanol recovery from domestic waste, food, leftovers; methanol collection, creating biofuels from waste cooking oil), applying a variety of ways to treat organic waste sources to contribute to reducing greenhouse gas emissions and climate change response.

Solutions on communication, awareness raising and human resource development: To promote the propagation and introduction of contents of waste management regulations to all levels, sectors, communities, organizations and individuals; To strengthen exchanges, visits and experience learning in the implementation of waste manage-

ment, focusing on feasibility and suitability when applying the same waste treatment model among localities; To train and strengthen human resources for waste management; To promote the propagation, training and organization of training courses for enterprises on cleaner production, minimizing the generation of solid waste, the process of collecting, transporting, treating and recycling domestic solid waste in accordance with the law; To promote the development and dissemination of databases and websites on domestic solid waste; technical guidelines on domestic solid waste management and treatment.

Solutions on investment and finance: To promote socialization of solid waste collection, transportation and operation of treatment facilities; to gradually increase the sources of sanitation charges, gradually reducing support from the budget for collection and transportation of domestic solid waste; to review amendments, supplements and promulgate the unit price of solid waste treatment with energy recovery; to expand the State credit support for investment projects, recycling, reuse and energy recovery projects from domestic solid waste, as well as incentives on taxes, fees and charges. At the same time, to review and research to minimize procedures in the process of loan deployment, including borrowing from the concessional capital source to implement domestic solid waste treatment projects applying technologies suitable to Vietnam's conditions; to formulate a public procurement policy to prioritize procurement of environmentally - friendly products and products after the recycling and waste treatment process from the budget; to select appropriate locations to invest in waste treatment and recycling centers at inter-regional and inter-provincial scale.

Solutions on supervision, checking and inspection: To strengthen the coordination among the local State environment management agencies in strictly controlling waste treatment areas, landfills adjacent to localities and inter-provincial waste transportation; To strengthen supervision of the implementation of the National Strategy on overall solid waste management, increasing investment to build solid waste management capacity towards green and low carbon development; To drastically require localities to implement environmental criteria within the framework of the implementation of the National Target Program on new rural development without investing in small incinerators that fail to meet environmental technical regulations; To strengthen the inspection and examination of domestic solid waste collection, transportation and treatment activities to prevent and promptly detect and handle violations.

Solutions on technical support, technology research and development: To study and develop modern and environmentally-friendly domestic solid waste treatment technology in the direction of minimizing landfilled domestic solid waste, increasing the rate of recycling, reusing and recovering energy from waste; To study, transfer and apply the best available technologies, environmentally friendly technologies; To promote the development of pilot models on recycling, reuse and recovery of energy from domestic solid waste in order to select suitable models for replication throughout the country.

•VEM: Thank you very much!

PHƯƠNG LINH (Implemented)

Preferential loan policy for solid waste treatment projects

NGUYỄN ĐỨC THUẬN
Director of Vietnam Environment Protection Fund

Along with the socio-economic development, Việt Nam is one of the countries greatly affected by environmental pollution and climate change. One of the reasons leading to the above situation is that enterprises and individuals lack investment capital sources for environmental protection, especially preferential capital sources.

VIETNAM ENVIRONMENT PROTECTION FUND AND PREFERENTIAL LOAN POLICY

In order to solve this problem, on June 26, 2002, the Prime Minister issued Decision No. 82/2002/QĐ-TTg on the establishment, organization and operation of the Vietnam Environment Protection Fund (Fund). Accordingly, the Fund is a State-owned financial institution that functions as a financial sponsor in the field of environmental protection and operates for non-profit purposes. The Fund is a State financial instrument to finance public investment capital for environmental protection nationwide through lending activities with preferential interest rates and grants.

When it was first established, the Fund belonged to the Ministry of Science, Technology and Environment; by the end of 2002, the Fund was transferred to be under the Ministry of Natural Resources and Environment (MONRE) with an initial charter capital of VND 200 billion. Up to now, the



▲ Domestic waste incinerators with a capacity of treating 50 tons of waste/day of the T - Tech Nghệ An Joint Stock Company

Fund's charter capital is VND 1.000 billion and is allocated from the State budget according to the Prime Minister's Decision No. 78/2014/QĐ-TTg dated December 26th, 2014, on the organization and operation of the Fund. As a State-owned financial institution, the Fund has the function of lending with preferential interest rates, financing and interest rate support for programs, projects, activities and tasks of environmental protection and climate change response nationwide.

Subjects and fields of loans are specified in the Government's Decree No. 40/2019/ND-CP dated May 13, 2019 (amended Decree No. 19/2015/ND-CP); loan interest rate, loan term and other criteria are specified in Circular No. 03/2017/TT-BTN-MT dated March 21st, 2017 of the MONRE; Accordingly, the loan interest rate must be guaranteed to be less than 50% of the State investment loan interest rate and fixed during the loan term; the maximum loan term is 10 years (normally 7 years), based on each project. Currently, in 2019, the loan interest rate is 2,6% or 3,6%, depending on the priority field and loan guarantee measures; the loan interest rate is fixed throughout the loan term. For a project, the maximum loan amount is equal to 70% of the total project investment; For an investor, the maximum loan amount is 10% of the Fund's actual charter capital.

In case of the project owners of solid waste treatment projects, if applying the treatment technology with the rate of waste to be landfilled after treatment is less than 30% of the total collected solid waste, they are allowed to get a total loan of up to 80% of the total investment of the project.

PREFERENTIAL LOAN RESULTS FOR SOLID WASTE TREATMENT PROJECTS

After more than 17 years of operation, the Fund has achieved many results in financial support activities contributing to environmental protection. The Fund has granted preferential loans to 310 projects, with a total capital of more than VND 2.900 billion nationwide. In particular, in the field of solid waste treatment, the Fund has committed to lend more than VND 1.000 billion to 93 projects nationwide as of September 30th, 2019 (Table 1).

No.	Solid waste treatment field	Loan amount (VND)	Number of projects
1	Domestic waste	525.480.200.000	30
2	Industrial and hazardous waste	438.183.000.000	25
3	Facilities for collection and transportation of waste	119.615.200.000	38
Total		1.083.278.400.000	93

Table 1: Loan results by type of solid waste in the period of 2004 - 2019

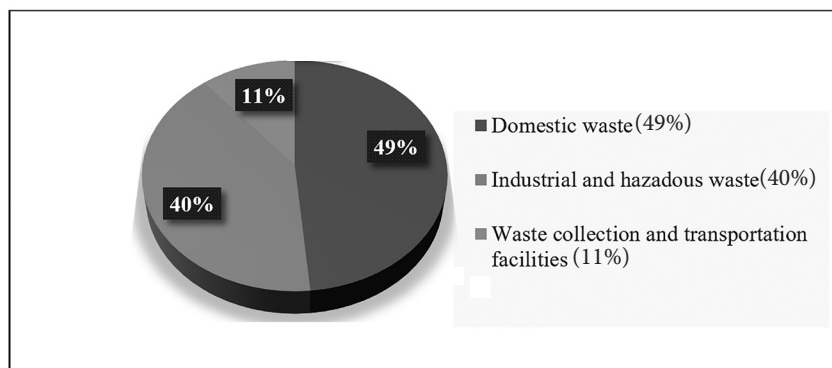


Figure 1: Loan proportion by type of solid waste in the period of 2004 - 2019

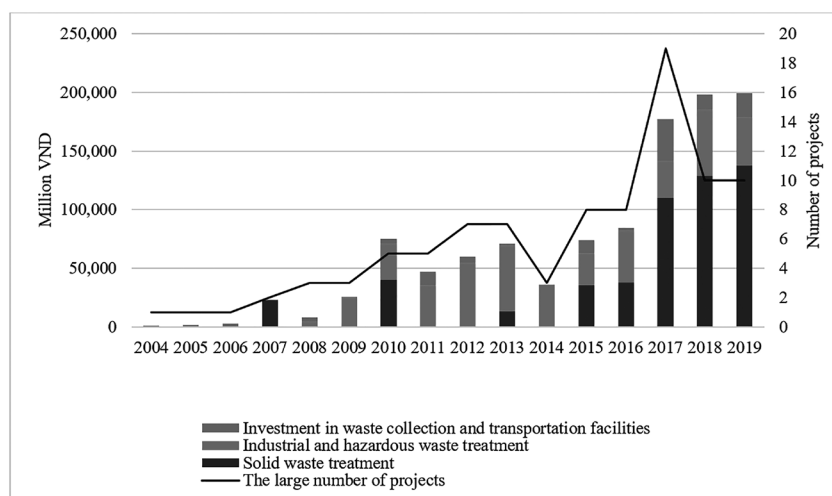


Figure 2: Lending results of solid waste treatment by type from 2004 to 2019

Lending activity in solid waste treatment focuses on three main types (domestic, industrial and hazardous waste treatment, investment in waste collection and transport facilities) (Figure 1). Accordingly, the loan for domestic waste is more than VND 500 billion (more than 49%) in solid waste treatment due to the nationwide investment demand as well as the large investment scale of these projects. Industrial and hazardous solid waste treatment also accounts for 40%, equivalent to more than VND 438 billion. The type of investment in waste collection and transportation facilities accounts for a small proportion despite the large number of projects, mainly due to the smaller investment scale of this type.

The lending by type and amount of loan from 2004 - 2019 tends to grow in the number of loan projects as well as loan amounts (Figure 2). While the total annual loan amount reached less than VND 50 billion in the period of 2004 - 2009, the total loan amount fluctuated from VND 50 to 100 billion in the period of 2010 - 2016. From 2017 - 2019, the annual loan amount is nearly VND 200 billion. The increase in annual loans is consis-

tent with the actual capital needs of the project owners as well as the urgent need for solid waste treatment investment nationwide.

The loans for industrial and hazardous waste treatment are kept at an average of VND 40 billion in the period of 2009 - 2019. Meanwhile, the loans for domestic waste treatment have increased sharply in the period of 2017 - 2019 among six socio-economic regions, focusing mainly on developed economic areas. The Red River Delta, the North Central Coast and the South Central Coast and the Southeast account for 81% of the total loan amount in the field of solid waste; while the remaining three regions of the Northern Midlands and Mountains and the Central Highlands and the Mekong River Delta account for 19% (Table 2).

In recent years, waste treatment technology projects that borrowed money for investment has also been constantly increased, upgraded and changed the technology over time. Initially, the projects invested in land-filling technologies, followed by the formation and improvement of incinerators, microbiological fertilizer production technology with the trend of waste to energy incinerators.

Annually, the Fund organizes a Financial Assistance Conference to introduce loan policies and invite enterprises operating in the field of environmental protection, consulting organizations and companies specializing in waste and wastewater treatment technology and renewable energy to attend for the presentation. In 2019, the Fund organized the Financial Assistance Conference in Hồ Chí Minh City with the participation of more than 300 enterprises. The loan growth rate for the waste treatment sector has increased rapidly in the period of 2017 - 2019, in line with the Fund's general growth rate, the Fund's overall disbursement growth rate was 33% in 2018, compared to 2017.

No.	Region	Number of projects	Loan amount	Ratio
1	Northern Midlands and Mountains	6	79.650.000.000	7%
2	Red River Delta	34	301.210.100.000	28%
3	North Central Coast and South Central Coast	25	311.335.300.000	29%
4	Central Highlands	1	13.000.000.000	1%
5	Southeast	20	255.083.000.000	24%
6	Mekong Delta	7	123.000.000.000	11%
Total		93	1.083.278.400.000	100%

Table 2: Lending results of solid waste by 6 socio-economic regions



▲ *Industrial waste incinerators with a capacity of 1,000 kg/h of the Green Industrial Environment Company Limited in Vĩnh Phúc are supported with loans by the Fund*

DEVELOPMENT ORIENTATION IN THE FUTURE

Facing increasing investment requirements for solid waste treatment in recent years, especially capital for investment in domestic waste treatment; in the coming time, the Fund is requesting additional charter capital and other sources to meet the preferential loan demand of organizations, individuals and enterprises nationwide in the field of environmental protection. The Fund focuses on providing financial support for solid waste treatment, especially domestic solid waste treatment projects using modern technology, contributing to reducing the amount of landfilled waste■

With the motto of accompanying enterprises in environmental protection activities, the Fund is pleased to cooperate with organizations and individuals in the field of solid waste treatment. For further information, consultancy and support, please contact the Fund - Address: 6th Floor, Cartographic Publishing House Building, 85 Nguyễn Chí Thanh, Đống Đa, Hà Nội. The Centralized Credit Department, Tel: 024.62542736, the Uncentralized Credit Department, Tel: 024.39429734; Fax 024.39426329; www.vepf.vn.

Environmental monitoring plays an important role in the State management of environmental protection. The environmental monitoring aims to provide data on the current environmental quality state and assess the activities of discharging into the environment, thereby contributing to supporting the relevant agencies in implementing the environmental management function. Many countries and regions around the world have paid attention to the development of environmental monitoring networks to assess the developments, provide warnings and develop appropriate management options.

In Việt Nam, the environmental monitoring work is also always concerned and closely directed. The context of the country's strong development and increasing industrial production, business and service activities has been creating great pressure on the environment, requiring the development of environmental monitoring networks to carry out monitoring on a regular and continuous basis to assess developments and provide environmental warnings to the community and regulatory agencies.

THE DEVELOPMENT PROCESS OF ENVIRONMENTAL MONITORING NETWORK PLANNINGS IN VIỆT NAM

After many years of implementation and operation, the environmental monitoring network in Việt Nam has developed, meeting the increasing demands of the State management of environmental protection. With the current coordinating role of the Ministry of Natural Resources and Environment (MONRE), the environmental monitoring station network has been increasingly expanded and effectively promoted the potential resources of facilities, technology and human resources of many agencies, industries and research institutes such as the Ministries of Education and Training, Science and Technology, Agriculture and Rural Development, National Defense, Industry and Trade, Health, Vietnam Academy of Science and Technology.

From 1994 to 2006, a number of Ministries/sectors and localities formed the environmental monitoring network. However, there has been no agreement on methods, processes, parameters, frequency of monitoring, some programs have not guaranteed the right time and place of monitoring as planned. Moreover, with limited budget, outdated equipment and limited staff capacity, the results of monitoring are inconsistent both in space and time, the reliability is not high, sometimes conflicting with each other, which is difficult to analyze, synthesize and use generally. The monitoring results have not been gathered to the national environmental management agency. The environmental monitoring has not met the actual requirements of environmental management and protection in the period of accelerating industrialization and modernization of the country.

Stemming from the above practical needs, on January 29th, 2007, the Prime Minister approved Decision No. 16/2007/QĐ-TTg on the Master planning on the national network on natural resources and environmental monitor-



Development of a national environmental monitoring network planning

TRƯƠNG MẠNH TUẤN

Vietnam Environment Administra-

ing to 2020, to set general goals such as: To build a national network on natural resources and environmental monitoring to ensure consistency across the country, synchronization, innovation and modernity to meet the needs of collecting and providing basic survey information and data on environment, water resources, hydrometeorology, effectively serving the treatment and remediation of environmental pollution, forecasts, warnings, prevention, avoidance and mitigation of damage caused by natural disasters and the strong and sustainable socio-economic development of the country. At the same time, the Decision also points out specific objectives for each stage, focusing on issues of developing and perfecting the organizational structure, management and administration apparatus; strengthening equipment and human resources for the natural resources and environmental monitoring

network. Although there are general provisions in a separate chapter in the Law on Environmental Protection and the Prime Minister has signed promulgated Decision No. 16/2007/QĐ-TTg, the actual management and operation of the national environmental monitoring network, environmental statistics, publication and disclosure of environmental information over the past time show that there are still many shortcomings and failures to meet the increasing requirements of environmental management.

On January 12th, 2016, the Prime Minister approved Decision No. 90/QĐ-TTg on the Planning of the national natural resources and environmental monitoring network in the period of 2016 - 2025, with a vision to 2030, replacing Decision No. 16/2007/QĐ-TTg with the objective to Develop a rational, synchronous and modern national natural resources and environmental monitoring system of leading level in Southeast Asia and the advanced level of Asia; meeting the needs of basic survey information for the State management of water, land, sea and island resources, hydrometeorology, environmental protection and other technical and economic sectors; serving forecasting, warning, preventing and mitigating damage caused by natural disasters and environmental pollution, climate change response.



▲ The meeting of the Appraisal Council of National Master Plan for the national environmental monitoring system for the period 2021 - 2030, with a vision to 2050 in Hà Nội City, December 11, 2019

In order to synchronously and effectively implement the Prime Minister's Decision No. 90/QĐ-TTg, the Minister of MONRE also issued Decision No. 2044/QĐ-BTNMT on September 7th, 2016 on the five-year Plan on implementing the Planning of the national natural resources and environmental monitoring network. Since the issuance of Decision No. 90/QĐ-TTg, the MONRE has always been active and proactive in implementing the Planning.

IMPLEMENTATION OF THE PLANNINGS

Currently, the Vietnam Environment Administration (VEA) has sufficient capacity to carry out the monitoring according to the Planning for environmental components, including: Surface water (coastal sea water and river water), air quality, sediment... implementing monitoring programs in key economic regions and river basins: Nhuệ - Đáy, Cầu, Đồng Nai, Mã, Hồng - Thái Bình, Đà and Vu Gia - Thu Bồn, areas of bauxite mining in the Central Highlands. To invest, maintain and operate the system of automatic air monitoring stations in Hà Nội, Đà Nẵng, Khánh Hòa and soon in Thừa Thiên - Huế, Phú Thọ, Quảng Ninh...; to enhance and install automatic water monitoring stations in Thái Nguyên, Bắc Ninh, Hà Nội, Thừa Thiên - Huế...

In addition to the national environmental monitoring network managed by the VEA, there are a number of environmental monitoring networks managed by other units under the MONRE, such as the air and water environmental monitoring network developed by the Vietnam Meteorological and Hydrological Administration (formerly), now the National Center for Hydro-Meteorological Forecasting (MONRE). This network of stations carrying out the air environmental monitoring is integrated with meteorological stations; the lake and river water environmental monitoring is integrated with hydrographic stations. In addition, there are also saline intrusion monitoring points in estuaries carried out by hydrographic stations...

In addition to the results achieved in recent years, the work of planning on environmental monitoring in our country still faces many difficulties and short-

comings. The system of automatic and continuous air and water environmental monitoring stations is still incomplete according to the National Planning on environmental monitoring network approved by Decision No. 90/QĐ-TTg due to the high cost of investing, maintaining and operating automatic monitoring stations, many provinces have difficulty in funding and maintaining stations. For periodic monitoring activities that are only carried out at certain times of the year, many monitoring programs have not been implemented according to the desired plan. The sharing of information and data on environmental monitoring among the Central and localities is still limited. On the other hand, the environmental database of the whole system currently does not meet the requirements of environmental management in the control, monitoring and warning of environmental developments and especially when major environmental pollution incidents occur. Besides, the requirement for access to environmental information by the society today requires more and more timely and enough information that thoroughly reflects the current state of the environment. The resources for environmental monitoring and analysis are increasing in quantity, but still not meeting the practical requirements in terms of both quantity and quality. The localities have invested in equipment that have not yet been synchronized. Some units have equipment that has been invested for a long time, so they are old and broken down, or have new equipment, but there is no synchronization on the categories and the technical specifications of the equipment...

ORIENTATION IN THE COMING TIME

According to Clause 12, Article 7 of the Law amending and supplementing 37 laws related to the Planning No. 35/2018/QH14 passed by the National Assembly on November 19th, 2018, the MONRE is tasked with formulating and valuating and submitting to the Prime Minister for approval the National Master Plan for Environmental Monitoring to meet new requirements to better serve management. Different from previous plannings where the environmental monitoring is integrated into the network of natural resources and meteorological meteorology, the coming Planning is specifically developed for the environment field.

The development of this Planning is based on the principle of inheriting the previous environmental monitoring plannings approved in Decision No. 16/2007/QĐ-TTg and Decision No. 90/2016/QĐ-TTg, showing the orientation in the planning of stations, monitoring points and towards strengthening socialization in mobilizing resources to implement the environmental monitoring programs in the planning. The new planning will contribute to updating the monitoring points, strengthening the mechanism for mobilizing resources for environmental monitoring activities and contributing to promoting the environmental monitoring activities to meet requirements in the new development period of the country■



Hà Nội City adopts plan to cut emissions

Hà Nội's Department of Natural Resources and Environment (DONRE) has outlined a plan to reduce air pollution in 2020. Green Initiatives for Hà Nội will focus on air quality management, waste management, energy, urban planning, and green living with sustainable consumption. The DONRE will develop an air monitoring network using low-cost air pollution sensors in selected areas of the city to provide online updates for the public regarding pollution levels.

Air sensors will initially be installed in public places and 25 schools and offices in the City. To increase public awareness about air pollution, regular activities will be held and the issue of air quality will be included in the school curriculum.

Waste management will include limiting the burning of agricultural waste, reducing plastic use and enhancing waste collection. Burning straw and agricultural waste is one of the main reasons for serious air pollution and increasing greenhouse gas emissions in the City. The Department will carry out a pilot program to show farmers how to use probiotics to produce compost from straw.

To reduce the use of energy, efficiency models will be introduced including the use of energy-saving bulbs, and the use of renewable energy for cooking, heating and lighting. The City will also carry out campaigns to reduce plastic waste, promote the use of environmentally friendly products, set up green offices and promote organic agriculture.

A green office is an environmental management system focusing on changing employees' perceptions and behavior towards sustainable consumption practices. This helps solve existing problems



▲ Air pollution in Hà Nội City on November 13th, 2019

and reduce costs and the environmental impacts of an organization's activities to benefit the organization and create a healthy, friendly working environment. The plan was introduced at a workshop dubbed "City Initiatives in Climate Change and the Key Progress in Developing City Promises" which was co-held by the department and the global network ICLEI - Local Governments for Sustainability.

The workshop was in the framework of the Ambitious City Promises campaign implemented by the ICLEI and funded by the International Climate Initiative under Germany's Ministry of the Environment, Nature Conservation, Building and Nuclear Safety, which focuses on reducing greenhouse gas emissions through participatory and inclusive local climate action. The project is designed to advance this work by increasing the capacity of local Governments, engaging citizens and driving climate action through low emission strategies.

The Promise of Seoul which is at the heart of the project, is a comprehensive climate action plan launched by the Republic of Korea in 2015.

The Promise of Seoul selected Southeast Asian cities, including Vietnam's Hà Nội, Sóc Sơn, Sơn Tây, Indonesia's Jakarta, Bekasi and Tangerang, and the Philippines's Pasig, Paranaque and Marikina to make ambitious commitments, mainstream low emission strategies and cultivate new climate champions in the region.

Mr. Ranell Martin Dedicatoria from the ICLEI said, the project aimed to call big cities in the Southeast Asia with first countries of Việt Nam, Indonesia and Philippines to commit cutting the greenhouse gas emission and support the cities to set up their action plans. The engagement of Governments from central to grassroots levels to activate climate change response was very significant■

HỒNG CẨM (VNS source)

Việt Nam needs solutions for sustainable development of rivers

Việt Nam's rivers have greatly contributed to socio-economic development, but over-exploitation in recent years has seriously affected this valuable resource.

Speaking at the network's annual workshop in Hà Nội, Dr. Đào Trọng Tứ - Head of the Việt Nam Rivers Network said that, the benefits from rivers were huge but protection seemed to be ignored. A rapid increase in population and rapid socio-economic

development were resulting in uncontrolled and unsustainable tapping of rivers' potential. Rivers are associated with human life, so protecting rivers helps to ensure the survival and prosperity of the country.

At the workshop, participants gave presentations on issues such as water security in the context of climate change and socio-economic development in Việt Nam, as well as the development of hydroelectricity on the Mekong River and exploiting, using and protecting sustainable water resources. Delegates also discussed energy development and water pollution, including small/medium hydropower development in Việt Nam such as Sapa Hydropower Plant in Lào Cai Province and Mu stream hydroelectric plant in Hòa Bình Province.

Director of Centre for Sustainable Development of Water Resources and Adaptation to Climate Change (CEWAREC) Đặng Ngọc Vinh said a huge amount of land was needed to build a small/medium hydroelectricity plant. One megawatt of a medium/



▲ Construction of Mu stream hydroelectric plant in Hòa Bình Province

small hydroelectricity plant occupies about 7,41 ha of land on average, including residential, agriculture, forest land, rivers and streams. The construction of a hydroelectric plant will also greatly affect households living in the areas that are planned to house the hydroelectric plant.

Việt Nam needs to eliminate hydroelectric works that have great impacts on the environment and tourism landscape and people's livelihoods. It was also necessary to develop a system to monitor minimum flow in some rivers and streams in the provinces and policies to mobilise capital from people investing in construction of power projects to link the interests of both businesses and people for sustainable development. For hydropower projects located in tourism areas or related to cultural heritage, appropriate policies should be in place to exploit the benefits of both hydropower and tourism projects and protect the environment.

Dr. Bùi Đức Hiến, Division of Environment and Natural Resources Law under the Institute of State and Law said, Việt Nam needed to enhance the role of agencies in protecting water resources sustainably and raise awareness for people about this issue. The use of science and technology in prevention, detection and treatment of water environmental pollution as well as forest protection and development also needed to be improved. There should be a national strategy on attracting investment in line with the strategy of sustainable development, green growth and environmentally friendly industries■

PHƯƠNG TÂM (VNA source)



Hồ Chí Minh City plans to clean up five polluted canals

The Hồ Chí Minh City People's Committee has approved the cleanup of five canals full of litter and waste discharged by households living nearby. The People's Committee has told five districts where the canals are located to strictly handle illegal encroachment and littering and to step up inspections of the canals.

Mrs. Lê Thị Thanh, a resident living near the Xuyên Tâm canal, which traverses Bình Thạnh and Gò Vấp Districts told that the canal had a foul smell and had been polluted for years. "Authorities should develop specific plans to clean up and upgrade the canals", she said.

The Xuyên Tâm canal connects the Nhiêu Lộc - Thị Nghè canal and Vàm Thuật River and has a total length of 6,21 kilometres. There are tens of thousands of people living along the canal. It would increase public awareness about the need to stop littering into the canal.

According to the City's Department of Construction, illegal encroachments exist on 35 canals in the City, although the number has fallen significantly compared to 2017. Encroachment affects water flow and causes flooding and landslides. It also makes it more difficult to build water supply and drainage systems, and fire protection systems.

Cleanup will occur on the Hy Vọng canal in Tân Bình District, Xuyên Tâm canal in Bình Thạnh - Gò Vấp District, Bình Thái canal in Thủ Đức District, Nhảy - Ruột Ngựa canal in District 8, Bàu Trầu canal in District 6 and Tân Phú District. ■

TRẦN TÂN (VietNamNet source)

Marine plastic pollution needs thorough solutions



▲ The workshop on "Marine Plastic Pollution in Việt Nam: Situation and solutions" was organized by the VNU-Central Institute for Natural Resources and Environmental Studies in Hà Nội, 29/11/2019

Việt Nam had been listed as one of the top five plastic polluters in the world, so eco-friendly technical solutions and the use of bio-degradable plastic products needed urgent promotion, participants at a workshop heard in Hà Nội.

According to the United Nations, about 300 million tons of plastics including billions of tons of plastic bottles and more than five billion plastic bags, were produced globally every year. Only 27 percent of plastic waste is recycled each year worldwide. The rest is thrown out and ends up in our seas. It takes hundreds of years for the waste to decompose. Plastic waste is also poisonous for marine animals. Scientists estimated there would be more plastic waste in the oceans than fish by 2050. Some statistics revealed at the workshop showed how plastic pollution in Việt Nam has reached an alarming level.

Deputy Director of the Việt Nam National University (VNU) Phạm Bảo Sơn said Việt Nam ranked 17 out of 109 countries with the highest rates of plastic pollution. The Government has joined global efforts to take concrete action to manage and reduce plastic waste such as reducing single use plastic; reusing and recycling product; and encouraging a circular economy and green growth. Besides the target of discussing plastic reduction solutions, the workshop aimed to kick off co-operation between Việt Nam and international partners in marine plastic waste solutions and management policies.

Mrs. Đặng Kim Chi from the Việt Nam Association for Conservation of Nature and Environment said: "Most plastic products are used only once and then thrown away. The amount of plastic waste keeps increasing as the demand surges. Only a small percentage of plastic waste is recycled or reused compared to 60 percent and 90 percent of the recycling rate for paper waste and steel waste". The usage value of plastic waste was short. It absorbed toxic elements over time and had negative impacts on the environment and public health.

Participants at the workshop said there was a need for general management policies on plastic production. Eco-friendly technical and technological solutions should also be encouraged. ■

CHÂU LONG (VNS source)

New calculation of Việt Nam Air Quality Index

LÊ HOÀNG ANH, VƯƠNG NHƯ LUẬN
Centre for Environmental Monitoring

Nowadays, the public demand for update and announcement of air quality control is highly increasing. In attempt to enhance the management and use of environmental monitoring data and publicise air quality data in a more diverse manner, the Vietnam Environment Administration (VEA) on November 12, 2019 issued Decision No. 1459/QĐ-TCMT regulating the techniques for the calculation and publication of the Vietnam Air Quality Index (VN_AQI) that replaced Decision 878/QĐ-TCMT dated July 1, 2011.

The Air Quality Index (AQI) included indicators that showed a clean or polluted environment, and gave warnings and recommendations to people when air pollution increases. The index was calculated upon five major substances that could be highly polluted – which are ground ozone

(O₃), PM2.5 and PM10 fine dust, carbon monoxide (CO), sulfur dioxide (SO₂) and nitro dioxide (NO₂).

The first AQI manual was released by VEA in 2011, which had then helped people get better access to air quality control. However, after eight years, the AQI manual needed changes based on a new approach that were being broadly applied across the world.

During the compilation of the new AQI manual, the group of authors studied AQI calculation methods that were available at the time, selected the most widely-used one and adjusted it to match Viet Nam's regulations. The selected method was called Break Point table, which was first used in the United States. Many countries had used the method such as China, Mexico, Brazil, Japan, South Korea, Thailand, India and Singapore. The authors then made some changes to make it meet the standards set by the Vietnamese Ministry of Natural Resources and Environment (Standard No. 05:2013/BTNMT).

According to the Guide of the VN_AQI, there are different score levels, displayed by different colours to show the quality of the atmosphere and the impact on the health.

AQI score range	The quality of air	Colour	RBD colour code	Impact on the health
0 - 50	Good	Green	0; 228; 0	Good quality of air, no impact on the health.
51 - 100	Average	Yellow	255; 255; 0	Acceptable quality of air. But there may be some impact on old people, children and people with diseases.
101 - 150	Poor	Orange	255; 126; 0	People who are sensitive to changes in the air may get health issues. Those with normal physical conditions get less impact.
151 - 200	Bad	Red	255; 0; 0	People with normal physical conditions start feeling unwell. Those are sensitive to changes get worse issues.
201 - 300	Very bad	Purple	143; 63; 151	Warning: All people may get serious health issues.
301-500	Harmful	Brown	126; 0; 35	Critical warning: All population get serious health issues.

Table 1. The AQI score ranges and evaluation



I	Ii	Regulated BPi for each indicator (Unit: $\mu\text{g}/\text{m}^3$)						
		O ₃ (1h)	O ₃ (8h)	CO	SO ₂	NO ₂	PM10	PM2.5
1	0	0	0	0	0	0	0	0
2	50	160	100	10.000	125	100	50	25
3	100	200	120	30.000	350	200	150	50
4	150	300	170	45.000	550	700	250	80
5	200	400	210	60.000	800	1.200	350	150
6	300	800	400	90.000	1.600	2.350	420	250
7	400	1.000	-	120.000	2.100	3.100	500	350
8	500	≥ 1.200	-	≥ 150.000	≥ 2.630	≥ 3.850	≥ 600	≥ 500

Table 2. BPi values for each indicator

AQI calculation

The AQI is divided into hour-based and day-based AQI:

- Day-based AQI: is used to report the air quality updates for the whole day.
- Hour-based AQI: is used to report hourly air quality updates.

Calculation of hour-based AQI (AQIh)

The data used in AQIh calculation is the one-hour average monitoring value. As there is no hourly calculation method for PM10 and PM2.5, so the monitor unit has to use the Nowcast method which is developed by the US Environmental Protection Agency. Nowcast is computed from the most recent 12 hours of PM monitoring data.

To compute hourly AQI, first, calculate all AQIh values of all indicators (AQIx).

The AQIh values of indicators SO₂, CO, NO₂, O₃ are computed by formula 1, the AQIh values of indicators PM10, PM2.5 are computed by formula 2:

(Formula 1)

$$AIQ = \frac{I_{i+1} - I_i}{BP_{i+1} - BP_i} (C_x - BP_i) + I_i$$

(Formula 2)

$$AQI_x = \frac{I_{i+1} - I_i}{BP_{i+1} - BP_i} (\text{Nowcast}_x - BP_i) + I_i$$

Of which:

Note: - Use BPi value of O₃ to calculate hourly AQI (AQIh) value of indicator O₃ (1h)

- Use BPi values of O₃ (1h) and O₃ (8h) to calculate daily AQI (AQId) values of O₃



▲ The automatic air quality monitoring station at 566 Nguyễn Văn Cừ, Hà Nội

Combined hourly AQI: is the maximum AQIx value of all indicators

Calculation of daily AQI (AQId)

The formula used in computing daily AQI is similar to that of hourly AQI based on the Break Point table (Table 2). But the inputs are:

- Indicators for PM2.5 and PM10: 24-hour average values.
- Indicator O₃: highest one-hour average value of the day and the highest eight-hour average value of the day.
- Indicators SO₂, NO₂ and CO: highest one-hour average values of the day.

Combined daily AQI: the maximum AQIx values of all indicators.

The new rules of computing AQI in Việt Nam is highly appreciated by experts. After being released by the VEA, agencies and organisations apply the VN_AQI calculation to publish the results on air quality for people■



Proposing suggestions to amend and perfect the environmental technical regulations

DR. TRẦN THẾ LOÃN

Vietnam Association of Environmental Economics

According to the Law on Environmental Protection (LEP) 2014, environmental technical regulations are the limits of the parameters of ambient environment quality, contents of pollutants in waste, technical and management requirements that are promulgated by a State competent agency in the form of compulsory requirement to apply for environmental protection.

PERFECTING THE SYSTEM OF NATIONAL TECHNICAL REGULATIONS ON ENVIRONMENT

The system of environmental technical regulations includes: Group of technical regulations on ambient environment quality; Group of technical regulations on waste; Group of other technical regulations (technical regulations for imported scraps, technical regulations for some types of specialized equipment for waste treatment). These are legal tools that directly regulate environmental quality, determine environmental goals and set the permissible amount or concentration of substances released into the soil, water and air environment.

The system of our country's environmental technical regulations has been developed in order to stipulate the permissible values of environmental parameters to ensure the life and development of humans and organisms, on the basis of both ensuring the environmental protection objective, suitable with the socio-economic, science and technology development conditions of the country in each period and region, while meeting the requirements of harmonization with regional countries' standards and international conventions to which Việt Nam is a party. Therefore, our country's environmental technical regulations system has many similarities with the environmental standards systems of countries in the region and around the world.

The LEP 2014 also stipulates that the environmental technical regulations must conform to the features of the area, region and production sector; Local environmental technical regulations must be more stringent than national ones, meeting spe-

cific environmental management requirements. Therefore, in addition to National Technical Regulations on Environment (Vietnam Regulations) issued by the Ministry of Natural Resources and Environment (MONRE), many localities have also issued a number of environmental technical regulations to tighten waste treatment requirements. Besides the general waste regulations, the MONRE has also issued regulations (for wastewater and gaseous emissions) for some specific production sectors. Up to now, 48 effective Vietnam Regulations on environment have been issued by the MONRE, including technical regulations on ambient environment quality, waste and other environmental technical regulations.

In addition, the Ministries of Transport, Industry and Trade, Health, Agriculture and Rural Development..., also issued Vietnam Regulations related to preventing environmental pollution as a tool to control environmental pollution such as: QCVN No. 09:2015/BGTVT - Vietnam Regulations on technical safety quality and environmental protection for cars; QCVN No. 17:2011/BGTVT - Vietnam Regulations on provisions on preventing pollution caused by inland waterway vessels; QCVN No. 02:2011/BCT - Vietnam Regulations on safety in mineral processing plants; QCVN No. 01-14:2010/BNNT - Vietnam Regulations on biosafe pig farm conditions; QCVN No. 01-15:2010/BNNT - Vietnam Regulations on biosafe poultry farm conditions; some Vietnam Regulations on workplace environment (light, electromagnetic field, noise level, vibration, dust concentration, chemicals according to QCVN No. 21:2016/BYT, QCVN No. 27:2016/BYT, QCVN No. 29:2016/BYT, QCVN No. 30:2016/BYT, QCVN No. 02:2019/BYT, QCVN No. 03:2019/BYT...) issued by the Ministry of Health. The development of technical regulations on waste for specific production sectors is now based on the principle of supporting the development of certain production sectors, which only includes supervising regulations for typical emission parameters of the production sector, loosening some pollution parameters in comparison with technical regulations on general industrial waste to reduce waste treatment costs for enterprises.

PROBLEMS IN THE DEVELOPMENT AND APPLICATION PROCESS OF REGULATIONS

According to the Vietnam Environment Administration, the application of Vietnam Regulations in localities across the country in recent years has contributed to the control of waste sources that may cause environmental pollution. However, the application process in localities still reveals some inadequacies due to the different particularities of natural conditions, socio-economic development levels and management requirements of the localities. The application of Vietnam Regulations on environment is sometimes inconsistent in some localities; many environmental management agen-



cies require the application of general Vietnam Regulations on environment for wastewater or general emissions that are different for the same industrial production sector. Even the MONRE also applies different regulations in the requirements when approving the environmental impact assessment reports and when issuing the discharge permits, or there has been no research or assessment of the carrying capacity of the receiving waste sources (rivers, streams, ponds, lakes, canals, etc.), which leads to difficulties in the implementation process in accordance with environmental regulations. In addition, the application of technical regulations on discharges according to water use purposes is also difficult, especially in inter-regional and inter-provincial areas.

In accordance with the Law on Technical Standards and Regulations, the localities shall develop local regulations in accordance with local practical conditions. While the LEP 2014 stipulates that local regulations must be more stringent than national environmental technical regulations or meet specific environmental management requirements. However, the issuance of local environmental technical regulations is still limited and not properly taken care of by the local authorities, resulting in the localities having to apply national regulations in some specific cases, which is still im-

proper and difficult for both enterprises and the State management agencies on the environment.

Up to now, the MONRE has issued 19 Vietnam Regulations on environment for wastewater and gaseous emissions for 18 specific sectors (particularly, for the steel sector, Vietnam Regulations have been developed for both wastewater and gaseous emissions). As mentioned above, the development and issuance of some environmental technical regulations for a number of specific production sectors are based on the principle of supporting production development for certain sectors; the application of these regulations should have been accompanied by a number of specific management regulations (for example, development of specific production sectors is only encouraged in certain areas/localities, with limited scope), but in reality, there are no attached management regulations, leading to inequality among different sectors in the same operating area. Many other production sectors and fields that are subject to application of the general Vietnam Regulations propose to have technical regulations developed for their own sectors.

PROPOSALS AND RECOMMENDATIONS FOR THE ENVIRONMENTAL TECHNICAL REGULATIONS TO MEET THE PRACTICAL REQUIREMENTS

Some experts believe that, in order to protect the environment, it is necessary to develop and promulgate environmental technical regulations in the direction of managing the discharge load, not merely managing the discharge concentration as today. However, it is necessary to recognize that, in any direction, there are also certain advantages and disadvantages; environmental technical regulations are just one of the tools to manage the environmental protection and should always be applied in conjunction with other management tools. In order to develop and apply environmental technical regulations to manage discharge



▲ *Environmental monitoring to assess compliance with Vietnam Regulations*

load, it is necessary to calculate the carrying capacity of the environment, these data will vary in different areas and need to be updated regularly. Therefore, it is necessary to start conducting research immediately to select and prescribe the methodologies/procedures to calculate the environmental carrying capacity, as a premise for the development and application of environmental technical regulations for discharge load management. It also shows that it is necessary to continue to perfect and apply the environmental technical regulations towards managing discharge concentration in the coming time. In particular, the recommendations need to note some of the following issues:

Vietnam Regulations for waste has to be more stringent to ensure an improved environment; there should be more detailed regulations on waste- receiving environment, coefficients of receiving areas, waste flow coefficients and roadmap so that they can be applied in many different cases.

To promote research, development and application of local technical regulations on environment and zoning for receiving waste in detail to overcome difficulties arising when applying Vietnam Regulations and protect environment in sensitive areas; areas that has been or will be seriously polluted.

It is necessary to have specific direction and orientation on the development and issuance of environmental technical regulations for specific production sectors. If it is necessary to loosen the regulation on the discharge concentration of a pollutant, it must be linked to specific regulations on the discharge area, which is to restrict the area of developing that specialized production sector (meaning the surrounding environment is still capable of receiving and treating typical pollutants of the production sector)■

On October 31st, 2019, the Ministry of Natural Resources and Environment (MONRE) issued an indicator set for assessing environmental protection results of provinces and centrally-run cities (the set of indicators) at Decision No. 2782/QĐ-BTNMT. The indicator set aims to assess the implementation results of environmental protection objectives and tasks and the people's satisfaction with the living environment quality of the provinces and centrally-run cities. At the same time, to assess the effectiveness and efficiency of the State management of environmental protection; to raise awareness, responsibilities and encourage efforts of the State management agencies and people in environmental protection.

THE NECESSITY OF ISSUING THE INDICATOR SET

In the world, the application of criteria and indicator sets related to the assessment and ranking of environmental protection has become popular. At the global level, the set of environmental performance indicators (EPI) developed by Yale University and Columbia University (USA) in cooperation with the World Economic Forum and the European Cooperation Center since 2006, has been officially applied since 2008, for biennial assessment and ranking of environmental performance for most countries in the world. With 10 times of application for assessment for the countries, the EPI set still maintains two main target groups (environmental health and ecosystem vitality), but there are adjustments in policies, specific assessment indicators, with about 9 - 14 policy groups and 22 - 25 assessment indicators; the corresponding weights for the specific target groups, policies and indicators are also changed according to each assessment period to suit the priority and importance of environmental protection activities.

Based on this EPI set, since 2010, China and Malaysia have also developed their own sets of indicators, appropriate to the conditions of each country, to assess and rank the country's states and provinces for the assessment and development of environmental protection policies, aiming to meet the United Nations Sustainable Development Goals. In addition, other countries have developed indicator sets such as the Green City Index, which has been applied in some countries of Europe, Americas, Asia; or the Green Local Index, which has been implemented in Canada and the US since 2010, with the aim of helping city and local managers compare and monitor the progress in environmental protection over the years, as well as develop policies to improve the environment.

In Việt Nam, in recent years, there have also been a number of indicator sets in many fields that have been studied, developed, issued and implemented, serving the purpose of assessment, comparison and ranking among localities, assessing the satisfaction of people and organizations of the Ministries and branches such as: Provincial competitiveness index (PCI); Provincial Administrative Reforms (PAR) index of the Ministries, branches and localities; citizens' and organizations' satisfaction index of public administration agencies' services (Sipas); citizens' and organizations' satisfaction index of public services; Set of criteria for assessing and ranking food safety management in agriculture; Set of indicators for monitoring and assessing rural clean water and environmental sanitation, smart city index, green urban index; Set of indicators for assessing the results of environmental pollution control in the sea and islands...



Some basic contents of the set of indicators for assessing environmental protection results of provinces and centrally-run cities

ĐẶNG QUỐC THẮNG

Vietnam Environment Administration

However, in our country, there is currently no comprehensive set of assessment tools to show the implementation results of environmental protection objectives and tasks, as well as the people's and organizations' satisfaction with the environment, in order to monitor and compare the implementation results and make necessary adjustments suitable to the reality, thereby improving the efficiency and effectiveness of the State management of environmental protection. Therefore, the development and issuance of the indicator set for assessing environmental protection results of localities will contribute to monitoring, comparing and ranking the implementation results of environmental protection activities of localities and among localities; clearly identifying strengths and weaknesses in the implementation of policies and laws on environmental protection to take effective adjustment measures; strengthening the responsibilities of the State management and encouraging local efforts in environmental protection.

BASIC CONTENTS OF THE INDICATOR SET

The indicator set is developed on the basis of legal grounds: Law on Environmental Protection 2014; Law on Biodiversity 2008; Law on Statistics 2015; Resolution No. 08/NQ-CP dated January 23rd, 2014 of the Government on the Action Program of the implementation of Resolution No. 24/NQ-TW dated March 6th, 2013 of the 11th Party Central Executive Committee on Proactively responding to climate change, strengthening resource management and environmental protection; Directive No. 25/CT-TTg dated August 31st, 2016 on a number of urgent tasks and solutions in the field of environmental protection; Decision No. 622/QĐ-TTg dated May 10th, 2017 of the Prime Minister promulgating the National Action Plan to implement the 2030 Agenda for Sustainable Development.

The indicator set is structured into 2 groups including: Assessment of the implementation results of environmental protection objectives and tasks and Assessment of the people's satisfaction with the living environment quality.

For the assessment of the implementation results of environmental protection objectives and tasks, the indicator set has set criteria and component indicators for assessment. Accordingly, the assessment criteria include: Protection of the living environment quality (control of pollution sources;



▲ *The proportion of industrial zones, export processing zones and high-tech zones with centralized wastewater treatment systems meeting environmental technical regulations is a component indicator of the indicator set*



management of hazardous waste and ordinary solid waste; remedying pollution and improving environmental quality; providing clean water and environmental sanitation); Protection of the ecosystem vitality (nature conservation and biodiversity; forest protection and development); Protection of the climate system (using renewable energy); the State management capacity on environmental protection (technical infrastructure for environmental protection; investment for environmental protection; human resources for the State management of environmental protection; efficiency of hotlines on environmental pollution).

Based on the above criteria, the indicator set also provides 26 component indicators (Group I): The proportion of urban domestic wastewater of category IV or higher with the treatment meeting environmental technical regulations; The proportion of production, business and service establishments generating wastewater from 50 m³/day (24 hours) or more with wastewater treatment systems meeting environmental technical regulations; The proportion of industrial parks, export processing zones and high-tech parks with centralized wastewater treatment systems meeting environmental technical regulations; The proportion of industrial clusters with centralized wastewater treatment systems meeting environmental technical regulations; The proportion of health facilities with wastewater treatment systems meeting environmental technical regulations; The proportion of thorough handling of establishments causing serious environmental pollution; The number of public transport per 10,000 urban population; The number of environmental incidents caused by waste; The proportion of treated hazardous waste meeting environmental protection requirements; The proportion of provincial, district-level state agencies, party agencies, socio-political organizations, public service business entities; supermarkets and tourist resorts with regulations, commitments and implementation plans on anti-plastic waste; The proportion of domestic solid waste separated at source; The proportion of treated domestic solid waste meeting environmental protection requirements; The propor-

tion of hygienic domestic solid waste landfills; The proportion of polluted land areas treated and renovated; The proportion of urban population supplied with clean water through centralized water supply systems; The proportion of rural population using clean water; The proportion of rural households having hygienic toilets; The proportion of land area of nature reserves established on the total area of land planned for nature conservation and biodiversity; The proportion of newly planted forest area concentrated on the area of land planned for forestry; The area of natural forest burnt and cleared; The output of electricity from renewable energy; The number of automatic monitoring stations of air quality in urban centers of category IV or higher per 10,000 urban population; The proportion of industrial parks, production, business and service establishments installing automatic and continuous monitoring systems of wastewater and exhaust gas and transferring data directly to the local Department of Natural Resources and Environment in accordance with the Law; The proportion of budget expenditure on environmental protection; The number of civil servants and officials performing environmental protection tasks per 1 million people; The proportion of processing reports and petitions on environmental pollution via hotlines.

For the assessment of the people's satisfaction with the living environment quality, the indicator set provides the following criteria: Ambient air environment quality; surface water environment quality; soil environment quality; natural landscape and biodiversity. The component indicators assessing the people's satisfaction (Group II) is the proportion of people satisfied for the living environment quality.

The implementation of Group I's indicators is organized, gathered and assessed by the provincial People's Committees; Group II's indicators will be implemented through sociological surveys. Based on the local self-assessment results and sociological surveys, the MONRE will establish an intersectoral Appraisal Council to organize appraisal and assessment. The environmental protection results of localities will be announced on the occasion of the World Environment Day (June 5th) next year for assessment and publicization on the website of the MONRE, the Vietnam Environment Administration (VEA) and other localities. This indicator set is applied annually and officially from 2020. The VEA is the main agency in charge of organizing the deployment of guidance, training, monitoring, urging and inspecting the implementation; at the same time, stipulating the responsibilities of the units under the Ministry and the People's Committees of the provinces and centrally-run cities in the implementation.

The indicator set will serve as a basis for assessing the implementation of objectives and tasks on environmental protection and the people' and organizations' satisfaction with environmental protection in order to accelerate the process of perfecting environmental protection tools suitable with the country's socio-economic development situation and sustainable development goals in the coming time. ■

The volume-based waste fee system – An effective economic tool to promote resource circulation in Korea and opportunities for application in Việt Nam

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Implementing effective waste management both economically and environmentally is becoming a major challenge at the global level. This is a challenge not only for developing countries, but also for developed countries. Currently, unsustainable consumption habits, arising from the viewpoint of enjoying socio-economic achievements, are becoming a problem that requires policy changes at all levels, including national policies, the direction and commitment of each enterprise and every consumer.

The application of economic tools in waste management policy has become a key trend in many countries' waste management strategies to minimize generation at source, strengthen recycling and gradually replace the conventional management only focusing on the end-of-pipe treatment. The economic tools currently being implemented in waste management in countries mainly focus on waste fee system, landfilling fee system and deposit system for recovering recyclable waste after using products and extended producer responsibility (EPR).

International experience shows that the benefits of applying economic tools in waste management include: Waste reduction; Reduction in the proportion of hazardous components in generated waste; Increase in the ability to apply safe transportation and treatment of hazardous components; En-

couragement of reuse, recycling and recovery of waste; Improvement in the cost-benefit of waste management activities from collection, transportation, treatment to disposal.

Since the early 1990s, with the application of economic measures in waste and domestic solid waste management, the recycling rate of domestic waste in developed countries has increased (Table 1) but the reduction in domestic waste generation volume per capita remains a challenge for most developed countries.

Among developed countries, Korea is considered a country that has attained remarkable achievements in domestic waste management. Up to now, Korea is the only country that has achieved its goal of reducing domestic waste generation amount per capita and has the second highest rate of domestic waste recycling in the OECD countries. These achievements of Korea are due to the implementation of the volume-based waste fee system (VBWFS).

In terms of culture, society, natural conditions and economic development, Korea has many similarities with Vietnam and was also an emerging economy only after the 1980s with fast economic growth. Therefore, the study and learning of Korean experience in various management fields for appropriate application will contribute to accelerating the growth as well as the industrialization process of Việt Nam towards environmental and economic sustainability.

THE APPLICATION OF DOMESTIC WASTE FEE SYSTEM IN KOREA

Since 1995, the volume-based waste fee system as the measure to apply economic tools to encourage the waste generation reduction and the implementation of mandatory waste separation at source has been officially applied in Korea. Like Việt Nam today, before 1995, in the field of do-

Table 1. The recycling rate of domestic waste in some developed countries					Top 10 countries with the highest recycling rate of domestic waste in the world in 2018	
Recycling rate (%)	USA	EU	Japan	South Korea	Germany (65%)	Sweden and the Netherlands (50%)
1995	16	22	0.3	16	Korea (59%)	Luxembourg (48%)
2008	34-35	44	-	-	Slovenia and Austria (58%)	Iceland (48%)
2018	34-35	44	15.8	59	Belgium (55%)	Denmark (44%)
					Switzerland (51%)	England (43%)



mestic waste management, Korea applied a standard fee collection system on a per capita and monthly basis, without considering the domestic waste generation amount of each household. In fact, this fee collection system did not encourage people to minimize waste generation, as well as voluntarily implement waste separation. On the other hand, in terms of social justice, this fee system clearly showed the inequality due to the fact that better-off households generated more waste than middle-class or poor households, however, they only had to pay the same fee as the poor households.

The application of the volume-based waste fee system is implemented in accordance with the Government's regulations on the list of domestic waste types that need to be separated at source; specifications of specialized bags for domestic waste disposal; the regime of selling and using waste bags according to each type of domestic waste with different sizes, as well as the regulations on only collecting domestic waste that is properly-separated and put in proper bags.



▲ Solid domestic waste collection activities in Korea

In the Korean VBWFS system, domestic waste is separated into the following categories: recyclable inorganic domestic waste (paper, metal cans, bottles, metal, plastic, cloth...), organic domestic waste and non-recyclable domestic waste. Waste bags are designed with different sizes, materials and colors according to each type (Table 2). The selling price of each type of bag is set by the local government, depending on the reality of each region, the lowest price is about 1.450 VND (equivalent to 6% of the price of 1L of gasoline) for the smallest bag (5L) and the highest price is about 13.600 VND for the largest bag (50 L) for household use. The revenue from bag sales is currently approximately 30% of the total costs of transportation, treatment and disposal of domestic waste in Korea. The cost expenditure of designated manufacturers and sales units of specified domestic waste bags accounts for about 6% of the revenue from bag sales.

According to regulations, the government or legal collection organizations only collect waste that have been properly separated and put in proper bags. For recyclable inorganic waste, people or organizations can put it in ordinary domestic waste bags (meaning they have to pay for the bags) or dispose of in designated areas for the collection facilities to recycle (meaning free waste disposal as there is no payment for the bags). In addition, for some types of waste that are too large in size (such as televisions, refrigerators, tables, chairs, etc.) or construction waste, the waste generators will have to pay another fee for disposal and treatment. With this regulation, people are encouraged to self-separate recyclable waste before disposing to save the cost of buying waste bags. This applies to non-recyclable waste.

Residents or facilities that generate domestic waste can buy waste bags as prescribed at grocery stores or supermarkets. The production and supply of these bags to the retail system is carried out by the provincial authorities on the basis of designating an enterprise or organization permitted to produce and distribute waste bags according to the provisions of law. The act of dumping waste not at the prescribed places or putting waste in improper bags when discharging will be severely punished.

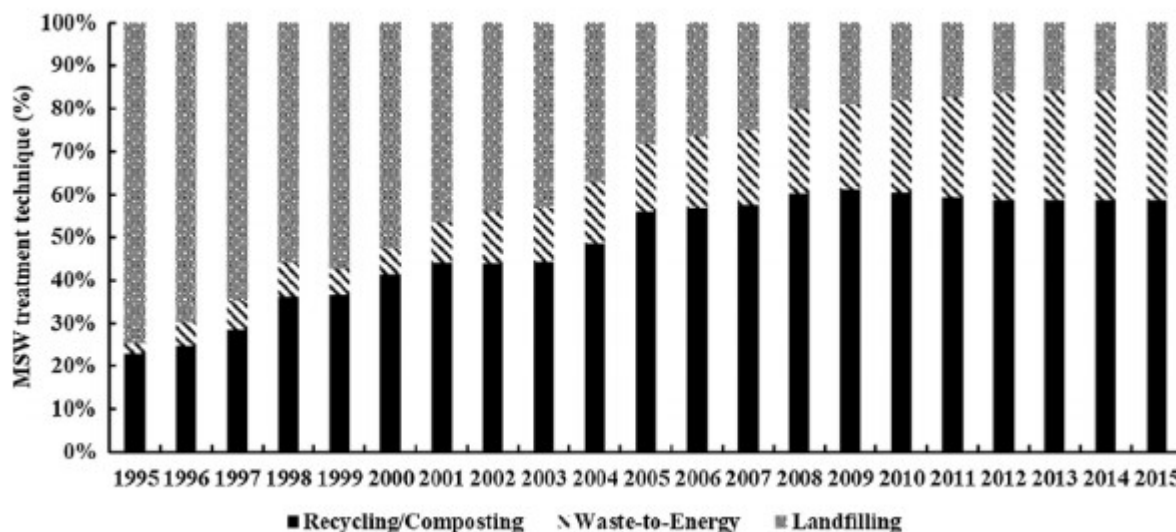
In addition to its achievements, the implementation of the VBWFS system in Korea still needs to be improved to

Table 2. Specifications of waste bags that the generators must purchase in accordance with the VBWFS regulations in Korea

Source	Specifications and mandatory requirements for domestic waste bags when disposing		
Household	Color	White	(i) PE bags for ordinary domestic waste (ii) Biodegradable LDPE bags for domestic waste subject to compost production (iii) LDPE bags with CaCO ₃ content greater than 30% for domestic waste subject to incineration
	Volume	5, 10, 20, 50 (L)	
Enterprise	Color	Orange	
	Volume	20, 50, 75, 100 (L)	
Public organization	Color	Light green	
	Volume	20, 50, 75, 100 (L)	



▲ Figure 1. Changes in the application of domestic waste treatment technology in Korea (1995 - 2015)



Source: Korean Ministry of Environment, 2015

address a number of challenges, such as illegal dumping and incineration and avoidance of purchase of domestic waste bags as prescribed. To overcome the improper waste dumping situation, local governments have adopted surveillance measures such as increasing the installation of CCTV systems (surveillance cameras for security and civil behavior) in residential areas, as well as issuing many reward policies for people who detect acts of improper waste dumping (50% of the fines collected from dumping individuals will reward those who detect acts of waste dumping).

With the application of the VBWFS system, the total domestic waste generation amount in Korea decreased by about 15.95% between 1994 and 2006 (corresponding to the domestic waste generation amount per capita reduced from 1,33 kg/person/day to 1,05 kg/person/day). Meanwhile, during the same period, domestic waste recycling rate increased from 15,4% to 57,2%. By 2018, Korea's domestic waste recycling rate is estimated to be 80% (Figure 1), especially the recycling rate of foodstuff waste is 98%. Economically, the application of VBWFS in the period of 1995 - 2015 has saved about 19 billion USD by reducing the domestic waste amount to be collected, treated and increasing revenue from recycled products.

SUGGESTING SOME PROPOSALS FOR VIỆT NAM TO STUDY, REVIEW AND APPLY

With the recent great economic achievements, after more than 30 years of applying the policy of renovation and open economy,

Việt Nam has officially been ranked among the middle-income countries since 2010. However, these great economic achievements have also brought Việt Nam new challenges in environmental protection. Along with the level of economic growth and people's living standards, the situation of unsustainable consumption and the domestic waste generation amount per capita in Việt Nam has also increased rapidly (from 0,9 - 1,2 kg/person/day in 2004 to 1,45 kg/person/day in 2008 in big cities). In fact, in recent years, Việt Nam has been facing a series of difficulties and challenges in domestic waste management such as: The volume of generated domestic waste has increased rapidly with increasingly diverse components; The infrastructure system for domestic waste collection, transportation, treatment and disposal is outdated and does not keep up with the domestic waste generation situation in reality; The cost of domestic waste management is increasing and becoming a burden for the national budget... These are the factors that put strong pressure on the expansion of domestic waste landfills, which is the key technology that Việt Nam is currently applying to treat domestic waste.

Therefore, Việt Nam needs to take prompt policy measures to early address these challenges and improve the effectiveness of domestic waste management. Currently, in environmental protection activities in general and waste management in particular, Việt Nam has many similarities with Korea before the application of the VBWFS system in 1995. Based on the current situation analysis in Việt Nam and comparison with Korea in the period before the implementation of VBWFS, some advantages and opportunities for the application of VBWFS can be clearly seen as follows:

First, Việt Nam is facing a shortage of land fund for domestic waste landfilling. In 2018, according to the Report of the Vietnam Environment Administration, the recycling rate of domestic waste in Việt Nam was estimated at approximately 8 - 18%, equivalent to the recycling rate of domestic waste in Korea in 1995 (Table 1). The proportion



of domestic waste treated by landfilling method still accounts for approximately 90% of the total domestic waste generation amount (Specifically: 75% of domestic waste is collected for treatment, 34% of domestic waste collected is treated by direct landfilling and 24% of post-treated or post-recycled waste is landfilled). This landfilling rate is equivalent to Korea's domestic waste landfilling rate of 81% in 1995.

Second, the domestic waste generation amount has increased rapidly in Việt Nam. Compared to the level of generation per capita of Korea in 1994 (1.33 kg/person/day), before the application of VBWFS, the domestic waste generation amount per capita in big cities in Việt Nam has already been higher (1.45 kg/person/day). Without timely control measures, the domestic waste generation amount in Việt Nam will surely continue to increase sharply in the following years, along with the trend of changing consumption habits, economic growth and improved living standards.

Third, Việt Nam officially launched the Ecologo Program (Vietnam Green Label) in 2009. Through the implementation of the Ecologo Program, the awareness of the majority of consumers on waste minimization, natural resources and financial resources savings for waste treatment will

be enhanced. This is a very good opportunity to deploy the application of the volume-based waste fee system (VBFS) later. In Korea, the Ecologo Program was officially implemented in 1992, three years before the implementation of the VBFS.

Fourth, Vietnamese people have a high sense of savings in paying for environmental services. In fact, currently in many big cities, people still separate and sell recyclable domestic waste to the unofficial waste collection teams that Vietnamese people still call "scrap metal trading facilities". This will be a very positive factor showing the people's ability to respond if applying the VBWFS in Việt Nam.

Fifth, the key point of the VBWFS policy is to provide equity in the payment of environmental services, the waste generators shall pay money as per the generation amounts, through the stipulated price of bags based on the generated waste amount. If the Vietnamese people clearly understand this principle, they will surely actively participate and support the implementation of this policy.

Finally, the VBWFS policy will provide an opportunity for Việt Nam to successfully implement domestic waste separation at source. The domestic waste separation at source is assessed by specialized experts as the most urgent and essential activity that determines the economic efficiency of modern waste treatment and disposal technologies. Without waste separation at source, it would be impossible to apply any modern treatment technology to effectively treat the waste both economically and environmentally.

In the framework of the experience exchange article, the author would like to point out some favorable factors as well as opportunities for studying and applying the VBWFS in Vietnam based on analysis of Korean experience and observations acquired over 10 years of working in Việt Nam in the field of promoting environmental cooperation between

Việt Nam and Korea. However, in order to successfully implement any new policies, thorough study of the real situation, learning from the experience of many different countries and deciding the appropriate timing to deploy it in our own country are very important factors that determine the success of the policies. Therefore, the environmental management agencies in Việt Nam need to conduct further feasibility studies to solve and clarify relevant issues to make policy decisions appropriate to the domestic socio-economic situation as well as global trend in the context of globalization today■



▲ Korean students participated in the campaign "Introduction of solid domestic waste bags"



Promoting the role of coordination and connection with localities in Đồng Nai river basin to protect the environment



▲ Mr. Trần Văn Cần - Chairman of the Long An People's Committee cum Chairman of the Đồng Nai River Basin Commission

•VEM: Congratulations for becoming the fifth Chairman of the Environmental Protection Commission of the Low Catchment Basin of the Đồng Nai River. What do you think about the potential and advantage of the Đồng Nai River's low catchment basin and what do you feel when taking charge of the position?

Mr. Trần Văn Cần: The Đồng Nai River is the third largest river system in the country after the Mekong and Red rivers. The system of Đồng Nai River is made of the mainstream - Đồng Nai River - and four big tributaries - La Ngà River, Bé River, Sài Gòn River and Vàm Cỏ River. The whole catchment basin covers 11 provinces and cities that are Lâm Đồng, Bình Phước, Bình Dương, Bình Thuận, Đồng Nai, Bà Rịa-Vũng Tàu, Tây Ninh, Hồ Chí Minh City, Ninh Thuận and a part of Đắk Nông and Long An. The total area of the catchment basin is about 44.100 square kilometres, 84.8 percent of which or 37.400 square kilometres is in Viet Nam's territory.

The Đồng Nai River's catchment basin is a vast region with a huge potential of economic development, which may benefit a number of provinces and cities. It also sits in a strategic location that can drive the socio-economic development of the Southeast, the South and the whole country forward. The region also covers the southern key economic zone - which leads and bridges other economic zones and has the strongest socio-

Chairman of the Long An People's Committee cum Chairman of the Đồng Nai River Basin Commission Trần Văn Cần became the fifth Chairman of the Environmental Protection Commission of the Low Catchment Basin of the Đồng Nai River at the Commission's 13th meeting of on November 22, 2019 in Bà Rịa-Vũng Tàu Province. He talks to the Vietnam Environmental Administration Magazine (VEM) about the new role and responsibility.

economic growth in the country. Official statistics have shown that the system of the Đồng Nai River has produced 28-63 per cent of the country's total industrial, servicing and agricultural production. Besides, many provinces and cities in the region have the biggest shares in the State budget such as Hồ Chí Minh City, Đồng Nai, Bà Rịa-Vũng Tàu and Bình Dương. The rapid development of the region, with the fast-growing number of industrial and urban zones, has increased the demand for clean water and requires better waste management to protect the environment. This has become an urgent task that needs the co-operation of all stakeholders in the society.

At the 13th meeting of the Environmental Protection Commission of the Low Catchment Basin of the Đồng Nai River held in Bà Rịa-Vũng Tàu Province, I was appointed the Chairman of the Environmental Protection Commission of the Low Catchment Basin of the Đồng Nai River for 2020. With deep understanding of the importance of the Đồng Nai River network, I am committed to making best efforts and performances in the new role.

In the one-year term of 2020, I am looking forward to receiving assistance and co-operation of the Ministry of Natural Resources and Environment, other Ministries and State agencies, and local authorities of provinces and cities to implement key tasks for 2020 that were agreed at the 13th meeting.

•VEM: How do you assess the co-operation between provinces and cities and their efforts in the catchment basis to protect the river's environment?

Mr. Trần Văn Cần: In recent years, there are some positive results in implementing the Master plan for the environmental protection of the low catchment basin of the Đồng Nai River to improve the quality of water for the Đồng Nai River network. We have installed a monitoring system to check the quality of the river and develop a database; checked the sources to see whether their waste is process well or not; improved the legal



framework on environmental protection; and constructed and upgraded the sewage system for the urban areas.

The co-operation between provinces, cities and regions is also a concern of the Environmental Protection Commission of the Low Catchment Basin of the Promoting the role of coordination and connection with localities in Đồng Nai river basin to protect the environment river. In Bình Phước Province, nine provinces and cities, which are Hồ Chí Minh City, Bà Rịa-Vũng Tàu, Đồng Nai, Bình Dương, Tây Ninh, Long An, Tiền Giang, Bình Phước and Lâm Đồng, signed an agreement on State management of water and mineral resources and environmental protection for border areas of the nine provinces and cities. Besides, local authorities in the basin have shared data of their monitoring systems, dealt with environmental issues and violations such as illegal sand mining, and cleaned the channels and rivers in border areas. Despite achievements, there are further improvements the provinces and cities could make. Therefore, we strongly recommend the Environmental Protection Commission of the Low Catchment Basin of the Đồng Nai River become an independent organisation and it should be given full power to act as a co-ordinator that connects provinces and cities in the environmental protection.

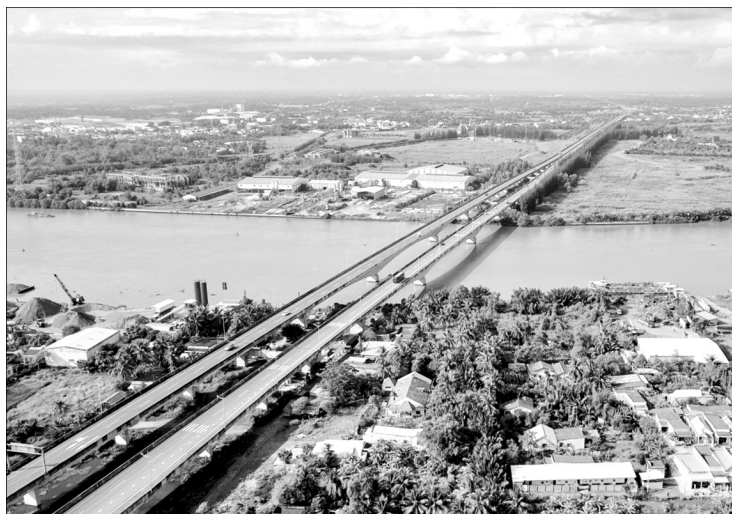
•VEM: What are the challenges the basin area is facing? What are the solutions for the challenges?

Mr. Trần Văn Cần: Because the low catchment basin of the Đồng Nai River stretches over 11 provinces and cities and each of the cities and provinces have their own socio-economic characteristics, so they have different roles in environmental protection and the challenges they face are also different. But in general, the following are major challenges for the basin:

First, environmental pollution caused by household waste, especially plastic waste.

Household waste, in addition to waste water, is the major source of pollution for the environment of the low catchment basin of the Đồng Nai River. Meanwhile, there are still limitations with waste collection and management such as lack of at-source waste classification and insufficient number of standardised plants and technologies to process waste.

We'd better address the needs of each province and City to develop processing



▲ Đồng Nai River, that run through Biên Hòa City

plants, set up the routes for waste collection, and raise people's awareness about at-source waste treatment and classification and less use of plastic products. In addition, we need more people to deal with collective waste sites and a guide on processing plants, technologies for solid waste must be developed.

Second, worse quality of water in the basin region.

The Ministry of Natural Resources and Environment and regional provinces and cities have monitored the quality of water in the low catchment basin of the Đồng Nai River since 2006. Data has shown the risk of pollution for the surface water of regional rivers is increasing because of the impact of the socio-economic development activities. The consequence is the surface water of the basin at the stretches, which run through industrial zones, processing areas, urban areas and economic zones, is heavily polluted.

We will have to make comprehensive review and evaluation of the main streams in the basin regarding their quality of water and the capacity of loading and absorbing waste water so that a socio-economic development plan for the whole region is designed. Private investors must be lured into the industry but their licences must meet requirements of environmental protection. Provinces and cities in the basin region need to issue a common regulation on the quality of waste water, install automatic monitoring stations to keep checking the quality of the surface water, and respond instantly to potential, and even unexpected, environmental issues.

Third, intense and immense negative impact of climate change.

Climate change is getting stronger and faster than expected; and if there is no appropriate solution, there will be great sufferings for us. Land salinisation, landslide and erosion are happening more often and worse in many local areas of the basin. This is one of the major challenges Viet Nam is facing, especially localities living at the end of the river. Therefore, to minimise the impact, we need to keep checking climate change and develop different scenarios for the whole region and all provinces and cities. In addition, provinces in the upper area of the river must protect the forest, accept investment projects with environmentally-friendly technologies and limit the use of fossil fuel.

•VEM Thank you!

PHẠM TUYỀN (Implemented)



Extended producer responsibility in solid waste management

On November 22nd, 2019, Ministry of Natural Resources and Environment (MONRE) organized the workshop on extended producer responsibility (ERP) in solid waste management in Hà Nội. The workshop on ERP in solid waste management provided a holistic view on creating a more comprehensive and effective ERP legal system in Việt Nam.

EPR is most defined as “an environmental policy approach in which a producer’s responsibility for a product is extended to the post-consumer stage of the product’s life cycle”. The application of EPR legislation not only shifts the financial burdens on public budgets and taxpayers to producers but also helps improve recycling and reduce landfilling. Therefore, EPR has been widely adopted in most OECD countries since the 1980s as one of the key policies to respond to the challenges of solid waste growing in both volume and complexity.

In Việt Nam, the EPR concept has been first introduced in the Law on Environmental Protection 2005, with several supplements and adjustments in 2015. That was followed by the Prime Minister’s directive on the collection and recycling of solid waste in 2013, then revised and supplemented in 2015. However, the current EPR schemes are only modestly effective due to the lack of comprehensive targets and application areas, effective financial tools, or detailed guidance in implementation. In this context, the need for a more comprehensive EPR system as part of the National Action Plan is a priority issue for Việt Nam.

Head of the Legal Affairs Department of the MONRE Phan Tuấn Hùng shared at the workshop: “Building a comprehensive EPR legislation is an integral part for the National Action Plan of Việt Nam in tackling solid waste, especially plastic waste. Hence, we give recognition and appreciation for open dialogues with multiple stakeholders in public policy development and consider this as data for improving the EPR legislation to assure comprehensiveness, shared financial responsibility and long-term financial sustainability. In my personal view, I believe that building and implementing an effective



▲ The workshop on extended producer responsibility in solid waste management

EPR system will be a critical factor in advancing the circular economy in Việt Nam”.

According to the proposal on EPR legislation enhancement to the MONRE, Packaging Recycling Organization Vietnam (PRO Vietnam) affirmed the important role of producers, brand owners, distributors, retailers, import-exporters in managing and recycling post-consumer packaging waste to minimize the impacts on the environment. In fact, it would be unrealistic to try and “copy-paste” an EPR approach from one country to another. Each country faces unique challenges and must develop its own approach to meet its specific environmental, social, and economic conditions.

At the workshop, Vice Chairman of PRO Vietnam Fausto Tazzi stated: “PRO Vietnam with the participation of 12 leading brand owners, packaging producers, and distributors have strong commitments to sustainable packaging. In general, an EPR system aimed at recycling post-consumer packaging waste is to enable the successful growth of recycling while maintaining a level playing field for all packaging materials. We treasure the opportunities for open discussions and opinion-sharing to support the development of EPR in waste management and packaging recycling growth for a greener Việt Nam”.

Discussed topics at the workshop include ERP models and their pros and cons in improving solid waste management, as well as successful EPR models in the world (Korea, Taiwan and South Africa), understanding the context of Việt Nam, and recommendations for EPR development in Việt Nam.

The workshop was organized under the framework of the MoU signed by the MONRE and PRO Vietnam in last September to promote activities in reducing, segregating, collecting, and recycling waste and fostering the development of the circular economy in Việt Nam. This workshop is one of the various programs organized by the MONRE to prepare the proposal to adjust and supplement the Law on Environmental Protection which is expected to be submitted by the Government to the 9th National Assembly in 2020■

ĐỨC ANH (MONRE source)



The efficiency of Cần Thơ waste-to-energy plant model

Currently, the management of domestic solid waste is a hot issue, which is paid special attention to by the public. The overloaded domestic landfills and outdated technology incinerators lead to high risk of environmental pollution and affect public health.

In this context, finding a solution for solid waste treatment is a challenge for many localities. Cần Thơ has solved this difficult problem since the waste-to-energy plant in Trường Xuân Commune (Thới Lai, Cần Thơ City) went into operation (December 2018). In order to learn about the Plant's waste treatment technology, as well as its development orientation in the near future, the Vietnam Environment Administration Magazine (VEM) had an interview with Mr. Shao Qi Chao - Chief Representative of China Everbright International Limited in Việt Nam (the project owner of the Cần Thơ waste-to-energy plant project) on this issue.



▲ Mr. Shao Qi Chao - Chief Representative of China Everbright International Limited in Việt Nam

•VEM: Could you please introduce briefly about the Plant, as well as the advantages of the waste-to-energy technology that the Plant is using compared to other technologies?

Mr. Shao Qi Chao: Cần Thơ Project is the first modern waste-to-energy project to be developed and operated by the China Everbright International Limited (China) in Việt Nam. The Plant has a treatment capacity of 400 tons of domestic waste/day and generates about 150.000 kWh of electricity (equivalent to 60 million kWh/year) into the national grid. The Plant applies the technology with flipped-type incinerators and 7,5 MW condensate steam turbine generators developed by the Company itself and SNCR emission treatment technology (NOx treatment technology after combustion by chemical reaction).

Based on some European standards, the Company has improved and perfected the Plant's incineration technology, helping to reduce more than 90% of waste volume and 80% of waste amount, without the need for additional fuel. The Plant's emission treatment system is installed in a synchronous manner, meeting the European Standard

BU2000 and the Vietnam Regulation No. 61 - MT:2016/BT-NMT, the National Technical Regulation on biological solid waste incinerator, the main technology of emission treatment system is: The SNCR nitrogen removal equipment (selective non-catalytic reduction) shall conduct dry and semi-dry treatment and use activated carbon to remove heavy metals and dioxins. Simultaneously, the Company also installs dust filter bags and dioxin treatment in the 3T + E method to control temperature, time and excess air, in which the furnace temperature is maintained above 950°C. The emission treatment system is fully automated, the emission indices all meet the environmental standards. For leachate, the Plant uses A/O + UF + Chemistry Softener + MicroFilter + Reverse Osmosis technology, after the treatment, and it is reused through the circulating system in the Plant. Through the above treatment process, all the indicators meet the environmental standards of Việt Nam.

Compared to landfilling or composting, waste-to-energy technology is the preferred method of waste treatment, helping to treat a large amount of waste, saving land area and avoiding negative impact on the environment. Prior to investing in the Plant in Việt Nam, the Company had studied Việt Nam's environmental issues and decided to select the waste-to-energy technology. In addition, the features of domestic waste of the two countries are similar in low calorific value, high water level, high ash and impurities content. Therefore, the Company has invested in a waste-to-energy plant in Cần Thơ, helping the locality solve the problems of domestic waste and protect



people's health. The waste generated during incineration will turn into a source of electricity to serve the daily life of people.

•VEM: Could you tell us the commissioning operation results of the plant in the past time?

Mr. Shao Qi Chao: The Cần Thơ waste-to-energy plant is a project in which Cần Thơ City uses international bidding to select the investor to be the China Everbright International Limited. On June 30th, 2017, the project began construction and the operation license was granted on November 26th, 2018. By the end of July 2019, more than 120.000 tons of domestic waste were treated (about more than 60% of the City's waste). Since the Plant was put into operation so far, the operation has been guaranteed continuously and stably. Up to now, all the indicators on emissions and wastewater have met environmental standards and regulations. Outside the Plant's gate, LED screens are installed, showing the parameters of the Plant and clear operating time for local environmental managers and communities to know. Emission indicators are stored in the computer system of the Plant to provide all data when a competent authority requires to check. During the commissioning period, the Plant used an independent third party to check and monitor the indicators to ensure 100% of the indicators meeting the requirements. At the same time, the Plant also regularly welcomes the management agencies, enterprises and people to visit, which shows the objectivity and transparency of the plant's operation information. Starting from April 2019, on the first Friday of each month, the Plant is open for everyone to visit. Up to now, there has been more than 2,000 people to visit the plant and give a lot of compliments on the Green - Clean - Beautiful grounds and the system of modern and advanced machinery and equipment of the Plant.

•VEM: How is slag and fly ash treated by the Plant?

Mr. Shao Qi Chao: After the treatment by waste-to-energy technology, the rate of furnace slag accounts for about 16% of the waste amount put into the furnace (about 480 tons of waste/day). The furnace slag is treated by sorting, screening, grinding and then collected to produce bricks or road construction materials and sold to units in need of leveling. The Plant has been licensed by the authorities to produce construction



▲ Leaders of Cần Thơ City visit the Plant's operating area

materials from slag in accordance with the law. In addition, the fly ash content of the Plant is currently about 3%, which is stabilized, collected and then covered with tarpaulins and temporarily stored in the warehouse area of the Plant. After that, it will be taken to the designated area by the local Government. Cần Thơ City is currently constructing a fly ash landfilling and treatment area for the Plant to treat fly ash as prescribed.

•VEM: In your opinion, what are the biggest difficulties for the investors of the waste-to-energy plant projects? What suggestions do you have for making this technology widely available in Việt Nam?

Mr. Shao Qi Chao: In order to invest in a waste-to-energy plant in Việt Nam, investors must spend a lot of time applying for approval of the Project with a lot of procedures, making it difficult for investors to fulfill their schedule commitments with the local authorities. Currently, the China Everbright International Limited is investing in a number of waste-to-energy plant projects in some localities and conducting technology transfer for some Vietnamese enterprises. However, the policies of each locality are different, making it difficult for enterprises in the process of applying for project investment.

In order to meet the development of the waste-to-energy sector in Việt Nam, the Plant would like to propose some solutions: Unifying and perfecting various standards on construction and operation of waste-to-energy plants; There should be a unified national regulation on procedures for investment in waste-to-energy plants to avoid each locality requiring a different regulation; For small provinces and cities with low population, the relevant agencies should coordinate to construct waste-to-energy projects in some neighboring provinces to ensure the project feasibility and the economic scale to attract investors.

The company expects that the Cần Thơ waste-to-energy plant will be a model for the management agencies and the local authorities to refer to, thereby replicating to other localities in Việt Nam.

•VEM: Thank you very much!

HƯƠNG TRẦN (Implemented)

Phú Quốc – The first city of Việt Nam commits to become a city against plastic waste

PHÚ HÀ
WWF Việt Nam



▲ Delegates participated in the signing of Declaration of Intent into WWF's Plastic Smart Cities program on behalf of their cities at Responsible Business Forum Singapore 2019

WWF is calling on cities in South East Asia to join Patong (Thailand), Donsol (Philippines) and Phú Quốc (Việt Nam) in making a commitment to eliminate plastic pollution, by developing an action plan and trial innovative solutions. Plastic Smart Cities is a WWF initiative bringing together cities and tourism destinations to commit to fight plastic pollution. In just the last 12 months WWF has fundraised 40 million USD to work on circular economy projects in cities in Thailand, Việt Nam, Indonesia and Philippines.

WWF'S PLASTIC SMART CITIES PROGRAM

An estimated 60% of plastic marine debris derives from urban centers, often carried to the ocean by rivers. While cities will rapidly increase their populace to account for two-thirds of the global population by 2050, they must urgently adopt smart solutions that reduce the collective impact of their prospering communities. This means preventing, minimizing and managing plastic. Many good examples and initiatives are already underway; WWF seeks to accelerate these existing efforts by empowering cities around the world to become Plastic Smart.

At Responsible Business Forum Singapore 2019, Chairman of the People's commit-

tee of Phú Quốc District (Việt Nam) Mai Văn Huỳnh, Advisor to Mayor of Patong Municipality (Thailand) Kumnung Sing-Eaim and Mayor of Donsol (Philippines) Hon. Josephine Alcantara joins have signed Declaration of Intent into WWF's Plastic Smart Cities program on behalf of their cities.

Through Plastic Smart Cities, WWF is building cities' capacity to eliminate plastic pollution by 2030. An online knowledge platform with best practices will be launched at the World Urban Forum in February 2020. In the meantime, WWF is calling on Asian cities to sign-up and to start sharing best practices through www.plasticsmartcities.org. This is the beginning of a long-term campaign to reduce plastic globally through sharing innovative, tried and tested solutions for those on the front line in the fight against plastic pollution. Mayors also call on Governments to introduce a global legally-binding agreement to stop plastics polluting our oceans.

Mr. Vincent Kneefel, Global Cities Lead, WWF: "With eight million metric tons of plastic entering our oceans each year, mismanaged plastic waste is profoundly threatening people and the environment, especially rivers and oceans. We are proud to launch Plastic Smart Cities today and are confident that through this initiative we can create a global movement of cities taking action to tackle plastic pollution and stop leakage into nature. Plastic Smart Cities will strengthen action when it comes to preventing, measuring and managing plastic waste at a local level. Our goal is to promote best practices around the world and to make sure that smart measures on plastic reduction and waste management are widely shared. With strong commitments from cities, Governments and industry, we can end additional plastics in nature and ensure the safety of our communities and the environment".



Key stats on plastic pollution:

- Eight million tonnes of plastic pollution ends up in the ocean every year.
- Overall CO₂ emissions from the plastic life cycle are expected to increase by 50%, while the CO₂ increase from plastic incineration is set to triple by 2030, due to wrong waste management choices.
- An additional 104 million metric tons of plastic is at risk of leakage into our ecosystems by 2030 without a drastic change in approach.
- Since 2000, the world has produced as much plastic as all the preceding years combined, a third of which is leaked into nature.
- More than 270 wildlife species have been documented as having been harmed by entanglement, while more than 240 species have been found to have ingested plastics.

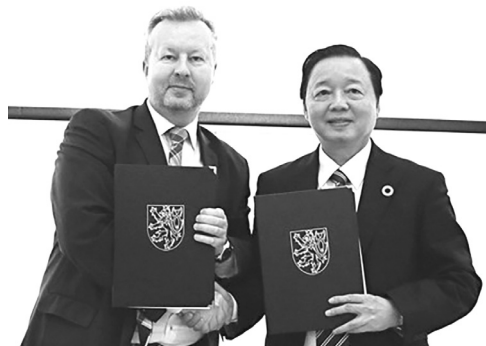
PHÚ QUỐC ISLAND'S EFFORTS IN PLASTIC WASTE REDUCTION

For the last one year or so, WWF - along with the Phú Quốc District authority, businesses, schools and individuals - has made continuous efforts to reduce plastic waste on the island. Some remarkable results include the followings.

In June 2019, Phú Quốc District People's Committee issued a decision that orders all District offices not to use single-use plastic drinking water bottles and alternatively to use multiple-use water bottles and cups. Since July 2019, Phú Quốc has made the first Saturday of every month to be the "Environment Day". On this day, the authority and people participate in cleaning up the surroundings of the island; Thousands of people have participated and hundreds of tons of improperly-disposed waste have been collected. All schools in Phú Quốc have responded to the awareness-raising campaigns on the impact of plastic waste on the environment and many initiatives and specific actions have been implemented by teachers and students to reduce plastic waste in schools and to spread the message of reducing plastic waste to the community.

Currently, there are 19 resorts and hotels that have officially committed to reducing plastic waste with specific plans; 16 restaurants have committed not to serve customers with single-use plastic items. WWF and the island district have jointly developed an action plan for plastic waste management in Phú Quốc by 2025.

Việt Nam, Czech Republic step up environmental cooperation



▲ Minister of Natural Resources and Environment Trần Hồng Hà (right) and Minister of the Environment of the Czech Republic Richard Brabec (left) signed an action plan for cooperation during 2020 - 2025

On December 13th, 2019, in Prague (the Czech Republic), Minister of Natural Resources and Environment Trần Hồng Hà and Minister of the Environment of the Czech Republic Richard Brabec signed an action plan for cooperation during 2020 - 2025.

At the event, the two Ministers spoke highly of the unceasingly consolidated traditional friendship between the two nations, describing it as a foundation for the Ministries and sectors of both sides to boost all-round cooperation in this field. Minister Trần Hồng Hà highlighted that the signing of the action plan, implementation of the Memorandum of Understanding signed between the two Ministries in 2012 and the Việt Nam - Czech Environmental Business Forum will serve as a base for competent authorities of both sides to concretise cooperative activities in environment, climate change and technology transfer.

He particularly laid stress on the Business Forum, saying it was included in the action plan to enhance cooperation and share investment opportunities between the two nations. Minister Trần Hồng Hà hoped that both sides will work together in waste and sewage treatment technologies, waste-to-energy technologies, as well as environmental monitoring capacity improvement. As the free trade agreement between Việt Nam and the EU was signed, it is necessary for Việt Nam to learn experience from the Czech Republic in completing legal mechanisms and policies in tandem with the EU standards, he added.

Minister of the Environment of the Czech Republic Richard Brabec, for his part, said both nations hold huge potential to branch out collaboration in renewable energy, while hailing the signing of the action plan, saying it will create conditions for Czech businesses to land investment in the Southeast Asian country in the environmental field. Meanwhile, Mr. Richard Brabec said that Czech Republic had to face environmental problems during its economic development in the past three decades like Việt Nam.

It's time for Việt Nam to move to use renewable energy and the Czech Republic stands ready to share experience with the Southeast Asian nation in the management of environmental protection, including building legal framework, he underlined.

HOÀNG ĐÀN (Nhandan source)

International support for the implementation of green credit in Việt Nam



Green credit is considered as a potential area, which is being promoted by banks, especially in the context of climate change and environmental pollution being a global problem.

PRIORITY, BUT NOT YET DEVELOPED

Currently, the trend of investment, business and consumption of green products by individuals and businesses is encouraged by the Government. For the banking sector, green credit is also being deployed by banks, in which priority areas are high-tech agriculture, solar energy, environmentally friendly projects ... This is also an area that plays an important role in promoting sustainable development and realizing Vietnam's green growth strategy.

Since 2015, one of the policies of the banking sector in credit activities is to pay attention to environmental protection, improve the efficiency of using resources and energy; improve environmental quality and protect human health, ensure sustainable development. In 2018, the State Bank approved the scheme for developing green banks in Việt Nam. However, the number of banks that have established a credit appraisal process for green projects is limited.

Statistics of the State Bank show that only about 24% of green projects have been developed by banks for credit appraisal process, which is mainly carried out at a number of head offices and branches of banks such as Sacombank,

BIDV, VietinBank, Vietcombank, Agribank, SHB, ACB, Việt Á Bank, OCB, Kiên Long Bank, PVCombank, HSBC...

In addition, 26% of banks have developed and implemented an environmental and social risk management process in credit provision, including banks licensed to operate in the form of 100% foreign owned banks such as HSBC, Standard Chartered...

APPLICATION OF INTERNATIONAL EXPERIENCE

To improve this situation, international organizations are always eager to support partners in Việt Nam in terms of financial investment and professional experience. The Global Climate Partnership Fund (GCPF) is one of the pioneers in mobilizing investment capital to reduce CO₂ emissions into the environment, with a strong global capacity profile and experience in supporting the Fund's partners.

GCPF has now invested in two financial institutions: Nam Á Bank and TPBank. Through this cooperation, Nam Á Bank and TP Bank Support Fund builds an environmental and social risk management system (environmental and social - E&S) according to international standards. Nam Á Bank is currently organizing intensive training and consultancy from GCPF experts in the implementation of the green credit portfolio. In the first phase, Nam Á Bank focuses on loans in the energy-saving appliances, auto irrigation systems, trucks, environmentally friendly building materials and attic solar panels. In subsequent stages, Nam Á Bank will expand its coverage to other sectors with the potential to reduce CO₂ emissions.

LEED is a green building certificate issued by the Green Building Council, established in 2000 in the United States. This is the pioneering international standard in the construction of energy-saving and environmental protection facilities for people. TP Bank, the latest partner of GCPF in Việt Nam, has developed a green credit portfolio for renewable energy projects and in cooperation with the GCPF to launch new products in both areas of energy saving and renewable energy.

NAM VIỆT



Developing renewable energy in Việt Nam: Through the lens of equality and sustainability

While Việt Nam is facing many challenges in producing electricity, renewable energy is emerging as the tipping point for advancing development that is inclusive and sustainable in the country.

VIỆT NAM SET THE TARGET OF AN 8 PERCENT REDUCTION IN CO₂ EMISSIONS

As climate change is progressing at an even greater pace than expected by various climate modelling scenarios, the Inter-governmental Panel on Climate Change (IPCC) is urging countries to take robust action to cut down greenhouse gas (GHG) emissions to limit the average global temperature increase to no more than 1,5 degrees Celsius by 2030. The 25th session of the Conference of the Parties (COP 25) to the United Nations Framework Convention on Climate Change (UNFCCC) in December 2019 calls for action and champions to demand more ambition from nations to fight the climate crisis. This is also an invitation to elevate care for the environment into a national theme where all have a role to play. Việt Nam’s high-level delegation is going to join the COP 25 with strong commitments in climate change adaptation and mitigation.

In its Nationally Determined Contributions (NDC), Việt Nam set the target of an 8 percent reduction in CO₂ emissions, through measures such as land-use change, forest management and reforestation, low-carbon rice farming practices and renewable energy development.

It is expected that by 2030, 47,3 billion kilowatt-hours of electricity in the country will come from wind and solar energy. Under the revised Power Development Plan 7 (PDP 7) of state-run Electricity of Việt Nam

(EVN), renewable energy will account for a modest 10,7 percent of the national electricity output in 2030 (Figure 1). In 2019, the development of renewable energy in Việt Nam has made significant progress (Figure 2). Notably, with a record level of solar power facilities put into operation, Việt Nam has become a very active and attractive renewable energy market in Southeast Asia.

This, on one hand, contributes to the reduction of GHG emissions that Việt Nam has committed in the NDC. However, this incredible development is also posing new challenges for the steady development of the national grid, as well as land use, electricity pricing, human and financial resources and especially for equitable and sustainable development, that is, to ensure that no one is left behind because of losing their livelihoods, jobs, or agricultural land in the process.

Oxfam in Việt Nam recommends three sets of solutions to work towards the development of an inclusive and sustainable renewable energy industry in Việt Nam.

SUSTAINABLE LIVELIHOOD AND EQUALITY FOR ALL STAKEHOLDERS

The development of renewable energy, especially wind and solar energy, requires vast areas of land to be repurposed. People can lose their agricultural land if it is acquired and handed over to enterprises to develop renewable energy projects.

Currently, there are no specific regulations to provide an explicit rate for land compensation or land price to pay landholders. The process of converting agricultural, forest and aquaculture land into land for renewable energy generation does not engage people who are directly affected but are only subjects to the agreement between provincial Governments and investors.

The lack of engagement of local communities and civil society organizations undermines the rights of local people to voice their concerns. Consequently, affected landholders are put in a disadvantaged position, receiving low land compensation rates while losing their vital production resources.

Currently, there are many different models for electricity sector stakeholders to join hands to reduce GHG emissions, including the conversion of low-productivity lands for renewable energy development, purchase of production land from local people, land leasing and the use of land as shares. Among these models, using land as shares is the most sustainable mechanism.

FIGURE 1: THE STRUCTURE OF POWER SOURCES IN TOTAL INSTALLED CAPACITY BASED ON REVISED PDP 7							
POWER SOURCES	2015	2020		2025		2030	
	IE (%)	PDP 7 (%)	PDP 7 rev (%)	PDP 7 (%)	PDP 7 rev (%)	PDP 7 (%)	PDP 7 rev (%)
Renewable Energy	5.37	5.6	9.9	---	12.5	9.4	21
Coal	33.45	48	42.7	---	49.3	51.6	42.6
Gas turbin	22.45	16.5	14.9	---	15.6	11.8	14.7
Hydro	37.31	25.5	30.1	---	21.1	15.7	16.9
Import	1.42	3.1	2.4	---	1.5	4.9	1.2
Nuclear	---	1.3	---	---	---	6.6	3.6



People with land can become shareholders in renewable energy projects by contributing their plots of land, therefore, enterprises do not have to incur enormous amount of capital upfronts for land compensation and people can participate in the protection and development of renewable energy areas, which would also mean protecting their own productive assets.

This way, people can earn dividends from electricity projects, and at the same time have a source of monthly income based on their own land and do not have to forgo the land permanently. This model requires a process of testing, cost-benefit analysis, repurposing of land use and provision of guidelines for provincial Governments to work with investors. Most of all, this shareholder model requires a participatory process that includes landholders throughout the process of developing renewable energy projects.

GREEN FINANCE FOR RENEWABLE ENERGY DEVELOPMENT

According to the Ministry of Planning and Investment, from now until 2030, Việt Nam needs about \$30 billion for renewable energy development. The current green finance mechanism is a good way to attract the participation of the private sector. However, no green finance model is in place to facilitate climate change mitigation.

In Việt Nam, there is currently no existing green financing mechanism for climate change mitigation. Commercial banks are willing to provide loans to enterprises and households to develop renewable energy.

However, the lending interest rate of these loans is now 12 percent, which is higher than the commercial lending rate. This is not fair because enterprises and people applying new technology to reduce GHG emissions and protect the environment should enjoy a lower rate of interest than commercial loans.

Việt Nam is part of the Climate Vulnerable Forum (CVF), which is the group of the world's most disaster-prone, climate-vulnerable countries. There are 10 Asian members: Afghanistan, Bangladesh, Bhutan, Cambodia, Mongolia, Nepal, the Philippines, Sri Lanka, Timor-Leste, Việt Nam. With their people experiencing some of the worst impacts of climate change - from super cyclones to extreme flooding, displaced communities, and disappearing arable land - CVF Governments and their citizens know that inaction is no longer an option.

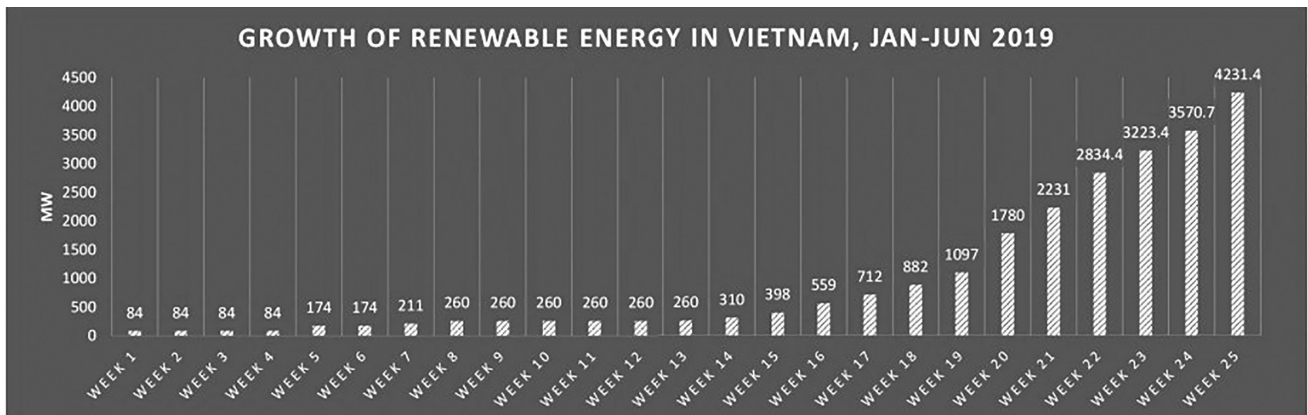
In 2015, CVF member states created the Vulnerable 20 (V20) Group of Finance Ministers, to bring together the finance ministers of all CVF countries (which now number more than 20). The V20 is focused specifically on mobilizing financial resources for climate action. It has called on international financial institutions to align their operations with the Paris Agreement, the 1,5 degrees Celsius limit and with their member economies' 100 percent renewable energy vision in support of sustainable development.

Việt Nam needs to adjust the renewable energy targets in the revised PDP 7 and its Strategy of Renewable Energy Development to be consistent with the CVF vision of 100 per cent renewable energy by 2050. It should also avoid borrowing for new coal plants or lifetime extensions for existing plants. Most importantly, although the development of renewable energy to replace coal and fuel energy is essential, the development process requires consideration of sustainable livelihood solutions for the local communities and an approach for mutual benefits between investors and local people■

HỒNG NHUNG (VietNamNet Source)



▲ Việt Nam strives to reduce greenhouse gas emissions





HEINEKEN Vietnam continues to be one of the most sustainable companies in Việt Nam



▲ HEINEKEN Vietnam was selected amongst the most Sustainable Companies in Việt Nam 2019

HEINEKEN Vietnam was selected amongst the top 3 most Sustainable Companies in Việt Nam 2019 (in manufacturing sector). The event was organized on November 26th, 2019 by Vietnam Chamber of Commerce and Industry (VCCI) in cooperation with the Vietnam Business Council for Sustainable Development (VBCSD) in Hà Nội City. This is the fourth consecutive year HEINEKEN Vietnam has received this honorable recognition for its continuous efforts in sustainability and positive impact that the Company has created for the socio-economic development of Việt Nam.

According to Secretary General of VCCI and Vice Chairman cum Secretary General of VBCSD Quang Vinh: “HEINEKEN Vietnam is a leading business in sustainability. Their successful story of sustainable development is an inspiring example for business community and private sector. We highly appreciate the contribution of pioneering companies like HEINEKEN Vietnam and their active sharing of the best practices that support us to achieve the 2030 agenda of sustainable development in Việt Nam”.

Managing Director of HEINEKEN Vietnam Jacco Van der Linden said: “Once

again, being ranked in the top three of the most sustainable companies in Việt Nam for the fourth consecutive year is an honor for everyone at HEINEKEN Vietnam. Sustainability has always been at the core of our business. This award is an added encouragement and a challenge for us to improve further because sustainability is a long-term journey that requires the cooperation of all stakeholders, including the business community”.

Both HEINEKEN’s global and local/Vietnamese approach to sustainability covers its entire value chain from manufacturing to distribution to consumption. HEINEKEN Vietnam’s sustainability strategy focuses on six key areas and supports the implementation of 6 out of 17 SDGs, where the Company believes it can have the greatest impact in Việt Nam: Advocating Responsible Consumption, Promoting Health and Safety, Protecting Water Resources, Reducing CO₂ Emissions, Growing with Communities and Sourcing Sustainably.

To ensure that its sustainability initiatives can create tangible value for people, planet and prosperity in Việt Nam, the Company proactively builds a sustainability culture for all employees to think and act more sustainably. This includes: Building a simple decision-making framework, which includes sustainability as a core component, to guide all decision making at HEINEKEN Vietnam; constantly communicating and interacting with its employees to inspire and help them better understand the impact of their daily activities; promoting and sharing sustainability practices with business partners and stakeholders to raise awareness and encourage participation. This is done through workshops



and regular communication activities.

Some notable initiatives and innovations that HEINEKEN Vietnam has implemented on its sustainability journey are: Implementing Circular Economy: the Tiger Cap Recycling program is an exciting project that is a three-pronged strategy to encourage recycling; reduce waste and to provide vital infrastructure for the community. Started in 2018, this project has already resulted in two bridges being built from recycled bottle caps in Tiền Giang and An Giang Province this year. A third bridge is underway and will be completed in early 2020 in Hồ Chí Minh City. This is a clear example of how circular economy can create value for society, protect the environment, and support business growth. HEINEKEN Vietnam has proactively worked with both the Vietnamese Government and VBCSD to encourage sustainable development amongst businesses by sharing its best practices of circular economy at various training sessions and workshops with other local businesses throughout the year. Protecting the Planet: HEINEKEN Vietnam uses renewable energy, has reduced its water consumption and sends virtually zero waste to landfill in production with 99% of its waste and by-products from production being reused or recycled. Prosperity in Việt Nam: In terms of economic impact, HEINEKEN Vietnam has directly and indirectly created 166.000 jobs and contributed nearly 1% of Vietnam's total GDP in 2018■

PHẠM ĐÌNH

Established in New York, the USA since 1895, the Wildlife Conservation Society (WCS) saves wildlife and wild places worldwide through science, conservation action, education, and inspiring people to value nature. WCS has made a positive contribution to wildlife conservation all over the world in general and in Việt Nam in particular. Vietnam Environment Administration Magazine had an interview with Ms. Trần Thị Thanh Hương - Grant Manager of WCS Vietnam to learn more about their work in the country.

•VEM: *Could you introduce about WCS and the mission of your organization?*

Ms. Trần Thị Thanh Hương: WCS has nearly 60 country offices worldwide. We started our work in Việt Nam in 2006 and have been working with Government, national and international civil society organizations, media and community to strengthen the commitment of the Government of Việt Nam, promote multinational and multi-discipline collaboration among law enforcement agencies and relevant Governments in the fight against illegal wildlife trade. One of our priorities is to support Law enforcement agencies to arrest, convict and sentence wildlife criminals along the trade chains.

•VEM: *Could you share some key activities WCS have implemented to fight against illegal wildlife trade?*

Ms. Trần Thị Thanh Hương: We have learned from our experience that cooperation between government, civil society organization and local communities play a vital role in improving the legal framework and strengthening Law enforcement in reality. WCS Vietnam has been working the National Assembly, the Ministry of Justice and the Ministry of Agriculture and Rural Development (MARD) to review and provide recommendations to improve more than 10 legislations related to wildlife conservation. As a result, the legal framework of Việt Nam for wildlife management and protection has been revamped with the introduction of Resolution No. 05/2018/ NQ-HDTP on guiding principles to apply Article 234 and Article 244 in the Penal Code 2015 (amended in 2017), Decree No. 06/2019/ND-CP on the management of endangered, precious and rare wild fauna and flora, the implementation of the Convention on International Trade in Endangered species of Wild Fauna and Flora and Decree No. 35/2019/ND-CP on Administrative Penalties in Respect of Forest Control, Forest Development, Forest Protection and Forest Product Management.

WCS Việt Nam has also cooperated with the Department of Environmental Police, Ministry of Public Security; CITES Management Authority; Forest Protection Department, MARD; Supreme People's Procuracy and Supreme People's Court to organize information-sharing workshops and trainings for relevant agencies of Việt Nam and our partners in other Asian and African countries such as China, Cambodia, Laos, Indonesia and Mozambique, South Africa, Kenya, Tanzania. From 2010 to 2019, WCS coordinated 32 training for 1.837 trainees.

In addition, WCS has helped enhance the international cooperation through the organization of working visits and facilitation of the signing of Memorandum of Understanding (MoU) between the Governments of Việt Nam and other countries that are related to illegal wildlife trade chain. Notably, on December 3rd, 2018, a Mutual Legal Assistance Treaty (MLAT) on criminal matters was officially signed by Supreme People's Procuracy (SPP) of Việt Nam and Minister of Justice, Constitutional and Religious Affairs of Mozambique in Maputo, Mozambique, significantly contributing to strengthening bilateral cooperation to combat transnational crimes, including wildlife trafficking crimes, between the two countries. We take this signing of such an important document as a remark milestone for our on-going



Strengthening the wildlife conservation in Việt Nam



▲ Ms Trần Thị Thanh Hương
– WCS Project Manager

efforts to strengthen international collaboration as a strategic approach to fight illegal wildlife trade.

Since 2010, WCS Vietnam has joined efforts to detect viruses that may lead to pandemics, especially those that can be transmitted between animals and humans. In our wildlife health project, we have implemented activities in five provinces and cities, including Hà Nội, Đồng Nai, Đồng Tháp, Bắc Giang and Quảng Ninh. In the 2014 - 2019 period, a total of 15.767 samples from 4.712 individuals were collected. We carry out quantitative and qualitative research via 40 ethnographic interviews and 4 focus group discussions to identify risk factors for viral transmission and obtain descriptive accounts of human behaviours and perceptions to support the development of effective public health interventions.

In 2015, WCS Vietnam started its participation in the conservation of the Rafetus swinhoei the historic legend of Hanoi and has now become a critically endangered species with only three known individuals worldwide. To find more individuals of Hoàn Kiếm Turtle in the wild, WCS has conducted multiple surveys in many natural lakes of Việt Nam and recently developed a real-time and on-site environmental DNA test kit of Rafetus swinhoei, bringing new hope for finding and restoring the population of this species. WCS is currently working with Hà Nội Department of Fisheries and the Indo-Myanmar Conservation to implement the Hoàn Kiếm Turtle Con-

servation Plan of Hanoi People's Committee for the period of 2018 -2020, with a vision to 2030.

•VEM: In July 2019, WCS has officially launched the project “Partners against wildlife crime” funded by the European Union, could you introduce about project objectives and activities?

Ms. Trần Thị Thanh Hương: The project “Partners against wildlife crime” funded by the European Union will be implemented in seven countries (Cambodia, China, Malaysia, Myanmar, Laos, Thailand, Việt Nam), for four years (2019-2022). The project objectives are to enhance protection in key source sites for tigers, Asian elephants, freshwater turtles, and rosewood in Cambodia, Malaysia, Myanmar and Thailand; increase the effectiveness of law enforcement and justice sector to combat wildlife trafficking; increase trans-boundary coordination to combat wildlife trafficking; reduce preference for illegally sourced products from our target species.

In Việt Nam, WCS will cooperate with PanNature, a local NGO, to implement a number of activities to increase quality and quantity of intelligence on wildlife trafficking; building capacity of local and regional journalists and NGOs in Việt Nam in gathering information on the trafficking of our target species. These can be done through training and technical workshops, development of environmental journalism network and the establishment of cross-border journalist network. Besides, WCS will also build a partnership with Government agencies to provide on-the-job, real-time technical and strategic support in law enforcement and judicial process. In addition, we will organise high-level political dialogues between Việt Nam and Laos to discuss policy cooperation and coordination, as well as potential bilateral agreements/MOUs to show commitment at Government level that will ultimately direct the actual implementation of cooperation on the ground.

•VEM: What are the expected results of the project and could you describe some activities project that will take place in the near future?

Ms. Trần Thị Thanh Hương: Through this project, we expect to gather useful information and share it with relevant government agencies of Việt Nam and other related countries in a timely manner so that they can verify and handle cases effectively; we will also implement capacity building and cooperation strengthening between Việt Nam and Laos. WCS and PanNature will work closely with environmental journalist network in Việt Nam and the region to gather information and deliver consistent messages to the target audiences. In the other six countries, WCS will implement a series of field conservation activities on tigers, Asian elephants, freshwater turtles, and rosewood in their habitat simultaneously. We will also support cooperation among all related Government agencies, promote communication campaign to reduce wildlife product demand■

NGUYỄN HẰNG (Implemented)



Kenyan universities aim to be “greenest in the world”

In Kenya, over 70 universities are being called on by the UN Environment Program and the Kenyan Government to work together and transform their campuses to be the “greenest in the world”. This comes as Strathmore University in Nairobi has put in place one of the greenest campuses in Africa and is offering its support to other Kenyan universities.

“Universities across Africa can run on the power of the sun and set new standards for sustainability. But it’s just not on the roofs of our campuses that we need to act. We also need to support students to act in support of the planet in their personal lives”, said Professor da Silva of Strathmore University.

Strathmore University set up its own 600-kilowatt photovoltaic grid tie system about five years ago and is not only enjoying free energy from the sun but also selling the excess to Kenya Power under a 20-year contract. Another initiative on campus involves “green buildings” which utilize natural lighting, water evaporation cooling systems and rainwater, making them much more affordable to run than conventional buildings. Students and faculty members are also working together on projects around plastic recycling and using food leftovers to produce natural gas. Support is now growing to re-establish the Kenya Green University Network in the country with network members including 18 Universities, such as Karatina University, University of Nairobi and Kenyatta University. At a recent meeting, they committed to a new plan of action including greening campus operations while also enhancing student engagement and learning.

Apart from the desire to go green, many universities are seeing the shift to



▲ *Karatina University (Kenya)*

adopting green technologies as a way to reduce costs and further sustainability. Strathmore University and Karatina University were selected to lead the effort to commit universities to going green. Working closely with the Ministry of Environment and the National Environment Management Authority, UN Environment will be hosting a Kenya University Summit in the coming months, calling on other Kenyan universities to join the network.

“Kenyan universities not only define the learning and careers of the next generation, they can also shape their behaviors”, says Africa Director for UN Environment Juliette Biao. “We look forward to supporting the Green University Network to inspire Kenya’s students and to become a point of reference to other universities on the continent”.

Professor Aloo-Obudho from Karatina University says: “The Kenya Green University Network meeting was timely and has helped me establish relevant contacts to support Karatina University’s solar energy project. Karatina University is at a very advanced stage to implement this project and intends to go 100 percent solar in the near future”. The Green University Network in Kenya draws on the African Ministerial Conference on the Environment’s Arusha Declaration “to strengthen environmental education and training and develop an action plan for Africa” and the lessons from Kenya will be shared at a ministerial meeting in South Africa in August.

“I’m particularly happy about the proposed green campuses plan and incorporation of environmental studies into the curriculum. This will help students gain the awareness, knowledge and skills needed to impact the environment, thus fast-tracking the movement to a greener and cleaner Kenya”, says Daystar University’s student Chris Waweru■

GIANG HƯƠNG (UNEP source)



Bãi Xép - the "hidden gem" of Asia

There are various reasons why Bãi Xép (Area 1, Ghềnh Ráng Ward, An Chấn Commune, Tuy An District, Quy Nhơn City, Bình Định Province) is considered as one of the 16 "hidden gems" of Asia by Business Insider. The traditional small fishing village nestled on the mountain, by the sea, with the ocean waves all day and night. The special thing about Bãi Xép is the two black stone cliffs covering the two ends of the beach with unique shapes, adding some sharpness to the softness of the ocean. Along with the green grass and giant cactus dusts, the stunning scenery is a pure picture of wild nature.

For the perfect view of Bãi Xép, tourists need to walk 20 minutes to Gành Ông. You can see a breathtaking beach and a seashore where thousands of dark stones create a song together with the ocean waves.

At Bãi Xép, people prefer taking the romantic pictures and relaxing in peace here by walking or swimming. This is also considered as the ideal teambuilding place for groups of friends, family, company. The dark stones on the right looks like a flat hill, which

is suitable for watching sunrise or sunset. Visitors can also choose Sao Viet resort (6km away from the beach) for free trams to Bãi Xép every day.

There are some homestay/guesthouses near Bãi Xép such as: Haven, Big Tree, Love's a Beach..., accommodates over 100 guests, with a small number of luxurious rooms ranging from 700.000 to 1.000.000VND/day. Dorm is also a good choice with 180.000 VND/person/day; catering, drinks, motorbike rental are always available...

Travelling to Bãi Xép, visitors cannot miss to discover the special cuisine of Phú Yên including squid hotpot, oyster soup, grilled oysters, ocean tuna, tuna stomach salad, stewed tuna's eyes with Chinese herbs, fresh tuna rolls with mustard, fish curry... There are many other interesting places that visitors can visit on the way to Bãi Xép such as Long Thủy beach, Yến island, Pagoda island, Ô Loan lagoon, Đá Đĩa reef... At each destination, you will be amazed at its beauty and diversity. Therefore, Phú Yên never fails to impress thousands of tourists every year.

The road to Bãi Xép is quite easy to follow: From Tuy An District, visitors follow National Highway No.1 for about 17 km to the South. If traveling from Tuy Hòa City, visitors should follow Highway No. 1 for about 12 km to the North. When arriving at the Sao Việt junction, go through the fishing villages and the fields and you will be at Bãi Xép at the end of the road■

HIỂN NHÂM



▲ View of Bãi Xép (Quy Nhơn City, Bình Định Province) from above



Exploring the paradise islands in Việt Nam

Việt Nam has thousands of large and small islands, and many beaches have been ranked on the Top beautiful beaches in the world by many international tourism magazines. Here is the list of "paradise" islands we must visit when in Việt Nam.

VÂN ĐỒN - CÔ TÔ WITH BEAUTIFUL ISLANDS

Located in the East and Northeast of Quảng Ninh Province, Vân Đồn - Cô Tô area owns beautiful islands and natural beaches including Quan Lạn - Minh Châu island, Ngọc Vừng island, Cô Tô island...

In addition to the World Natural Heritage - Hạ Long bay, visitors can spend one to two days to visit and explore Cô Tô island with Vân Cháy harbor, Hồng Vân, Bắc Vân, Cầu Mỵ or Cô Tô lighthouse ...

Quan Lạn island has nearly 10 large and small beaches, including 4 largest wonderful beaches named Sơn Hào, Quan Lạn, Minh Châu and Cồn Khởi. Located near Sơn Hào beach, there is a round rocky beach called "Heaven Rock". The beaches on Quan Lạn island are also attractive to visitors with teambuilding activities or dinner galas, dinner parties in summer. Besides swimming, visitors can conquer the ocean waves by rubber boat which is really exciting.



▲ Cô Tô (Quảng Ninh Province)

CÁT BÀ - NGỌC ISLAND: NATURAL BEAUTY BETWEEN THE GULF OF TONKIN

Cát Bà (Hải Phòng Province) is the largest of the 367 islands that comprise the Cát Bà archipelago. Cát Bà island itself is famous for harmony combination of mountains, forests, sea and deserted beaches. The climate here is cool for all year so that visitors can come here anytime.

There are 3 beaches with the biggest one called Cát Cò 1 whose three surfaces surrounded by mountains. Cát Cò 2 and Cát Cò 3 are smaller but quite peaceful. Travelers can enjoy panoramic views of Cát Bà island and Lan Ha bay from high altitude; Explore the world biosphere reserve - Cát Bà National Park; Kayak at Lan Hạ bay; visit the Monkey island with small monkeys playing around. Cát Dứa beach on Monkey island is one of the ideal spots for guests to enjoy the sea or choose snorkeling tour to look at coral reefs. Enjoying the fresh seafood is one of the attractions for visitors to Cát Bà. You will love 7 dishes of "sam", roasted salted mantis shrimp, green crab, "song" fish, squid...



▲ Ngọc island (Cát Bà, Hải Phòng)

CÙ LAO CHÀM - CHÀM ISLAND

Cù Lao Chàm (Quảng Nam) is about 15 km from Hội An, including 8 islands, which has been recognized by UNESCO as the World Biosphere Reserve. Lao island has Làng beach, Hương beach or Chồng beach, Bắc beach, located on the north side Chàm island. Now, there is a new road from Bãi Ông to Bãi Bắc.

On Chàm island, visitors can not only experience scuba diving, but also enjoy the life of local people such as farming. Fresh water from streams flowing all day and night create a lot of fresh and delicious fruits, which can make many special dishes.



▲ Chàm island (Quảng Nam Province)

KỠ CO ISLAND - PRISTINE PARADISE IN QUY NHƠN

Located 25 km to the north-east of Quy Nhơn (Bình Định Province), Kỳ Co is located in Nhơn Lý island commune. Adjacent to sea on one side, the remaining three sides are mountains. Kỳ Co still has a wild and bold lyrical beauty. It is the perfect crystalline of blue sea, waves and clouds creating a strangely fascinated, captivates even the most discerning travelers. In Kỳ Co, tourists will be immersed with wild nature, clear blue water between the white sandy beaches, sunshine and have fun with friends on the "pool" made of the rock around.



▲ Kỳ Co island (Bình Định Province)



▲ Lý Sơn island (Quảng Ngãi Province)

LÝ SƠN ISLAND

Lý Sơn (also known as Cù Lao Ré in Quảng Ngãi Province) is formed from the activity of volcanoes and coral reefs, creating many caves, beaches and volcanic craters... It holds important strategy on the East Sea of Việt Nam. Lý Sơn island has a wild nature with magnificent scenery and volcanic geological values, as well as many historical and cultural relics such as Tò Vồ gate, Quan Âm tower, Hang pagoda, Câu cave and National Flagpole at the top of Thới Lới mountain and some other temples...

CÔN ĐẢO ISLAND

If you love exploring, Côn Đảo (Bà Rịa - Vũng Tàu Province) is a place that you have to go once in a lifetime. Đầm Trầu beach is the most beautiful beach in Côn Đảo, like a yellow ribbon lacing the green carpet: half crossed the forest and half on the sea. A majestic rocky cliff and a gentle hill spreading to the edge of the water is like a friendly welcome to the tourists. The majestic impression of the mountain, the deep feeling of the sea and endless green of the mountain is the source of endless inspiration for anyone who comes to this place. Bẫy Cạnh island is a place that you can explore when coming to Côn Đảo. In addition, you can learn the history of Côn Đảo through prison system, tiger cage, museum... Côn Đảo is also the conservation of vic.



▲ Wild beauty of Côn Đảo island
(Bà Rịa-Vũng Tàu Province)



PHÚ QUỐC ISLAND

Leading to the Top 3 tourist destinations in the winter by National Geographic, Phú Quốc (Kiên Giang Province) island owns beautiful beaches such as Sao beach, Long beach and dozens of other pristine beaches. Sao beach is considered as the most beautiful beach in Phú Quốc. The sand here is white and smooth as ice cream! With abundant seafood such as sea urchin, shellfish, snails, fish... and with wonderful experiences in Phú Quốc such as snorkeling, squid fishing, watching sunset at Dinh Cậu or exploring National Park, visitors can also explore pearl farming and buy pearl products, discover Phú Quốc fish sauce and enjoy Sim wine.

Coming to Kiên Giang, visitors cannot ignore the opportunity to visit some beautiful islands such as Nam Du island, Thổ Chu island, Bà Lụa archipelago...

PHÚ QUÝ ISLAND

Located about 120km from Phan Thiết City (Bình Thuận Province), Phú Quý island (also called Cù Lao Thu islet) attracts visitors by many romantic and pristine beaches such as Triều Dương bay, Dơi Dừa beach, Nhỏ beach - Gành Hang... Triều Dương bay has flat and wide sandy beach, clear water and a shady forest on the shore.

It is a small island with an area of only 16 km² but Phú Quý island has many temples,



▲ Phú Quý island (Bình Thuận Province)

shrines with longstanding architectures such as: Linh Quang pagoda, Vạn An Thạnh pagoda in Tam Thanh commune, Thầy Sài Nại tomb, Bàn Tranh pagoda in Long Hải commune. Phú Quý island also has stunning coastal roads. In the early morning, you can go shopping at fish markets or use a canoe to visit the island to see fishing boats landed, buy fresh seafood and ask local people to make delicious dishes. King prawns and red groupers are specialties of the island that you must try■

HÒA TRẠNG, HIỀN NHÂM



▲ Phú Quốc island (Kiên Giang Province)

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