Chapter 4

Recommendations for the ASEAN Region

June 2023

This chapter should be cited as
ERIA study team (2023), 'Background, Objectives, and Methodology of the Study', in Yamada, F., K. Murakami, H. Phoumin (eds.), *Study on the Applicability of CCT for a Comprehensive and Optimal Carbon-neutral Solution in ASEAN*. ERIA Research Project Report FY2023 No. 04, Jakarta: ERIA, pp.97-108.

Chapter 4
Recommendations for the ASEAN Region

1. Available Technologies and Technical Solutions

Recommendations from the technological aspects are summarised as follows.

1) The pathway to CN depends on the country's situation. So, considering energy security and feasibility, selecting a tailored technology option for each country is necessary. For example, utilisation of existing CFPPs is a practical solution for biomass and/or ammonia cofiring.
2) To achieve CN, it is necessary to take comprehensive measures, including CCUS, which captures CO_2 and uses it for storage and carbon recycling, and adopt the appropriate technology to reduce CO_2 emissions.
3) In particular, CO_2 recovery has become a major issue in the power and industrial sectors, so cross-sectoral cooperation is required. Policy initiatives for supporting such cooperative activities are thought to be effective. Also, a financing scheme that covers the entire carbon-neutral project would be essential to make this possible.
4) It is also effective to proceed with international cooperation when studying the adaptability of specific carbon-neutral technologies.

2. Available Technologies and Technical Solutions: By-country Recommendations

2.1. Indonesia

The recommended technologies and technical solutions for Indonesia are as follows.

1) Clean Coal Technology (CCT)

Coal, Indonesia's most abundant and major indigenous energy source, has been supporting the national revenue. However, coal is also the biggest emitter of CO_2. As mentioned above, CFPPs will be phased out, and no new ones will be constructed. This direction was confirmed at the G20 hosted by Indonesia in November 2022. The above 'no more new CFPP' policy is conditional, with exceptions like financially closed ones and those under construction. Also, those under any specific national development plan can be exempted from the directive, according to the newly legislated Presidential Regulation No. 112 of 2022. With the little possibility for new CFPPs, the introduction of CCT, such as IGCC and A-USC, cannot be envisaged as they are not technology for existing CFPPs.

However, as those existing CFPPs shall continuously contribute to the power supply and as balancing resources for grid stabilisation, in parallel with progressing massive RE introduction and emerging new energy development, CCT and accompanying appropriate environmental compliance and efficiency techniques remain crucial.

2) Cofiring

CFPPs will increase until 2030 and will be phased out after 2031. However, coal is expected to remain a power generation source by 2057 until CO_2 emissions from CFPPs continue. Because of the importance of enhanced environmental measures, especially in reducing CO_2 emissions, cofiring coal with biomass or ammonia, acknowledged as carbon neutral, is effective. Currently, ammonia supply sufficiency and its value chain are yet to be secured. So, as the Government of Indonesia has been pursuing, biomass cofiring implementation is a just and most realistic measure to further reduce emissions from CFPPs towards 2030. During this period, Indonesia can explore possibilities for ammonia cofiring through studies and demonstrations, including cross-sectoral studies for value chain formulation.

3) Carbon Capture and Storage or Carbon Capture, Usage, and Storage (CCS or CCUS)

CCS or CCUS is also effective in reducing CO_2 emissions from the CFPPs. Many old oil wells in Indonesia are suitable for CCS. There is also potential for oil recovery as enhanced oil recovery.

4) New and Renewable Energy (NRE)

NRE is expected to provide alternative power capacity as the capacity fulfilled by CFPPs decreases during its phasing out. Increased generation from RE is already ongoing. However, after 2031, the country will see the full-fledged development of various renewables. During its energy transition towards 2060, Indonesia has committed to developing 587 GW of clean energy-sourced power, of which 361 GW is solar, 83 GW is hydroelectric, and 39 GW is wind power. As CFPPs are phased out, VRE will take the overwhelming share of power generation. On the way, impacts on the grid will emerge even in the early phase of the transition path. This is because coal power can function as a balancing source and VRE, a substantially intermittent source, cannot. However, Indonesia has advantages as it is endowed with invariable geothermal resources. The once-government-facilitated rooftop solar power generation envisaged to be grid-connected recently has been pending because of concerns raised about the possible severe impact on the grid system.

5) Hydrogen

So far, Indonesia seems comparatively reserved about developing and utilising hydrogen. However, looking at the planned generation mix in 2060 in which solar dominance is outstanding and considering Indonesia is endowed with gas and coal, the country would benefit in pursuing possibilities for both blue and green hydrogen.

Further, key considerations that would enhance the introduction and deployment of the above technologies are indicated below.

1) Measures for grid system stabilisation

Grid system stability is probably the most crucial key to the energy transition.

In the case of Indonesia, like other AMSs, the situation could be more severe than in developed economies as VRE’s introduction will proceed speedily to address the growing economy and power demand.

Indonesia has been trying hard to enhance grid capacity and system management and will enhance its efforts in the coming years. Also, as part of ASEAN, Indonesia has an advantage from the ASEAN Power Grid that will help the country with sustainable power supply and the requirements for grid flexibility. In addition to enhancing the grid system, flexibilisation can be ensured primarily through power plants that can perform flexible operations, such as pumped storage, gas, and coal. BESS and synchronous phase modifiers will also help.

The other idea that deserves attention is about choices of on-grid and off-grid power generation to ensure the resilience of the power supply and grid system. Accelerating grid stabilisation requires urgency, and capacity addition for fulfilling the last miles of hard-to-electrify remote areas is also urgent. However, a grid connection is not a must. Electrification plans with off-grid choices are worth considering, especially in island areas.

2) Coal-fired power plants can remain contributing to energy transition

Coal will stay in the power generation mix of Indonesia for the foreseeable future and up to the latter part of the energy transition. Coal-fired power can be a flexible source if operated appropriately. So, Indonesia can continue using the existing CFPPs for power supply and supporting grid system stabilisation.

Even after retirement, CFPPs can be repurposed through conversion to synchronous phase modifiers, a proven and commercially available technology for grid stabilisation, or for whatever purpose conducive to energy transformation.

We must note that environmental measures shall be continuously enhanced as long as CFPPs are utilised.

3) Shift of domestic coal use to the industrial sector

Coal is an important indigenous natural resource for Indonesia.

The government and private sector players have been engaging in discussions on the green shift of domestic coal use to the industrial sector for further clean and effective use suitable to the energy transition era. The outcome of such discussions is expected to be conducive to the policy and policy instruments that will ensure appropriate and sustainable coal utilisation while the coal phase-down is progressing in the power sector.

4) Technology deployment helped with key knowledge and experience sharing with other AMSs

CCS, hydrogen, and ammonia utilisation is a crucial technology area requiring a grand design of a cross-sectoral and internationally coordinated value chain based on sharing key knowledge and experience between countries. In this context, collaboration with other AMSs will be beneficial.

5) The next national energy plan with decarbonisation plans and perspectives

The last basic energy plan (RUEN) was enacted in 2017. The official supporting plan or policy is yet to be in place. The next RUEN is anticipated to be equipped with decarbonisation plans and perspectives that have been committed and mentioned on occasions, such as COP26 and COP27 and G20 hosted by Indonesia.

2.2. Malaysia

1) Highly potential technology areas

Highly potential technology areas in the context of policy directions and applicability are highlighted below.

<u>Technology area 1: Hydrogen</u>
Malaysia is outstanding in promoting hydrogen development and utilisation. In 2019, a few years before the Hydrogen Economy Position Paper was released, Sarawak Energy had started hydrogen production and refuelling. It partnered with PETRONAS, Samsung Engineering, LOTTE Chemical, and POSCO Holdings.

The Hydrogen Economy Position Paper claims that Malaysia could be on par with the United States and Australia in leading global hydrogen technology development and utilisation in the future.

Both the position paper and Sarawak Energy coincidentally focus on green hydrogen. This is especially because of the recent situation where the prices of blue hydrogen have been surging, natural gas prices are skyrocketing, and green hydrogen is gradually taking the primary position for massive production in the future. Also, since it matters how much carbon footprint can be reduced throughout the hydrogen value chain to be formulated, Malaysia is on the right track in focusing on green hydrogen.

Below are a few points for further consideration:

- Currently, much attention is paid to fuel cells and electricity regarding hydrogen. However, there are various areas, such as chemical and industrial processes, for which hydrogen can be used. So, it would be advisable for the hydrogen development and utilisation policy to be multisectoral, with a clear picture of value chains to be established.
- As the Hydrogen Position Paper clarifies, safety is one of the major concerns in considering hydrogen use. Accordingly, safety considerations shall be a part of the basic policy that will be formulated soon.

Also, like most industrial activities, hydrogen production entails carbon emissions, though its massive introduction is primarily for reducing emissions. Accordingly, the government is supposed to facilitate and oversee development and utilisation efforts by national and private companies while paying extra attention to how carbon footprint can be reduced during the process.

Technology area 2: Solar and hydropower

Solar power and hydropower are undoubtedly important for clean and sustainable electricity supply and bolstering the anticipated green hydrogen development.

Technology area 3: CCS

CCS is deemed to be crucial for the energy transition. However, only some projects have reached the commercial phase due to the cost barriers and unforeseeable factors around the technology. Most commercial projects are in oil and gas development sites utilising CO_2 injections for enhanced recovery. Applying the technology to a power plant requires using CO_2 for CCUS to increase the project's economy.

As clarified in the preceding part, PETRONAS is ready to engage in the Kasawari CCS project with its domestic and international partners and a roadmap to back up the relevant activities. Thai government–owned PTT's subsidiary PTTEP is also considering going for a CCS project at its Lang Lebah field in Malaysia. The company has been developing a CCS project in Thailand already.

Kasawari CCS attracts such attention from ASEAN, the rest of Asia, and the world, as developing a sour gas field will be common throughout all incoming gas development projects in ASEAN. However, since sour gas contains a high content of H2S and CO_2, its development entails technical difficulties and requires extra deliberation and measures in exploration, as does the CCS project.

Considering that CCS-potential depleted fields in Malaysia will have the same conditions and requirements as the same for CCS projects in Indonesia, Thailand will experience a similar situation. In collaboration with other AMSs, Malaysia would benefit from establishing a knowledge and data-sharing scheme between AMSs.

That way, huge costs incurred at the initial stage can be avoided, and well-informed decisions on project implementation will be possible.

Other potential technology areas:

In addition to the above areas, biofuel, energy storage, biomass cofiring, and ammonia cofiring at CFPPs have a high potential.

These existing and new energy areas and technologies are anticipated to open up opportunities for industry development, job creation, and social development as per the 12th Plan and beyond, for which cross-sectoral planning, coordination, and collaboration with more focus on industry areas are crucial.

Also, safety, economy, and energy security and transformation shall be ensured.

2) Institutional support

Institutional support and incentives will be required to facilitate the application of decarbonisation technology. Policymakers must note that such institutional support may also be transitional and must be followed up for modifications or further institutional changes. For instance, FiT is quite effective in supporting the introduction of renewables. However, preceding cases have shown that unbundling the power sector for a competitive market is crucial to accelerating RE introduction. Therefore, RE will not depend on FiT anymore since it will have to be incorporated into the competitive market. So, Malaysia's power market on a single-buyer scheme will change during the power sector transformation. That way RE development and massive production of green hydrogen can be materialised.

3) Coal phase-down path

Malaysia has 12,546 MW of CFPPs, of which 2,000 MW commenced operations only in 2019. Because of the standard residual life and economy of power plants, it is a little too early to retire the most recent ones at some point before 2040.

However, it would work if those power plants were retired and appropriately reutilised through conversion into synchronous condensers, a proven and commercially available technology for grid stablisation,[6] or whatever purpose conducive to energy transformation.

A coal-fired power phase-down and phaseout roadmap as part of a national energy transition roadmap shall be formulated, and all necessary measures will be taken. This is because coal-fired power, as a major part of the electricity mix, will continue to support energy security through sustainable electricity supply for at least the first half to the middle of the energy transition period. During that time, efforts to reduce emissions and environmental measures must continue, and operations shall be conducted in a way that contributes to preventing grid fluctuation.

4) Malaysia's position to support ASEAN's energy transition

Malaysia has an advantage since the country, as a member of the ASEAN community, has been involved in most areas of the energy sector – from fossil fuel production, power generation, clean utilisation of coal, RE, and new energy development to regional grid integration. Being steps ahead in terms of readiness for policy and standards formulation and legislation, Malaysia is highly anticipated to initiate government-to-government sharing of knowledge, experience, information, and cooperation for regional value chain formulation and establishment. These will benefit the country as the energy transition will be very costly, especiallyat its initial stage. Well-informed decisions are the key to the successful application of decarbonisation technology.

5) National Decarbonisation Roadmap

Since NEP, the long-term energy policy is in place and so is MyRER, the national RE roadmap, Next anticipated is the formulation of a national decarbonisation roadmap showing a cross-sectoral and inclusive energy transition pathway. Again, Malaysia can contribute to formulating an integrated roadmap of ASEAN decarbonisation and roadmaps of other AMSs by initiating the national roadmap formulation.

---

[6] There are several cases of reutilisation of retired thermal power plants repurposed as synchronous condensers. The World Bank conducted a very useful study to indicate repurposing of thermal power plants as synchronous condensers will be one of the most potential options to address the issue of so-called 'too young to retire' CFPPs in ASEAN. See the foregoing subchapter about Malaysia.

2.3. Thailand

The applicability of CCT for a carbon-neutral solution is as follows. According to the Thai government's energy policy 4D+E, the comprehensive utilisation of biomass is positioned as important, along with conventional RE, such as geothermal and hydropower, and relatively new RE, such as solar and wind power.

1) Regarding biomass utilisation in the power sector, the Thai government's policy to promote community power plants is the right choice, as it accelerates the decentralisation of power sources and utilisation of domestic resources. Biomass combustion can be combined with many other technologies according to the type of biomass and plant scale to enhance the overall community power plant outcomes for further dissemination. In this context, individual optimisation is desirable.
2) Regarding biomass utilisation in the transport sector, we think developing synthetic fuel from biomass gasification and fuel synthesis is desirable. Since the purity level of CO_2 produced as a by-product in the process is relatively high, substantial CO_2 reduction can be expected by replacing conventional fuels with synthetic fuels and storing them.
3) Hydrogen derived through a shift reaction of CO to CO_2 is expected to use combustion as carbon-free fuel, fuel cell, and key materials for several carbon-recycling reaction pathways. In this connection, a study on the overall utilisation chain of biomass, hydrogen, and CO_2 will be recommended.
4) The Thai government is actively promoting CCS projects. There are various CO_2 sources and their concentration. Among them, recovery of CO_2 from flue gas is particularly important. In this regard, government support would be very effective.

2.4. Viet Nam

In its keynote speech, Viet Nam, who chaired the AEBF in 2020, stated that it aims to achieve 50% RE by 2030/2050. The draft PDP8 was mainly concerned with introducing RE, and the results were presented in October 2021 and April 2022. The draft is currently awaiting approval by the Prime Minister.

Technology area 1: Biomass–coal cofiring power generation

According to the EVN report, coal-fired power generation in Viet Nam in 2020 accounted for about half of the total power generation and about 30% of the capacity. Most CFPPs in Viet Nam have operated for less than 10 years, so it would be best to use these facilities to reduce CO2 emissions efficiently. The feasibility of coal and biomass cofiring is high.

Technology area 2: Dedicated biomass-fired power generation

In Viet Nam, rice husks, rice straws, and sugarcane pomace from the vicinity of power stations can be compressed and transported to power stations and used directly as fuel, thus eliminating the need to process them into solid fuel wood pellets. In addition, a biomass called sorghum can be grown quickly and has a high potential for dedicated biomass firing.

Technical area 3: Ammonia cofiring with coal

Ammonia cofiring is one of the key measures to mitigate CO_2 emissions from CFPPs directly. In this regard, MOIT and EVN are pursuing technical information and experience from the countries in their demonstration stage.

Technology area 4: PV power generation

There is no room for new PV projects under the draft PDP8, as the power source is unstable and affects grid stability. But the policy of no upper limit on the scale of development and capacity for rooftop PVs, provided they are not connected to the grid and are for private consumption, will enable development to proceed.

Technology area 5: Wind power

In Viet Nam, there are areas with high potential for offshore wind power, particularly in the south, and future development is expected.

Technology area 6: CCS

To effectively use coal-fired power, it will be necessary to introduce technology to capture and store CO_2 from coal-fired power flue gas.

Many technologies that can be proposed are CO_2 reduction technologies. Solar and wind power, introduced worldwide as variable RE, is promising power generation technologies that can exploit Viet Nam's geographical characteristics and should be actively introduced. Of course, it is necessary to introduce power storage technology such as BESS to compensate for these fluctuations and load adjustment by other power sources, such as gas and coal-fired power. A development plan that considers the grid balance is necessary. In addition, we believe that the rooftop solar power described in the previous section is valuable as an off-grid power source and a power source that constitutes a virtual power plant in the future.

Since CFPPs are many and the current power generation is highly dependent on coal-fired power, biomass co-combustion, biomass dedicated firing, and ammonia cofiring, which can use existing infrastructure, are the main measures to reduce CO_2 in generating thermal power. In particular, Viet Nam is a promising country regarding fuel supply potential, so actively promoting domestic use is desirable.

Similarly, cofiring with ammonia, which can be used by modifying existing power plants, has already begun in Japan at a 1,000 MW class USC plant. Therefore, we can proceed with discussing with companies that have the technology.

Since CO_2 reduction alone cannot achieve CN, the so-called negative emission CCS is also a technology that should be introduced. CO_2 recovery technology from thermal power generation exhaust gas is an essential technology for CCS or CCUS in the future. We believe that early support from the government for its introduction is necessary.

Financial support is needed to effectively utilise many CFPPs in Viet Nam, as the cost of capturing the flue gas from CFPPs is a bottleneck. Setting the FiT price at an appropriate level for solar and wind power generation is important. But in the future, it is necessary to make the electricity market competitive, and the electricity system must be developed for this purpose.

3. Policy Recommendations for ASEAN

3.1. Highly Potential Technology Areas

Technology area 1: Biomass cofiring

Biomass cofiring and biomass dedicated firing will be one of the main measures to decarbonise the power and related sectors for the foreseeable future, especially towards 2030 when tangible emissions reduction outcomes shall be below 1.5°C. As a result of the study, we are pleased to learn that biomass cofiring and biomass-dedicated firing apply to all target countries. Both are supposed to apply to other AMSs, considering that technology prices are comparatively affordable and cofired biomass fuels are indigenously available. Using local biomass is expected to bring additional advantages to the local community through job creation and community participation during biomass collection and supply.

To ensure sustainability and supply security, having plural choices of biomass fuel is better to avoid dependence on a single biomass source.

Also, biomass cofiring is a transitional measure while CFPPs are being utilised.

Technology area 2: Ammonia cofiring

Indonesia, Malaysia, and Viet Nam have a high potential for ammonia cofiring deployment. Since ammonia cofiring is expected to follow the preceding biomass cofiring and then take the central role in decarbonised and non-variable electricity generation after 2030, R&D, demonstration, and regional value chain formulation shall go in parallel with the massive deployment of biomass cofiring.

Technology area 3: Hydrogen utilisation

Hydrogen is undoubtedly important in ASEAN. Some AMSs have a high potential for blue and green hydrogen production and utilisation. Others are expected to come up with green hydrogen deployment and utilisation in the future. Especially in the latter part of the energy transition, many renewables come on the grid, and massive curtailment to avoid fluctuation will be required if no measures are taken, enabling electricity use for green hydrogen. That is very good for AMSs embracing the hydrogen deployment plan with less carbon footprint. However, hydrogen has specific barriers, especially in terms of safety and difficulty in transportation. Hydrogen is said to be transported in a region but not between continents. Also, value chains shall be formulated throughout multiple sectors.

Therefore, planned value chain and development activities towards commercialisation, deployment, and application shall be better engaged through regional cooperation.

Technology area 4: Energy storage systems

BESSs and pumped storage hydropower are the currently available and applicable energy storage systems. Many BESSs have been commercialised. However, availability in terms of volume and prices is insufficient to address possible grid fluctuation. Even after availability and affordability are ensured, BESS may not fully address grid fluctuation issues due to capacity constraints.

In the meantime, pumped storage hydropower, a variation of hydropower technology, can store and release power as required at scale.

In summary, BESS is fast responsive with a limited capacity scale, while pumped storage hydropower is slow to respond, but large capacity is ensured. So, these technologies will be more effective if used in combination.

<u>Technology area 5: CCS and CCUS</u>

CCS is deemed crucial for the energy transition. However, some projects have reached the commercial phase due to cost barriers and unforeseeable factors around the technology. Most commercial projects are at oil and gas development sites utilising CO_2 injections for enhanced recovery. In applying the technology to a power plant, incorporating CO_2 utilisation is required to make it CCUS for the increased economy of the project.

In cooperation with international and domestic partners, Indonesian, Malaysian, and Thai national companies aggressively pursue CCS development in gas fields.

With many potential gas fields in ASEAN waiting for development, they are supposed to be sour gas fields. However, since sour gas contains a relatively high content of H2S and CO_2, its development entails technical difficulties and requires extra deliberation and measures in exploration. So does the CCS project.

Since fields and CCS candidate sites in ASEAN would have the same conditions and requirements, any country in the region would benefit from collaborating with other AMSs to establish a knowledge and data-sharing scheme among AMSs.

That way, huge costs incurred at the initial stage can be avoided, and well-informed decisions on project implementation will be possible.

Apart from CCS, R&D of CO_2 utilisation is underway worldwide to convert CO_2 into useful substances, such as methanol and other fuels. It is also important to monitor technology development trends so that ASEAN can respond when these technologies are adopted.

3.2. Key Considerations

1) Measures for grid system stabilisation are to be ensured

Readiness for the emerging issue of grid fluctuation with massive VRE introduction varies from one country to the other among AMSs. Preceding developed economies have experienced grid fluctuations and are still struggling to cope with such situation. In the case of ASEAN, the situation could be more severe as VRE's introduction will proceed speedily to address the growing economy and power demand.

That said, ASEAN has an advantage since the region has been facilitating system integration through the ASEAN Power Grid, which will help the countries address sustainable power supply and requirements for grid flexibility. All in all, grid system stability is crucial to the energy transition. So, every AMS should look into all kinds of measures to enhance flexibility at the grid, power plant, and any other facility.

In addition to enhancing the grid system, flexibilisation can be ensured primarily through power plants that can perform flexible operations, such as pumped storage, gas, and coal. BESS and synchronous phase modifiers will also help.

The other idea that deserves attention is on-grid and off-grid power generation choices to ensure power supply and grid system resilience. Accelerating grid stabilisation requires urgency, and capacity addition for fulfilling the last miles of hard-to-electrify remote areas is also urgent. However, a grid connection is not a must. Electrification plans with off-grid choices are worth considering, especially in island areas.

2) Coal-fired power plants can remain contributing to the energy transition

Many AMSs, including the four target countries in this study, foresee a coal phase-down and phaseout in the power sector. However, as we have seen, VRE-solar and wind are clean but variable; biomass is a big help in accelerating clean transition but is small to fulfil demand; and ammonia and hydrogen are still in the midway for future application and deployment. 'All-with-gas solution' is unrealistic because of the scale of energy and electricity demand related to infrastructure availability and the fact that gas is also transitional.

In summary, coal will stay in most AMSs' and ASEAN power generation mix for the foreseeable future and up to the latter part of the energy transition. Coal-fired power can be a flexible source if operated appropriately. So, the four target countries – Indonesia, Malaysia, Thailand, and Viet Nam – can continue using the existing CFPPs for power supply and supporting grid system stabilisation.

Even after retirement, CFPPs can be repurposed through conversion to synchronous phase modifiers, a proven and commercially available technology for grid stabilisation, or whatever purpose conducive to energy transformation.

We must note that environmental measures shall be continuously enhanced as long as CFPPs are utilised.

3) Enhanced collaboration and cooperation are required

As mentioned, CCS, hydrogen, and ammonia utilisation is a crucial technology area that requires a grand design of a cross-sectoral and internationally coordinated value chain based on sharing key knowledge and experiences among countries. In this context, collaboration and cooperation between AMSs and, some cases, all-ASEAN will be beneficial.

4) Not to waste anything

Waste management is now another emerging global issue, especially in emerging and growing economies. ASEAN is no exception. Addressing relevant issues while going through energy transition pathways means the ASEAN community will get closer to a circular economy. The issue provides challenges and opportunities as with the energy transition. Among others, utilisation of coal ash from CFPPs for roadbed materials, FGD (flue gas desulphurisation system) gypsum for construction materials, municipal waste for waste-to-energy power generation, and RE power plant waste such as retired solar panels for recycling can be considered.

5) A new, cross-sectoral platform for ASEAN decarbonisation

Given the need for well-concerted cross-sectoral coordination and the importance of early planning and actions, establishing a cross-sectoral and overarching platform for coordinating ASEAN decarbonisation would be worth considering. Such a coordinating platform is envisaged to be part of the ASEAN Centre for Energy (ACE), as ACE coordinates the ASEAN energy sector decarbonisation policy facilitation and activities.

The decarbonisation platform is to overview decarbonisation-related activities and projects in the pipeline in ASEAN and interact with non-energy and energy sector ASEAN organisations, if such actions are considered beneficial for efficiency and further coordination.