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SCOPING STUDY

Strengthening Science and Policy Interface in Climate Change related Decision-Making Process

LAYING THE GROUNDWORK FOR THE DEVELOPMENT OF LONG-TERM STRATEGIES (LTS) IN ASEAN
SEPTEMBER 2021

Enhanced Regional EU-ASEAN Dialogue Instrument (E-READI)



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The Association of Southeast Asian Nations (ASEAN) was established on 8 August 1967. The Member States are Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Viet Nam. The ASEAN Secretariat is based in Jakarta, Indonesia.

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ASEAN: A Community of Opportunities for All

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LIST OF ABBREVIATIONS

ADB	Asian Development Bank
ACRF	ASEAN Comprehensive Recovery Framework
AFOLU	Agriculture, Forestry, and Other Land Use
AMS	ASEAN Member States
ASEAN	Association of Southeast Asian Nations
ASCC	ASEAN Socio-Cultural Community
ASOEN	ASEAN Senior Officials on Environment
ASMC	ASEAN Specialised Meteorological Centre
ASPEN	ASEAN Strategic Plan on Environment
AWGCC	ASEAN Working Group on Climate Change
BAU	Business as Usual
BUR	Biennial Update Report
CCAFS	Research Program on Climate Change, Agriculture and Food Security
CCS	Carbon Capture and Storage
CCUS	Carbon Capture, Utilisation and Storage
CDM	Clean Development Mechanism
CGIAR	Consultative Group for International Agricultural Research
CiACA	Collaborative Instruments for Ambitious Climate Action
CIFOR	Center for International Forestry Research
COP	Conference of the Parties
COVID	Coronavirus Disease
DDPP	Deep Decarbonisation Pathways Project
DRR	Disaster Risk Reduction
DG	Directorate-General of the European Commission
E-READI	Enhanced Regional EU-ASEAN Dialogue Instrument
E-SAMCA	Expanded Special ASEAN Ministerial Meeting On Climate Action
ETS	Emissions Trading System
EU	European Union

FAO	Food and Agriculture Organisation
GDP	Gross Domestic Product
GGGI	Global Green Growth Institute
GHG	Greenhouse Gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
IDB	Inter-American Development Bank
IEA	International Energy Agency
IFAD	International Fund for Agricultural Development
INDC	Intended Nationally Determined Contribution
IPCC	Intergovernmental Panel on Climate Change
IRENA	International Renewable Energy Agency
JAIF	Japan-ASEAN Integration Fund
JCM	Joint Crediting Mechanism
JICA	Japan International Cooperation Agency
LAC	Latin America and the Caribbean
LDC	Least Developed Country
LEAP	Long-Range Energy Alternatives Planning
LEDS	Low Emission Development Strategy
LTS	Long-term Strategy
LULUCF	Land Use, Land Use Change and Forestry
MACC	Marginal Abatement Cost Curve
MDB	Multilateral Development Bank
MIC	Middle-Income Country
MRV	Monitoring, Reporting and Verification
NAP	National Adaptation Plan
NC	National Communication
NDC	Nationally Determined Contribution
NGO	Non-Governmental Organisation
OECD	Organisation for Economic Co-operation and Development

PaSTI	Partnership to Strengthen Transparency for co-Innovation
PDR	People's Democratic Republic
REDD	Reducing Emissions from Deforestation and Forest Degradation
R&D	Research and Development
SAARC	South Asian Association for Regional Cooperation
SADC	Southern African Development Community
SAMCA	Special ASEAN Ministerial Meeting On Climate Action
SEMARNAT	Secretariat of Environment and Natural Resources of Mexico
SDGs	Sustainable Development Goals
SDMC	SAARC Disaster Management Centre
SLCP	Short-lived Climate Pollutant
UNEP	United Nations Environment Programme
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNHABITAT	United Nations Human Settlements Programme
USAID	United States Agency for International Development



Foreword by

Laksmi Dhewanthi

Director General of Climate Change
Ministry of Environment and Forestry, Republic of Indonesia

The Southeast Asia region is one of the world's most vulnerable to climate change and its adverse impacts due to long coastlines, dense population, economic activity in coastal areas and heavy reliance on agriculture, fisheries, forestry, and other natural resources. In responding to these circumstances and the impact of climate change as the most complex, multi-faceted, and severe threats to humanity, ASEAN and its Member States have been working diligently through the ASEAN Working Group on Climate Change (AWGCC) to address these issues.

ASEAN Member States (AMS), as the Parties to the Paris Agreement, have submitted their Nationally Determined Contributions (NDCs) with some further submission of updated NDCs as a pledge of their contributions to reduce global greenhouse gas emission and build a climate-resilient society. In addition, referring to Article 2,4 and 19 of the Paris Agreement, to accomplish the global goals in pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, parties are encouraged to formulate and communicate Long-Term low greenhouse-gas emission development Strategies (LTS). The LTS consider the AMS' common but differentiated responsibilities and respective capabilities in the light of different national circumstances. Nonetheless, there is only one AMS that has submitted its LTS document to the UNFCCC.

We realise that to implement NDCs and develop LTS, accessible, credible, legitimate, and relevant scientific findings can lead to more robust, realistic, cost-effective climate change policies and successful implementations. We also note that there are gaps between policymakers and scientific advice or research to inform the conceptualisation, formulation, or implementation of policies at different levels. Therefore, ASEAN needs to strengthen the science and policy interface in the climate change-related decision-making process.

As a follow up of the first ASEAN-EU High-Level Dialogue on Environment and Climate Change in 2019, ASEAN and EU identified that immediate possible activities on strengthening the science and policy interface could be organized by focusing on climate change Long-Term Strategies. As the lead of the project, Indonesia identified the importance of early stocktake of the status of LTS formulation in ASEAN by considering the science-policy interface. It was initially planned to verify the initial findings of the LTS Scoping Study at a regional workshop in April 2020. However, due to the COVID-19 pandemic, in-person meetings could not be organised. Therefore, we focused on formulating the scoping study with the objectives to identify the priorities, the direction and the extent of ASEAN interventions related to LTS and laying out the specific steppingstones for advancing the LTS agenda in ASEAN.

The scoping study explores global practices and draws lessons-learned from the already developed LTS, identifying the status quo of formulation of LTS in AMS, the way forward, and examines how COVID-19 affects the process. We realize that the needs and urgencies in each AMS in formulating LTS may vary. However, by embodying the ASEAN spirit of unity and collaboration, we finally concluded the Scoping Study. We express our highest appreciation to all fellow AMS who continuously provided the information needed and their valuable inputs, the ASEAN Secretariat, and the EU for supporting this study through the Enhanced Regional EU-ASEAN Dialogue Instrument.

We hope that the study can contribute to enhancing the science-policy interface in the regional climate change decision-making process and showcasing regional stepping stones to achieving global climate change goals.

Laksmi Dhewanthi
Director General of Climate Change
Ministry of Environment and Forestry, Republic of Indonesia
Indonesia AWGCC National Focal Point





Foreword by

Kung Phoak

Deputy Secretary-General of ASEAN for ASEAN Socio-Cultural Community

The issue of climate change has become one of the major concerns for local people and the region and a key focus of international development due to its cumulative and multidimensional impacts. Driven largely by economic and population growth, the continued and cumulative emission of greenhouse gases will cause further warming and long-lasting changes in the climate system, increasing the likelihood of severe, pervasive and irreversible impacts for people and ecosystems. The adverse impacts of climate change in the Southeast Asia region are evident. The region suffers from climate-related risks and disasters such as intensified floods, drought, and tropical cyclones, causing extensive damage to society and the environment.

ASEAN Member States (AMS), as parties to the United Nations Framework Convention on Climate Change (UNFCCC) and Paris Agreement, are committed to accelerating and intensifying actions and investments needed for a sustainable low carbon future as stated in each national communication report. This includes efforts to develop long-term Greenhouse Gas (GHG) emission development strategies (LTS), in line with Article 4, paragraph 19, of the Paris Agreement, to show and guide the long-term direction of the Nationally determined Contributions (NDCs).

ASEAN has identified the long term planning and assessment of NDCs as one of its key priority actions within the ASEAN Working Group on Climate Change (AWGCC) Action Plan, including the initiative supported by the European Union (EU) in developing this Scoping Study on Strengthening Science and Policy Interface in Climate Change related Decision-Making Process: Laying the groundwork for the development of Long-term Strategies (LTS) in ASEAN.

Recognising the importance of LTS for climate change mitigation in ASEAN, in January 2019, the European Union (EU) and ASEAN agreed to strengthen cooperation on regional and global environmental challenges, including climate actions, among others through the development of this Scoping Study. The study will contribute to the synergy of ASEAN climate mitigation efforts consistent with the goal of ASEAN and AMS to reinforce the ambition of NDCs targets, and in particular to guide the development of a practical LTS plan and its implementation.

This initiative is a key milestone in the ASEAN-EU strategic partnership, contributing to the increasing ambition of NDCs. It will foster the dialogue on climate change between ASEAN and the EU and make a valuable contribution to the ASEAN-EU High-Level Dialogue on Environment and Climate Change, which serves as an important platform for ASEAN and the EU to share experiences, best practices and lessons learned.

I hope this publication will serve as a valuable resource for AMS in formulating and advancing the development and implementation of their LTS. Finally, I believe this study is also an essential reference for exchanges and dialogues between AMS and partners on long term actions to address climate change issues.

A handwritten signature in black ink, appearing to read 'Kung Phoak'.

H.E. Kung Phoak
Deputy Secretary General of ASEAN
ASEAN Socio-Cultural Community



Foreword by

Mauro Petriccione

Director-General Climate Action European Commission

Our children are born into higher economic prosperity than we were, yet the living conditions on the planet they will inherit from us are under threat from environmental degradation, loss of biodiversity and the increasing pace of climate change. Doing our utmost to change these trends is the responsibility we now face, and it is essential that we rise to this challenge together.

According to UN experts at the World Meteorological Organisation (WMO) and the Intergovernmental Panel on Climate Change (IPCC), global mean temperatures reached 1.2°C above pre-industrial levels by 2020 and continue to rise by 0.2°C per decade. The world is therefore at serious risk of missing its critical objective of limiting global warming to 1.5°C. In the 1.5°C pathways of the IPCC, global CO₂ emissions need to decline by about 45% from 2010 levels by 2030, reaching net zero around 2050.

Europe has been a major emitter of greenhouse gases since the industrial revolution and acknowledges that it must take a leading role in the global fight against climate change. By 2019, the European Union had already lowered its emissions by 21% since the first global conference on climate change in Kyoto in December 1997, and by 25% compared to 1990 levels. Under its “European Green Deal”, the EU has recently committed itself to further reductions of 55% by 2030 compared to 1990 levels – or 49% from 2010 levels – and to achieving net zero greenhouse gas emissions by 2050. It is now reshaping its legislation in order to secure these ambitious targets.

Yet the EU only accounts for about 8% of global greenhouse gas emissions and this figure is decreasing. Fighting the climate crisis requires a truly global effort, as agreed in Paris in 2015. Under the terms of the historic Paris agreement, all countries must formulate both medium-term commitments, known as nationally determined contributions and long-term low greenhouse gas emission development strategies. These commitments take into account countries’ common responsibilities and respective capabilities. While per-capita emissions in 7 of the 10 ASEAN Member States remain well below the EU’s, economic growth in the ASEAN region has increased its share of global emissions from 1.8% in 1990, to 3.5% in 2010 and 4.6% in 2019. This is why ASEAN Member States pay increased attention to strategies towards emission peaks and ultimate climate neutrality targets.

This is crucial also for economic reasons. Developed economies have already shown that decoupling growth from greenhouse gas emissions is possible. Consequently, the world’s consumption patterns are becoming less carbon-intensive and ASEAN economies should avoid being locked into emissions-intensive energy sources and locked out of important economic opportunities. Moreover, they need to develop long-term strategies that will allow them to adapt to the effects of climate change, such as rising sea levels, and devise regional responses to adverse weather events.

Regional organisations like ASEAN and the EU should play a key role in taking decarbonisation strategies forward. They can ensure fair distribution and monitoring of emission reductions across member states, thus securing better and more ambitious outcomes. They also help alleviate the economic and political costs of this green transition by sharing best practices, as in the case of ASEAN and the EU. The EU’s Member States even implement their emission reduction targets jointly, significantly reducing the economic impacts. The ASEAN Working Group on Climate Change was established in 2009 and fighting climate change has been a priority under ASEAN’s Strategic Plan on Environment since 2015.

The present study, jointly commissioned by the European Commission and the ASEAN Secretariat, with the support of the Enhanced EU-ASEAN Regional Dialogue Instrument (E-READI), extends our existing inter-regional cooperation to the preparation of long-term climate strategies. I recommend this well-written study with lots of instructive systematic, comparative and anecdotal evidence and well-founded recommendations to both policy-makers and senior civil servants alike.

Mauro Petriccione
Director-General Climate Action European Commission



EXECUTIVE SUMMARY

1. BACKGROUND AND OBJECTIVES

In accordance with Article 4, para. 19, of the Paris Agreement, all Parties should strive to formulate and communicate long-term low greenhouse gas emission development strategies, mindful of Article 2 taking into account their Common But Differentiated Responsibilities and Respective Capabilities, in the light of different national circumstances. The Conference of the Parties to UNFCCC (COP), by its decision 1/CP 21, para. 35, invited Parties to communicate such strategies by 2020. Conducting a scoping study focusing on the development of LTS in AMS was identified as one of the key activities under the ASEAN Working Group on Climate Change (AWGCC) Action Plan within the Action Line “Strengthening science and policy interface in climate change related decision-making process” led by Indonesia, which is one of three Action Lines prioritised by the EU and the AWGCC.¹

The main purpose of the study is to identify the priorities, the direction and the extent of ASEAN interventions related to LTS as well as to lay out the specific stepping stones to advance the LTS agenda in the ASEAN region. *Doing so, the study aims to provide an answer to the question: How can ASEAN and AMS best move forward in the LTS formulation process, taking into consideration good global practices and the regional circumstances?*

2. APPROACH AND METHODOLOGY

To provide an answer to this question, the study follows a three-step-approach:

1. Accumulating global practice and identifying lessons learnt from already developed LTS.
2. Identifying where AMS currently stand in LTS development, their barriers and opportunities.
3. Proposing specific regional mechanisms for advancing and harmonising LTS in ASEAN.

To support this approach, different sources of information were used. For all chapters, desk research on interim assessments of the LTS process, academic literature, as well as scientific and policy papers was conducted. Additionally, insights for Chapter 3 (“Good practices from submitted LTS”) were provided by conducting in-depth interviews with representatives of countries and jurisdictions that have already developed LTS. Furthermore, for Chapter 5 (“LTS in ASEAN”), a questionnaire designed by adelphi was circulated among AMS. In addition to this, bilateral consultations were conducted with more than half of the AMS to complement the results of the questionnaire and arrive at conclusions and recommendations.

3. FIVE TAKE-AWAYS ON LTS – GLOBAL GOOD PRACTICE

Steps for a whole-of-nation approach to develop an LTS

Overall, if the LTS process is actively going forward, it may take about two years. It may be worth investing additional 6-9 months for analysing sectoral and other economic and emissions data necessary as input for modelling and scenario development.

Figure 1: Steps of the LTS process



Source: based on interview outcomes

The process (after organisational matters are settled) starts with qualitative vision development (step 1) with an aim to establish the political and institutional framework for future goal setting, identifying key areas for transformation and determining general sectoral pathways. The vision is supported in the next step by scientific quantification (step 2), which comprises modelling and scenario development. This is normally conducted by a dedicated technical or research institution, as well as technical consultations with key sectoral stakeholders in order to validate and enrich the modelling exercise. The input received from the science and sectoral representatives is used as a basis to formulate the zero draft of the LTS (step 3 – simplification of modelling results and translating them into policy decisions, and step 4 – actual drafting including good visualisation of key messages and goals). The draft undergoes consultations within the government that normally last about half a year (step 5). To secure a whole-of-nation approach and arrive at steps 6 (finalisation and adoption) and 7 (submission to UNFCCC), it is absolutely necessary to receive inputs from key stakeholders:

- already at the stage of vision development (input from other ministries and financial institutions to make the strategy more financially viable and fundable);
- input from academia and sectoral actors is particularly useful at the modelling stage;
- input from sectoral stakeholders, experts, the private sector, NGOs and local communities is crucial for the choice of policies and measures;
- key stakeholders are normally invited to comment on the zero draft;
- the whole process needs to be accompanied by stakeholder engagement and awareness raising processes targeting national and subnational institutions and communities, the private sector and NGOs.

Shaping qualitative vision before diving into quantification

Many LTS that were submitted early put a lot of weight on quantification. However, this task may appear to be more challenging and less helpful for fast-growing economies (like the majority of ASEAN countries). Moreover, for some countries (especially LDCs) quantification may appear to be difficult due to partial data unavailability. Therefore, developing a strategy that is more qualitatively enriched allows to circumvent the need for thorough quantification until 2050.² Robust vision helps to identify specific areas for quantification in which it is strategically most important to invest scarce resources (e.g. high priority sectors). The vision is much broader than the desired emissions level in 2050; it helps a country determine the desired path of social and economic development, taking into consideration the opportunities offered and threats posed by climate change. For LTS development, it is most practical if the vision is supported by the highest political level possible (e.g. Prime Minister's Office).

*For **export-oriented countries**, the guiding question for the vision could be, e.g. how to preserve and strengthen international exporting positions in a 1.5° compatible world. (What changes would be necessary in the production chains when climate standards are introduced in importing countries? Which sectors and areas need to be strategically supported through investments?)*

*For **least developed countries (LDC)**, a guiding question could e.g. be how to become a middle-income country, taking into consideration the risks posed by climate change.*

Complementing modelling with sectoral consultations

Too strong reliance on the modelling tools alone is insufficient. From a very early stage input from sectoral stakeholders needs to be used to get the right understanding of the conditions at the sectoral level. For example, the EU Commission developed hypotheses and then assessed their feasibility with sectoral experts. The aim was cross-checking if particular sectors are able to decarbonise at the suggested speed. It proved to be a very useful scientific exercise with an aim to understand existing technologies, potential limits and build on the knowledge of experts who work in the particular sectors. Such an approach eventually helps to be ambitious but at the same time realistic in the target setting.

Bringing in the perspective of financial institutions

For the LTS to be more attractive for private as well as public investment (more financially viable), it is necessary to engage with actors from the financial sector (domestic and international, private and public financial institutions, bilateral donors, MDBs) early on (already at the visioning stage). Apart from providing general information on what their current funding priorities are and what they are likely to fund in the near future, they are able to make concrete suggestions on how the strategy must be designed and what it must include to be more attractive for investment (e.g. breaking the LTS down into specific policies, etc.).

Securing support of stakeholders and the private sector

Several good practice tips can be drawn from international experience. Tip 1: In the dialogue with the private sector on LTS, it can be helpful to put the arguments in the frame of opportunities and threats (explaining potential negative impacts on the value chain). Tip 2: Identifying “the winners” of LTS policies and measures and mobilizing them to advocate for the strategy. Tip 3: Conducting adequate economic impact assessments for various sectors is helpful for addressing concerns of the private sector. Tip 4: Using international cooperation to bring private sector representatives from various countries together to discuss similar concerns. Tip 5: Bringing in potentially contentious stakeholders at the modelling (technical) level rather than having to deal with them at a more political level.

4. REGIONAL COOPERATION ON LTS

So far, the examples of regional cooperation with an LTS focus beyond the European Union are scarce. They include primarily technical cooperation (scientific, modelling communities like DDPP LAC³); voluntary transnational networks at the technical level with an objective to facilitate peer learning, technical cooperation and information exchange (LEDS Global Partnership; 2050 Pathways Platform); sectoral regional LTS-related cooperation (e.g. in agriculture and food security); and topic-specific regional cooperation initiatives related to LTS. The latter includes e.g. regional cooperation on MRV issues and carbon markets (Partnership for Market Readiness; East African Alliance on Carbon Markets and Climate Finance; Pacific Alliance) or regional cooperation focusing primarily on adaptation issues (in SADC, SAARC).

The development of LTS at the national level can benefit substantially from the dialogue on coordination and harmonisation of LTS approaches at the regional level. On the one hand, regional organisations can play a key role in facilitating LTS-related technical cooperation (e.g. expert exchange on LTS modelling and scenario development) and provide a regional platform for learning, knowledge exchange, and sharing good practices across countries on LTS development and implementation. On the other hand, regional organisations can also go one level deeper and help shape the common vision for the long-term low-carbon transformation of the region as a whole and facilitate the bottom-up emergence of a regional approach to long-term decarbonization. For the participating countries, regional exchange can bring the benefits of strengthening their domestic LTS capacities and finding common ways of dealing with challenges.

5. ASEAN CLIMATE POLICY CONTEXT

ASEAN envisions, among other strategic priorities, to be a sustainable community that promotes social development and environmental protection through effective mechanisms to meet current and future needs of the peoples, and a resilient community with enhanced capacity and capability to adapt and respond to social and economic vulnerabilities, disasters, climate change as well as emerging threats and challenges⁴. **One major argument for the development of LTS in AMS is long-term adaptation planning that would help the region establish robust regional and national mechanisms for adequate responses to climate impacts.** Furthermore, it is necessary to eliminate the risks that climate change poses for economic and social development.

While the world moves towards climate neutrality, the demand for certain resources (such as fossil fuels) is likely to decrease, the exports of companies can be affected due to new production standards, and

3 Deep Decarbonization Pathways Project implemented through the Inter American Development Bank.

4 [ASEAN 2025: Forging Ahead Together](#).

international investment opportunities may be lost because certain areas will not be supported through investment in the future. **To ensure that economic growth and prosperity is preserved for decades ahead, ASEAN needs to face crucial choices that will influence its energy mix and emissions profile.** Drafting and implementing ambitious LTS will help to avoid sticking to emissions-intensive energy sources and instead remain on a sustainable development path.

ASEAN has a long history of promoting environmental cooperation among its Member States. Since 2007, ASEAN has been consistently reaffirming its commitment to climate action through the ASEAN Joint Statements on climate change.⁵ The ASEAN Working Group on Climate Change (AWGCC) has been functioning since 2009.⁶ ASEAN countries have been responding to climate change by focusing on the implementation of relevant actions in the ASEAN Socio-Cultural Community (ASCC) Blueprint 2025.⁷ In order to realise the relevant strategic measures in the ASCC Blueprint 2025, AWGCC is guided by the AWGCC Action Plan that comprises priority actions until 2025. In 2015, ASEAN Senior Officials on Environment (ASOEN) agreed to develop an ASEAN Strategic Plan on Environment (ASPEN), with climate change being one of the strategic priorities. Moreover, ASEAN Chairs annually undertake efforts to prioritise climate action in the regional collaboration. For example, the Special ASEAN Ministerial Meeting On Climate Action (SAMCA) and Expanded-SAMCA (E-SAMCA) provided a platform for AMS to engage one another on their climate action plans in a regional “Talanoa” dialogue setting, reaffirm their commitment to the Paris Agreement, and galvanise regional action to address climate change.⁸ Furthermore, the ASEAN Climate Change Partnership Conference was launched in 2018 with a view to enhancing ASEAN-wide cross-sectoral and multi-partner coordination in addressing climate change issues in the region.⁹

More specifically, ASEAN regional climate cooperation has particularly focused on the following topics: carbon pricing, MRV collaboration, climate finance issues including the development of the ASEAN Climate Finance Strategy, ASEAN Green Bond Standards, cooperation on adaptation and disaster risk management, as well as sector-specific collaboration (energy performance standards; ASEAN Transport Strategic Plan; cooperation in the AFOLU sector, etc.).¹⁰

6. LTS STATUS QUO IN ASEAN AND AMS

The study analysed where AMS currently stand in the LTS development process along a matrix of LTS building blocks focusing on four main elements (LTS content, LTS process, monitoring & review procedures, and capacities for LTS development)¹¹. The matrix was developed at the beginning of the study and is based on desk research and the findings from analysing good global practice. For each category, the information was gathered and analysed to conclude what is the current state of play in AMS.

At the current stage, AMS have already established many elements that are key for LTS development. At the same time, the analysis illustrates that there are areas where support in the form of regional or international collaboration could provide valuable guidance for AMS in order to catalyse LTS formulation in the region.

In particular, regarding the **Vision** component, seven AMS have issued high-level policies and strategies that will help them formulate LTS. At the same time, the vast majority of such policies is short to mid-term, with only a few AMS having developed long-term policies or analyses. In some AMS, current policy planning/ visioning does not go beyond 2030. With regard to **Target setting**, six AMS have either set long-term GHG reduction targets or are in the process to do so; however, some AMS mentioned technical constraints (e.g. the difficulty of determining the peaking year). All AMS have determined their sectoral priorities for

5 For example, ASEAN Secretariat 2019.

6 [ASEAN Cooperation on Environment 2021](#).

7 ASEAN Secretariat 2016.

8 [National Climate Change Secretariat Singapore 2018](#).

9 [ASEAN Secretariat News 2018](#).

10 UNFCCC Regional Collaboration Centre – Bangkok 2019; The ASEAN 2020.

11 See Chapter 3 for more information on the matrix and its sub-categories.

inclusion in the LTS: Electricity and heat production were ranked as the highest priority by the majority of AMS, followed by forestry and other land use, and transportation.

Concerning **Scientific input** for LTS development, more than a half of AMS mentioned existing in-country analytical capacities for conducting LTS-related research and long-term scenario modelling (e.g. a technical or research institution that can conduct such modelling). Some AMS are already conducting modelling and assessment exercises that will build the basis for LTS (e.g. sectoral mitigation analysis up to 2040 in the Philippines; sectoral modelling and assessment of mitigation potential in Malaysia). However, not in all AMS those capacities are sufficient to inform the LTS process due to limited familiarity with modelling tools, insufficient information to develop long-term projection models, insufficient technical capacity to implement mitigation modelling, incomplete or inconsistent sectoral data (e.g. for the AFOLU sector) and the insufficient level of technical capacities of the agencies involved in climate action at the national and local levels. The need to conduct a technology needs assessment to determine technologies necessary to decarbonize the economy was also particularly highlighted. Whereas more than two thirds of AMS have experience with the establishment of MRV procedures, some indicate that particularly local, sectoral and facility-level MRV procedures and their application on the ground need to be improved. Finally, some AMS have insufficient technical capacities to conduct sectoral vulnerability assessments that are necessary to inform the adaptation component of LTS.

More than two thirds of AMS mentioned having adopted mitigation and adaptation **policies and measures** that will be relevant for LTS development. During NDC preparation and reporting under UNFCCC, countries have identified some particular sectoral priority areas that need to be addressed to decarbonize their economies as well as adaptation priorities. Some AMS are already at the advanced stage of creating a legal and regulatory basis for low-carbon development. Along with Singapore that already has a carbon tax in place, seven other AMS have plans or interest in domestic carbon **market mechanisms**. Five AMS referred to international market-based mechanisms as areas where they have past experience and see potential ways to implement the LTS in the future, for example, through voluntary cooperation via international transfers of mitigation outcomes under Article 6 of the Paris Agreement. Seven AMS stressed the importance of **climate finance** for LTS implementation. Moreover, the need to translate planned climate policy measures and the LTS as a whole into a viable business proposal was particularly emphasized. While some AMS are establishing national mechanisms to mobilise and channel climate finance, the regional climate finance strategy is expected to play an important guiding role.

AMS are at various stages of the **LTS development process**. So far, Singapore and Indonesia are the only AMS that formally submitted their LTS to the UNFCCC. Indonesia is already at the advanced stage of the formulation process, and in Thailand LTS development is ongoing. Brunei Darussalam, Cambodia, Lao PDR or Myanmar have already initiated the LTS development process. Malaysia, Viet Nam and the Philippines mentioned that so far, the work on updating the NDCs had been a particular focus and the work on the LTS will build upon NDC efforts. Some AMS expressed interest in learning how the LTS process is organised in other AMS. With regard to **Governance**, the majority of AMS mentioned already existing institutional and coordination arrangements that will be used for or built upon for LTS development. At the same time, some AMS highlighted that cross-sectoral coordination mechanisms are insufficient at the moment; another challenge is vertical coordination and the involvement of subnational and local levels. One AMS mentioned a lack of an institution that can provide scientific background for LTS development; in some AMS, technical expertise of research institutions needs to be enhanced in order to conduct LTS modelling. Some AMS highlighted that the coordination between the science and policy-makers is insufficient. All AMS have put in place processes to **involve stakeholders** in climate policy development; five AMS explicitly referred to experience in engaging sectoral actors. Despite the existence of various **societal and private sector engagement** platforms and initiatives, some AMS mentioned concerns that the acceptance by the public and the private sector might be a challenge for LTS development.

With regard to **Monitoring & review** procedures, some AMS mentioned limited experience in monitoring the impacts of climate actions and the progress towards the achievement of climate policy goals as well as the lack of credible methodologies to measure the outcomes of climate policies and actions. Some AMS mentioned the necessity to institutionalize an efficient reporting system and a robust inventory of GHG emissions and removals that is accurate and reliable, and more generally, strengthen the capacities for the preparation of climate reports.

Overall, the study identified the following main challenges and capacity gaps on the way towards LTS formulation in ASEAN:

1. Lack of long-term vision for particular sectors and long-term low-carbon development vision on the whole (focus on short-term policy making, no clear understanding of the incentives towards decarbonisation and the compatibility of economic and development strategies with climate action);
2. Limited familiarity with modelling tools and insufficient technical capacities to conduct LTS modelling and develop scenarios;
3. Limited knowledge and technical capacities to conduct sectoral feasibility assessments of mitigation policies to inform LTS target setting (including sectoral targets);
4. Limited knowledge and technical capacities to conduct economic impact assessments to analyse economic implications of planned policies and targets;
5. The need to conduct technology needs assessments to determine the type of technologies needed to decarbonize the economy;
6. Limited availability and accuracy of sectoral and economic data necessary for long-term modelling; limited knowledge of which data is needed; the need to improve local, sectoral and facility-level MRV procedures and their application on the ground;
7. Insufficient technical capacities to conduct sectoral vulnerability assessments that are necessary to inform the adaptation component of LTS;
8. Insufficient level of technical capacities to implement climate policies and measures of the institutions involved at the national and local levels;
9. Financial constraints to implement climate policies and measures on the ground;
10. Potential challenges regarding societal and private sector buy-in of mitigation measures;
11. Lack of credible methodologies to measure the outcomes of climate policies and actions.

Based on the identification of these areas, a set of recommendations is proposed in the study.

7. RECOMMENDATIONS

A. Initiate an ASEAN political exchange on elements of a regional long-term low GHG emission development vision

Several AMS expressed the view that having a common regional long-term low GHG emission development vision for ASEAN could help them develop and refine their national LTS. At the same time, other AMS stressed the very different national circumstances and contexts in AMS, due to which the development of a common regional vision may not be feasible. To find the middle ground, it can be valuable to reach some extent of alignment on **general pathways and milestones for particular sectors** ("Where ASEAN wants to be in 2050 in terms of economic and social development, taking into consideration the risks posed by climate change? What kinds of sectoral transformation would be necessary for that? What benefits will long-term low GHG emission development bring to the region?") without focusing on common target setting.¹² The starting point for the discussion could thus be the exchange on a **joint regional framework for low-carbon development**. The benefit of such a framework would be creating additional political momentum for LTS to complement the current strong focus on NDCs in many AMS.

To support the creation of such a regional framework, ASEAN as a regional organisation can use the results of this study as well as experience from past and ongoing cooperation on climate and development within

¹² Although even in the target setting, which is a very sensitive issue, there is already some regional alignment e.g. in the energy sector – the agreement on joint ASEAN renewable energy and energy efficiency targets.

ASEAN to establish continuous and empowering exchanges for the implementation of long-term low GHG emission development. The framework will help to jointly identify progress on selected elements of LTS in the AMS which helps to draw the “big picture” for the region as a whole and selected sectoral low GHG emission pathways in ASEAN until 2050. To this end, regional as well as individual consultations with AMS on how to organise such a framework could be initiated with AMS to share priorities for such an exchange and the potential contributions by AMS. This may result in a structure where AMS are rotating in hosting exchange events together with ASEAN.

B. Organise specific technical sessions in selected areas & sectors related to LTS

1. First technical session: LTS modelling, feasibility & impacts assessment

Technical experts working on LTS could share their **experience in the application of different modelling tools** and developing projections and scenarios for the LTS, and demonstrate which sectoral, economic and emissions data is applied to develop such projections. Such an exchange could help AMS find the modelling tool that best suits their circumstances.

Another aspect that such technical exchange can focus on is **how economic impact assessments are conducted in other AMS**. Some AMS have difficulties in assessing which implications certain mitigation targets will have for the economy, which leads to challenges in determining LTS targets. Furthermore, for some AMS it is a challenge to determine how far emissions can be driven down in various sectors. Thus sharing **experience with conducting sectoral impact assessments** (within ASEAN but also with experienced partners such as the EU) would be extremely helpful.

To overcome these challenges, **the first technical session could focus on two aspects:** 1) how to conduct technological feasibility studies and assess sectoral mitigation potential to set feasible LTS goals; 2) how to identify impacts of climate policy on macroeconomic factors. The exchange on these issues could take place both within ASEAN and between ASEAN and its international partners. The major sectoral focus could lie on the energy and the AFOLU sectors as major sources of greenhouse gases.

2. Second technical session: Data basis for LTS development

Several challenges related to data have been identified during the analysis including incomplete sets of historical data, lacking / outdated data in certain sectors, need for improvement of the MRV of data, limited knowledge of data providers about data collection requirements (data providers do not compile / do not disclose all the necessary data) and inconsistencies in data collection. To overcome these challenges, technical exchange could focus on (1) sharing experience with data collection and management in various sectors; (2) organising regional trainings for data providers; (3) exchange on regional MRV guidelines and/ or standards; (4) sharing experience on how existing data gaps can be overcome in developing LTS projections.

3. Third technical session: LTS development process & review progress system

Some AMS considered it valuable to learn how the LTS process is organised in other AMS to inform their national processes. Ways to secure the whole-of-nation approach and guarantee acceptance of the LTS by 1) all sectors; 2) the private sector have been identified as areas of particular interest for exchange within ASEAN and between ASEAN and its international partners. Another aspect where AMS seek knowledge exchange is reviewing the progress of climate policies (identification of performance indicators; improvement of climate policies and measures).

On a more technical level, the study recommended developing a guiding manual for LTS formulation and implementation review progress system based on the main LTS building blocks identified in the study and the thematic areas mentioned above. In addition, especially for the technical sessions on modelling and data collection, regional capacity building trainings for the staff of research institutions or data providers would be very useful for further catalysing LTS development in AMS. ASEAN may not only facilitate the exchange within the region but also build the bridges to international partners such as the EU.

C. Establish ASEAN regional exchanges in key areas for LTS development:

1. Cooperation on emerging low-carbon technologies

Regional cooperation on R&D and deployment of needle-moving low-carbon technological solutions, for example, relating to Carbon Capture, Utilisation and Storage (CCUS), low-carbon hydrogen (as alternative fuel and industrial feedstock), energy storage systems and energy efficiency can help AMS decarbonise their industry sectors. Such exchange could focus on 1) information regarding the availability of and experience with particular technologies; conducting technology needs assessments; 2) co-developing or jointly developing specific technologies that are identified as key triggers for transformation; 3) for countries where geological formations to store carbon are restricted, finding partners with carbon storage opportunities within the region for dialogue on cooperation approaches. There is scope for AMS to work closely with international partners to build capacity and cooperate on harnessing these emerging low-carbon technologies.

2. Market mechanisms

A regional network for carbon pricing could be established with an aim to share experiences with carbon pricing instruments (for those AMS who are willing to do so to search for the most suitable instrument and start its development). For those AMS who are willing to go one level deeper in the cooperation, it would also be conceivable to start a regional discussion on the possibilities of future regional / bilateral market mechanisms (e.g. under Article 6 of the Paris Agreement). Due to the lack of cost-effective carbon removal technology in the short-run, some AMS may face restricted opportunities for in-country mitigation and removals, and would be interested in finding partners within the region for discussion on potential joint market-based approaches. Cooperation on oceans and sinks ("blue carbon") could also be discussed in the framework of the dialogue on market mechanisms (but to a lesser extent than forests).

3. Adaptation in the context of LTS

ASEAN cooperation on adaptation is ongoing but in the light of the study results, it can be complemented with the following forms of cooperation:

- Enhancing technical capacities of AMS to conduct long-term vulnerability assessments (e.g. through regional technical workshops and trainings of experts);
- Exchange on assessing and strengthening resilience of critical ecosystems and infrastructure (i.e. wastewater treatment facilities, water utilities, waste disposal facilities, landfills, air quality monitoring stations, hazardous waste storage facilities, etc.);
- Developing sectoral impact models for climate-sensitive sectors;
- Exchange on disaster risk reduction approaches (including the improvement of disaster risk assessment, and financing and insurance solutions such as the planned Southeast Asia Disaster Risk Insurance Facility).

4. Climate finance in the context of LTS

Climate finance is seen as a crucial instrument for LTS implementation by the vast majority of AMS. Regional cooperation on climate finance is already ongoing, e.g. with the dialogue on ASEAN Climate Finance Mobilization and Access Strategy). However, it could be complemented with the following aspects: 1) development of regional climate projects, which can be more attractive for international finance to come in; 2) bringing together Central Banking Institutions and Finance Ministers of AMS to have discussions on LTS across ASEAN – as climate finance institutions' involvement is highly important to formulate LTS as viable business proposals.

8. COVID-19 IMPLICATIONS ON LTS DEVELOPMENT

The study identified that AMS see both positive and negative implications of the COVID-19 pandemic on the LTS development. In particular, among the negative implications, AMS emphasized the need to divert some of the resources towards healthcare away from climate action; and the restricted functions of ministries and other institutions involved in climate action that slow down the implementation of climate measures and the LTS development process in general. COVID-19 also caused constraints in data collection for some AMS, and almost all stakeholder engagement processes have to be limited to virtual formats.

Some AMS mentioned the possibility of a need to revisit NDC targets set before COVID-19 as some of them might not be achievable any longer. Moreover, other AMS also highlighted the implications for the private sector, in particular the decreased financial resources to invest in low-carbon production processes and services. Some AMS spoke more broadly of negative socio-economic impacts such as increased risks for vulnerable groups, labour force impacts, as well as the loss of job and income, which indirectly influence LTS development as well as the content of LTS.

On the positive side, COVID-19 crisis was seen by some AMS as a good opportunity for ecosystem and economic recovery that is consistent with climate-resilient and sustainable development. COVID-19 helped public as well as private companies to start seeking new opportunities for strengthening their climate action and recovering in a low-carbon manner. Additionally, enhanced digitalisation due to the pandemic and the fact that actors involved in climate action can easily connect remotely, led to even higher interaction and connectivity in some AMS, speeding up LTS development. Several AMS noticed that so far, climate action as such is not supposed to be affected by COVID-19.

1. INTRODUCTION

1.1. Background

In accordance with Article 4, para. 19, of the Paris Agreement, all Parties should strive to formulate and communicate long-term low greenhouse gas emission development strategies, mindful of Article 2 taking into account their common but differentiated responsibilities and respective capabilities, in the light of different national circumstances. The Conference of the Parties to UNFCCC (COP), by its decision 1/CP 21, para. 35, invited Parties to communicate such strategies to the UNFCCC Secretariat by 2020. While often referred to as LTS or LT-LEDS, in this study these strategies are referred to as long-term strategies (LTS).

On the one hand, LTS illustrate how Parties plan to decarbonize their economies and make a contribution to the achievement of the long-term goals of the Paris Agreement.¹³ Recognizing that climate change is a major threat to economic systems and livelihoods globally as well as at country level, countries recognized that their GHG emissions need to peak and decline to achieve net zero emissions in the second half of the 21st century.¹⁴ Equally, countries strive to develop long-term viable adaptation responses to the adverse impacts of climate change. In the landscape of the country efforts to achieve these goals, LTS need to show the long-term direction of travel and be complementary to the short-term NDC submission and review process. LTS need to guide NDCs in terms of goal setting and help increase NDC ambition over time.

On the other hand, LTS play a much more significant role than purely fulfilling international climate policy commitments: They are in the very interest of the countries as they help them embark and remain on a path of sustainable economic development and mitigate climate-related risks in a timely manner. The required transformative changes (e.g. in infrastructure, mobility, energy systems, manufacturing and food production) should allow not just a reduction in GHG emissions but also encourage, as well as protect, economic growth and ensure inclusive development.¹⁵ The aim of the LTS is, thus, to identify risks (e.g. carbon lock-in, sectors in decline in the low-carbon economy), opportunities (e.g. new activities and growth prospects, improved energy access or better air quality, the use of emerging technologies), potential (for short-term action and adaptation) as well as uncertainties (e.g. low-carbon technology availability, future fossil fuel prices)¹⁶ of low-carbon development. LTS are a perfect starting point to initiate political, institutional, legal, economic and social processes that bring the countries on a long-term trajectory consistent with climate goals, while at the same time achieving their development priorities. LTS are critical planning tools that enable the transition in all economic sectors and help to avoid technology lock-in. Having clarity regarding the long-term direction makes it easier for policy-makers to make decisions in the short and medium term, provides a clear signal for economic and investment decisions of the private sector, helps attracting international climate finance and makes short-term sectoral planning more efficient.¹⁷

The modern world is characterized by the processes of globalization and regionalization, with the economies being highly interconnected and interdependent. Countries within one region share geographic features, and adverse impacts of climate change often affect several countries simultaneously.¹⁸ As a result, LTS are important not only from a national but also from a regional perspective. Regional organisations can take the lead and shape a common vision for the region to provide a long-term framework for addressing negative climate impacts, advancing the welfare and guiding development. Thinking about climate action as a development choice is paramount and regional efforts need to show that climate action is not just about reducing emissions but about choosing a new development path. A failure to transform regional development pathways could roll back years of progress and put at threat sustainable and inclusive growth.¹⁹

¹⁸ IDB and DDPLAC 2019.

¹⁹ Ibid.

With long and densely populated coastlines and heavy reliance on agriculture for livelihood, especially for a large segment of population living below the poverty line, the ASEAN region is among the most vulnerable regions in the world. According to the Global Climate Risk Index 2020, **five of AMS are among the top 15 countries most affected by climate change impacts from 1999 to 2018.**²⁰ In the last 45 years, the most economically damaging events in Southeast Asia were climate-related ones, namely the 2011 floods in Thailand, which caused over 45 billion US dollars worth of damage, and Typhoon Yolanda in the Philippines in 2013, which resulted in 10 billion US dollars worth of damage.²¹ Climate impacts are projected to cause significant losses in the coming decades.

The Asian Development Bank (ADB) estimated that climate change impacts could lead to the **reduction of the region's GDP by 11% in 2100 under the BAU emissions scenario.**²² ADB analysis illustrates that 185 million people in Southeast Asia are likely to experience water stress by 2050. The sea level is projected to rise by 70 centimeters by 2100, putting at risk many areas of Southeast Asia with many productive activities and about 436 million people living within 100 kilometers of the region's coasts.²³ In Indonesia, the Philippines, Thailand, and Viet Nam, deaths due to heat-related cardiovascular and respiratory diseases will rise by 3% and 14%, respectively, in 2050; and will increase by 10% and 25%, respectively, by the end of the 21st century. Southeast Asia's rice production is expected to suffer a decline of up to 5% between 2010 and 2050 due to climate change, and the production of rice along the Mekong River Delta in Viet Nam is expected to be severely impacted, particularly during selected seasons when production may decline by over 40%.²⁴

Furthermore, Southeast Asia, which hosts 8.5% of the global population,²⁵ is a booming economic region experiencing the growth in energy demand and GHG emissions. While land use emissions are the largest source of GHG emissions,²⁶ Southeast Asia's **growth in electricity demand**, at an average of 6% per year, has been among the fastest in the world. Since 2000, **overall energy demand** has grown by more than 80% and a large share of this growth has been met by a doubling in **fossil fuel use.**²⁷ Oil is the largest element in the regional energy mix and coal has been the fastest growing. Southeast Asia is one of a few regions where the share of coal in the power mix increased in 2018 and, based on today's policy settings, coal demand is projected to rise steadily over the coming decades.²⁸

20 Germanwatch Global Climate Risk Index 2020. AMS included in top-15 most affected countries from 1999 to 2018: Cambodia (12), Myanmar (2), Philippines (4), Thailand (8), Vietnam (6).

21 The ASEAN 2020.

22 Asian Development Bank 2015.

23 Ibid.

24 Ibid.

25 IRENA 2020.

26 Asian Development Bank 2015 (data for Indonesia, Malaysia, Philippines, Thailand and Viet Nam).

27 IEA 2019.

28 IEA 2019.

At the same time, the region is already actively exploring its **vast sustainable energy potential**. The International Renewable Energy Agency (IRENA) has estimated that Southeast Asia could meet about **41% of all of its energy needs from renewable energy by 2030** and create an additional **6.7 million green jobs by 2050**.²⁹ Enhanced efforts to improve building and equipment efficiency could help reduce the growth in cooling demand by around half in 2040.³⁰ Moreover, preventing deforestation and enhancing agricultural productivity can lead to significant emissions reductions.³¹

Against this background, the development of a long-term climate policy vision is crucial for ASEAN. The region currently **stands at a crossroads in terms of its energy future**, with sustainable and affordable energy being the cornerstone of growth and the pursuit of climate and sustainable development goals for ASEAN countries. ASEAN equally needs **robust long-term adaptation planning** that would help the region establish robust regional and national mechanisms for adequate responses to climate change impacts.

1.2. Objective

Conducting a scoping study focusing on the development of LTS in AMS was identified as one of the key activities under the ASEAN Working Group on Climate Change (AWGCC) Action Plan within the Action Line “Strengthening science and policy interface in climate change related decision-making process” led by Indonesia, which is one of three Action Lines prioritized by the EU and the AWGCC.³²

The main purpose of the scoping study is to identify the priorities, the direction and the extent of ASEAN interventions related to LTS as well as to lay out the specific steppingstones to advance the LTS agenda in the ASEAN region.

In particular, this scoping study aims to fulfil the following objectives:

- Share knowledge and experience related to LTS and stocktake the status of LTS development in the ASEAN region;
- Identify scientific and policy interface to support the formulation of LTS;
- Exchange lessons learned from regional and international partners in the formulation of LTS.

The study thus aims to provide an answer to the question: How can ASEAN and its Member States best move forward in the LTS formulation process, taking into consideration good global practices and the regional circumstances?

1.3. Approach

To provide an answer to this question, the study followed a three-step-approach:

1. Accumulating global practice and identifying lessons learnt from already developed LTS;
2. Identifying where AMS currently stand in LTS development, their barriers and opportunities;
3. Proposing specific regional mechanisms for advancing and harmonising LTS in ASEAN.

The outcomes of the scoping study will be shared within AWGCC and feed into the ASEAN Senior Officials on the Environment (ASOEN) Meeting and ASEAN-EU High-level Dialogue on Environment and Climate Change.

1.4. Structure

Chapter 1 “Introduction” describes the background for and the objectives of the Scoping Study. **Chapter 2 “Status quo of Long-term Strategies: Global practice”** provides a brief overview of submitted LTS and highlights practical experience that may be worthwhile for ASEAN to refer to and consider. **Chapter 3 “Good Practices from submitted LTS”** presents already existing LTS efforts identifying good practices structured along four major thematic areas:

1. LTS content (for example, setting targets and determining policies and measures);
2. LTS development process (featuring, for example, coordination arrangements at the regional, national and subnational level, etc.);
3. LTS capacities (which capacity gaps countries identified and how they coped with them);
4. LTS implementation and monitoring (how countries plan to track implementation progress through monitoring and review procedures).

Chapter 4 “Regional cooperation in LTS development” explores the importance of regional cooperation for supporting LTS-related efforts by countries and analyses practical examples of inter- and transnational cooperation in the LTS development process. Finally, the chapter provides a brief overview of existing international tools and manuals on how to develop an LTS that can be helpful for AMS.

Chapter 5 “Long-term Strategies in ASEAN: Status quo and Ways forward” starts by providing information on current ASEAN climate policy commitments such as fulfilling UNFCCC reporting requirements and actively participating in the NDC process. Second, it emphasizes the rationale for LTS development in ASEAN and, third, illustrates climate policy measures already undertaken (also at the regional level) and progress that has been made by AMS, which the LTS formulation process can build upon. Thereafter, the chapter focuses on the detailed analysis of ongoing LTS efforts in AMS, remaining challenges and opportunities for the future.

Chapter 6 “Impacts of COVID-19 on LTS development in ASEAN” discusses initial insights into the impacts of COVID-19 on the short- to long-term climate policy planning and implementation – with a specific view on the ASEAN region.

Chapter 7 “Conclusion and Next Steps” proposes concrete next steps and activities for AMS to foster LTS development at the national level as well as suggests specific regional mechanisms for advancing and harmonising LTS in ASEAN as a region.

1.5. Methodology

In order to support the three-step-approach described above, several types of information sources were used. For Chapters 2 to 6, **desk research** including subsequent qualitative assessment of academic literature, reports, as well as scientific and policy papers delivered by research institutions focusing on climate policy issues was conducted. Additionally, insights for Chapter 3 were provided by means of conducting **in-depth interviews** with representatives of countries and jurisdictions that have already developed LTS and international institutions that are supporting countries in the LTS formulation process.

The choice of the countries as interview partners was primarily guided by the idea of covering the ones representing various regional contexts and different levels of capacities for LTS development. Countries were selected **only from those who have already developed and officially submitted their strategies to the UNFCCC Secretariat at the time of study development**. Moreover, the intention was to focus on economic and development patterns that have more similarities with AMS (e.g. small-island developing states with low emissions were not selected). With the maximum restriction of conducting five interviews to obtain detailed information that is manageable and offers sufficient data for a fair analysis, representatives from the following jurisdictions were selected: EU (regional organization with ambitious climate policy), Germany (developed country with ambitious climate policy), Mexico (emerging and rapidly growing economy), Ukraine (developing country with strong coal mining lobby) and Costa Rica (developing economy and highly vulnerable state). An additional (6th) interview was conducted with a representative of 2050 Pathways Platform, a multi-stakeholder initiative launched at COP 22 to support countries seeking to develop long-term, net zero-GHG, climate-resilient and sustainable-development pathways. More information of the rationale for not selecting other countries that have submitted their strategies as interview partners are provided in Table 1.³³

As an additional means of providing insights for Chapter 5, a **questionnaire** was designed by adelphi and circulated among ministerial representatives from all AMS. The Scoping study presents the aggregated results of the questionnaire. Furthermore, **bilateral consultations** were conducted with AMS to extend the results of the questionnaire, verify preliminary results of the study and arrive at conclusions and recommendations. Chapter 7 presents the results of the analytical work based on aggregating and drawing conclusions from Chapters 2 to 6.

Table 1: Selection of interview partners for Chapter 3

Official LTS submissions under UNFCCC (at the time of study development)	Explanation why selected / not selected as interview partners
 Benin	Not selected as the country's LTS has a time horizon until 2025 instead of 2050 – not exactly a long-term strategy
 Canada	Not selected as developed economy – too similar to EU and Germany that were prioritised as interview partners
 Costa Rica	Selected
 Czechia	Not selected as part of EU
 EU	Selected
 Fiji	Not selected as it is a small-island developed state with very low emissions – very different from most AMS

Official LTS submissions under UNFCCC (at the time of study development)	Explanation why selected / not selected as interview partners
 Finland	Not selected as part of EU
 France	Not selected as part of EU
 Germany	Selected
 Japan	Not selected as developed economy – too similar to EU and Germany that were prioritised as interview partners
 Marshall Islands	Not selected as it is a small-island developed state with very low emissions – very different from most AMS
 Mexico	Selected
 Portugal	Not selected as part of EU
 Slovakia	Not selected as part of EU
 Singapore	Not selected – information gathered through Questionnaire for AMS and bilateral consultation
 South Africa	LTS submitted in October 2020 after all data collection for the study completed – no possibility to conduct an interview
 Ukraine	Selected
 United Kingdom	Not selected as developed economy – too similar to EU and Germany that were prioritised as interview partners
 United States	Not selected as developed economy – too similar to EU and Germany that were prioritised as interview partners

2. STATUS QUO OF LONG-TERM STRATEGIES: GLOBAL TRENDS

2.1. The Significance of LTS Development

LTS aims to show policy-makers, the private sector and the society as a whole “the direction of travel” that the country is going to pursue for years ahead. On this basis, societal and policy actors are able to better plan their decisions and make choices in present that will be relevant for their own and the country’s future. In climate policy, the need to bridge the short-term policy measures with long-term perspectives is particularly evident. While short-term policy measures are necessary to achieve short-term climate-related targets, a robust long-term perspective created by the government is key for achieving climate neutrality in the long term. LTS is thus a long-term signpost, which should guide short-term policy-making.

Having an LTS is equally important from an economic point of view because a lot of investments do not pay off immediately. Moreover, some technologies cannot be assessed and planned in the short term because their value can only be seen in the long term. Therefore, a long-term perspective is crucial to guide the economy by directing investments into “future-fit” areas and developing technologies that are relevant for the future. In the situation of periodic changes of government constellations, an LTS with a 30-year time horizon helps to provide political continuity, which preserves stability and gives the society and the economy certainty that the direction of travel will remain unchanged. Finally, having an LTS means having a clear international position in climate policy, which is valuable e.g. to attract international investment.³⁴

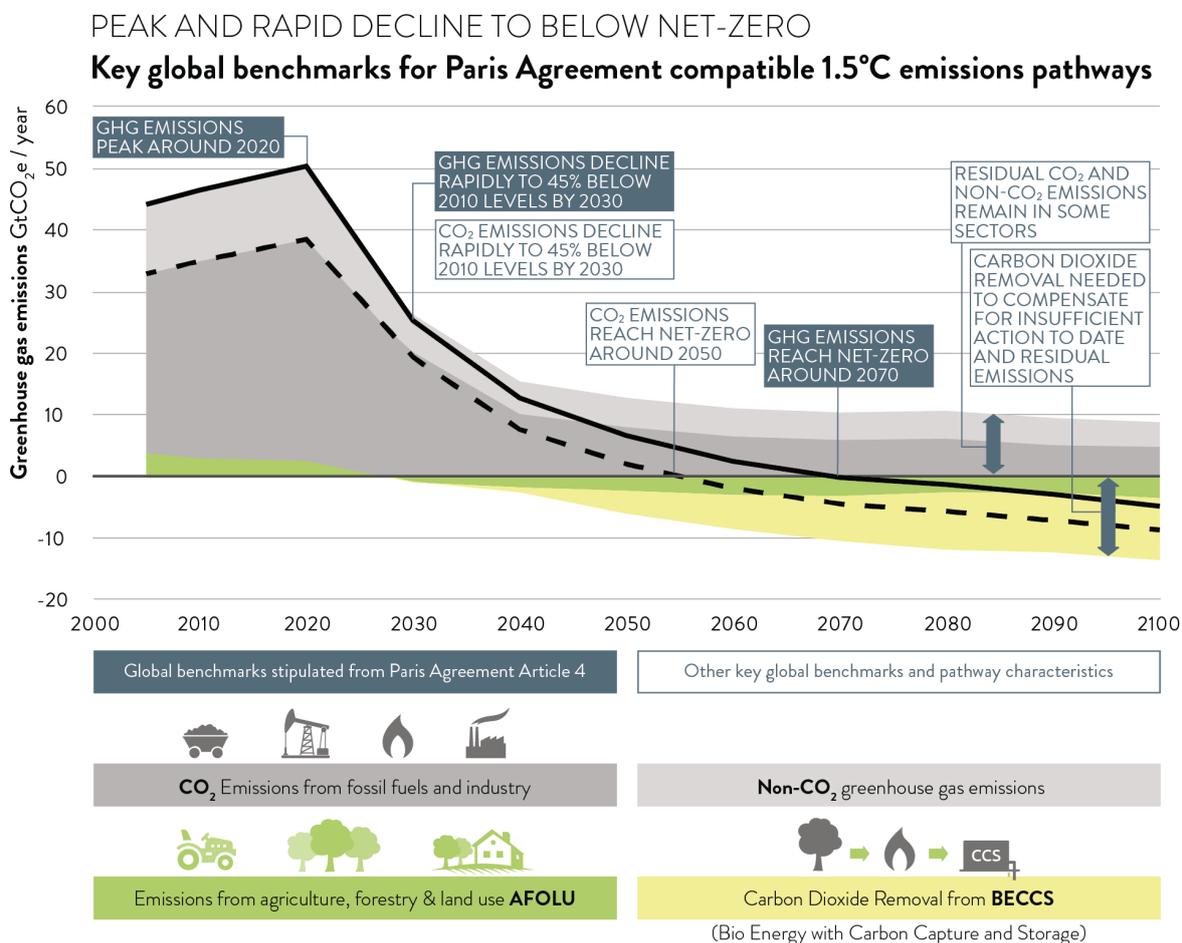
The Intergovernmental Panel on Climate Change (IPCC) Special Report “Global Warming of 1.5 °C” provides scientific evidence that global warming is likely to reach 1.5° C between 2030 and 2052 if it continues to increase at the current rate.³⁵ The report also describes potential impacts of climate change associated with global warming of 1.5°C, which are projected to increase further with 2°C warming. These include, for example, increases in mean temperature in most land and ocean regions, hot extremes in most inhabited regions, heavy precipitation in several regions, and the probability of drought and precipitation deficits in some regions, impacts on biodiversity and ecosystems, including species loss and extinction, as well as climate-related risks to health, livelihoods, food security, water supply, human security, and economic growth.

For limiting global warming to 1.5° C, annual global emissions would have to be reduced to below 35 billion tons by 2030, i.e. fall by 7.6% each year between 2020 and 2030.³⁶ GHG neutrality must be achieved in 2050 (see Figure 2). Limiting global warming to 1.5° C requires rapid and far-reaching changes in the areas of energy, land use, cities, infrastructure (including transport and buildings) and industrial systems. The lower the emissions in 2030, the easier it will be to reach the 1.5° C target. Figure 2 illustrates the Paris Agreement 1.5°C pathways and the three stages of global transformation and mitigation strategies as outlined in Article 4.1 (peak, rapid decline and zero GHG emissions) as well as the fourth key mitigation benchmark for decarbonisation (zero CO₂ emissions around 2050).³⁷ For every country to become an integral part of the global mosaic of reaching net zero, Article 4, para. 19, of the Paris Agreement, encouraged all Parties to formulate and communicate their respective LTS to the UNFCCC Secretariat.

Along with climate change mitigation, developing LTS is equally important from an **adaptation perspective**. In line with Article 7 of the Paris Agreement, countries follow the goal to enhance their adaptive capacity and resilience as well as reduce vulnerability, with a view to contributing to sustainable development, and ensuring an adequate adaptation response in the context of the goal of holding average global warming well below 2° C as well as pursuing efforts to hold it below 1.5° C. The Agreement requires all Parties, as appropriate, to engage in adaptation planning and implementation through e.g. national adaptation plans,

vulnerability assessments, monitoring and evaluation, and economic diversification. In this context, LTS can be a useful instrument to foster an integrated examination of climate impacts and provide a framework for better planning and facilitating the implementation and scaling up of prioritized adaptation options. Moreover, a robust LTS can support more enhanced integration of adaptation into sectoral and local planning and scale up investments for adaptation action.

Figure 2: Key global mitigation benchmarks³⁸



Source: Climate Analytics 2019

Developing an LTS, which is in line with 1.5° C paths, can bring synergies with all United Nations **Sustainable Development Goals (SDGs)** including not only benefits from avoided climate-change impacts. Climate protection often has direct social benefits (e.g. lower environmental and air pollution, higher energy security and more efficient use of resources). However, the exact choices over which mitigation options to deploy, at which scale and speed, and how to govern these actions will play a key role in determining how beneficial mitigation can be for achieving other societal goals (see box below).³⁹ Furthermore, LTS also helps bring about transformation in line with the **Sendai Framework on Disaster Risk Reduction**.

38 Climate Analytics 2019.

39 Ibid.

SDG's and long-term mitigation pathways – some examples:

Energy efficiency improvements required to limit warming to 1.5°C could facilitate an acceleration in energy access (SDG 7), sustainable cities and infrastructure (SDGs 9, 11 and 12), as well as strengthened collaboration between countries and companies (SDG 17). A shift to a more efficient transport and buildings could reduce water demand (SDGs 6 and 12), and the transition to a circular economy could have benefits for economic growth by reducing the resource needs of industry. Land management practices such as climate smart agriculture and agroforestry can improve rural livelihoods, increase resilience to climate change, and raise crop yields, thereby contributing to the reduction of poverty and an improved food security and nutrition (SDGs 1, 2 and 3). Forest restoration can conserve biodiversity and reduce erosion (SDG 15), and can provide income-generating opportunities for small holders (SDG 8).

2.2. LTS trend in international climate policy

LTS formulation is a complicated process involving cross-sectoral and multi-level collaboration between multiple stakeholders. It also requires smooth coordination between science and policy to enable the flow of sound scientific data into political decision-making processes. At the time of the development of this Scoping Study,⁴⁰ **28 countries and the EU** submitted their LTS to the UNFCCC Secretariat, with **Singapore and Indonesia being the only ASEAN Member States (AMS)** so far that have done so. Other countries include Austria, Belgium, Benin, Canada, Costa Rica, Czechia, Denmark, Fiji, Finland, France, Germany, Japan, Latvia, Marshall Islands, Mexico, Netherlands, Norway, Portugal, Republic of Korea, Slovakia, South Africa, Spain, Sweden, Switzerland, Ukraine, UK and the U.S. At the same time, dozens of other countries are currently working on their LTS.⁴¹

Among formal UNFCCC submissions, the EU, Portugal, Costa Rica, Germany, Fiji and the Marshall Islands set the goals of achieving **net-zero greenhouse gas (GHG) emissions by 2050**.⁴² Also other countries that submitted their strategies are aiming at substantial emissions cuts (see overview of the LTS targets in the table below).

Table 2: Overview of country goals and exemplary interventions by 2050

Country	Emission Reduction Goals for 2050	Baseline / base year	Main contributing sectors	Examples of planned interventions
 Benin	N/A (plan only extends to 2025)	2000	Agriculture; energy	Enhancement of sinks, raising resilience of local communities and the agricultural sector
 Canada	80% by 2050	2005	Energy, industry, transport	Energy sector transformation, technology innovations, electrification of transport, carbon storage
 Costa Rica	Net zero GHG emissions by 2050	Absolute target	Transport	Electrification of transport, standards for buildings, green tax reform, nature-based solutions
 Czechia	Pursue indicative level of 39 MtCO ₂ e of emissions in 2050	Absolute target	Energy	Energy sector transformation, EU ETS

Country	Emission Reduction Goals for 2050	Baseline / base year	Main contributing sectors	Examples of planned interventions
 EU	Net zero GHG emissions by 2050	Absolute target	Energy, transport	Energy sector transformation, EU ETS, technological innovations in energy, buildings, transport, industry and agriculture sectors, circular economy, enhancing sinks
 Fiji	Net zero GHG emissions by 2050	Absolute target	Land transport; electricity and other land use	Main focus on energy sector transformation; AFOLU sector measures
 Finland	At least 80% by 2050	1990	Energy, industry, transport	Energy and transport sector transformation, EU ETS, deployment of new technologies, circular economy
 France	75% by 2050	1990	Energy, industry, transport	Energy and transport sector transformation, buildings standards, EU ETS, circular economy
 Germany	Pursue GHG neutrality by 2050 as a long-term goal ⁴³	1990	Energy, industry, transport	Energy and transport sector transformation, buildings standards, EU ETS, circular economy, enhancement of sinks
 Japan	Net zero GHG emissions by 2050	Base year not specified	Energy, industry, transport	Energy, industry and transport sector transformation, enhancement of sinks, promotion of innovation, green finance and international cooperation
 Marshall Islands	Net zero GHG emissions by 2050	Absolute target	Electricity, waste	Transformation of the electricity sector, targeted measures in waste sector, cooking and lighting, climate finance strategy
 Mexico	50% by 2050	2000	Transport, energy, industry	Energy sector transformation, sustainable cities, enhancement of sinks, market-based instruments
 Portugal	Net zero GHG emissions by 2050	Absolute target	Energy, transport, industry	Energy and industry sector transformation, EU ETS, transport standards, circular economy
 Slovakia	Up to 90% by 2050	1990	Energy, industry	Energy and industry sector transformation, EU ETS, transport standards

43 Made at UN-Climate-Summit 2019, quoted in German Federal Climate Change Act.

Country	Emission Reduction Goals for 2050	Baseline / base year	Main contributing sectors	Examples of planned interventions
 Singapore	Halve emissions from its peak to 33 MtCO ₂ e by 2050 (with a view to achieving net-zero emissions as soon as viable in the 2nd half of the century)	Absolute target	Energy, industry	Energy and industry sector transformation, adoption of advanced low-carbon technologies; regional power grids; market-based mechanisms
 South Africa	Achieving the peak, plateau and decline trajectory for GHG emissions + action-based targets ⁴⁴	Peak, plateau and decline trajectory range will be used as benchmark	Energy	Energy sector transformation, carbon tax, carbon budgets, phasing out of inefficient fossil fuel subsidies
 Ukraine	31-34% of emissions from base year (=66-69% reduction) by 2050	1990	Energy, industry, transport	Energy sector transformation, modernization and innovation, enhancing carbon sinks, ETS planned
 United Kingdom	80% by 2050	1990	Energy, industry, transport (primarily heating in buildings and industry)	Carbon budgets, improving business and industry efficiency, heating standards, investment (green finance)
 United States	80% or more by 2050	2005	Energy, industry, transport	Energy sector transformation, storing carbon and reducing emissions with lands, research and innovation

Source: Original analysis by Climate Watch complemented with analysis of countries' LTS texts

Whereas the majority of the current LTS submissions include a balanced coverage of all key GHG emitting sectors, each LTS sets different priorities and reflects the individual economic profile of every country. For instance, some of the submissions focus largely on energy and are less extensive with regard to other sectors (Japan, Marshall Islands, Ukraine, UK). Some of the LTS are generally very brief with regard to the proposed policies and measures. In addition, only six submissions (Benin, Fiji, Marshall Islands, Mexico, Singapore, South Africa) include adaptation as a component – obviously the countries to which the topic is of particular importance.

LTS are normally developed as a result of a comprehensive, inclusive and transparent political process (e.g. in Germany, Ukraine the process benefitted from the input provided by government institutions, sectoral stakeholders and experts as well broader public – see Chapter 3.2 for more information on the process) involving stakeholders such as state and non-state actors as well as broader societal groups at

⁴⁴ Indicates that South Africa's GHG emissions should peak in the period 2020 to 2025 in a range with a lower limit of 398 Mt CO₂-eq and upper limits of 583 Mt CO₂-eq and 614 Mt CO₂-eq for 2020 and 2025 respectively. Emissions will then plateau for up to ten years after the peak within the range with a lower limit of 398 Mt CO₂-eq and upper limit of 614 Mt CO₂-eq. From 2036 onwards, emissions will decline in absolute terms to a range with a lower limit of 212 Mt CO₂-eq and an upper limit of 428 Mt CO₂-eq by 2050. The trajectory will regularly be updated.

the national, subnational and (in some cases) regional or supra-national levels. While the core element of LTS development is setting the country goals for deep GHG emission reductions by 2050, many strategies also determine the pathways for all key sectors and players to take concerted efforts in order to meet the national goals. The goals are ideally embedded in the national development framework; short-, medium-, and long-term objectives need to be well aligned with each other.⁴⁵

Although there is no obligatory structure of an LTS for the countries to follow, submitted LTS often include the elements as included in Figure 3. A more detailed analysis of the various components of LTS that were developed by other countries and the description of good global practices that may be relevant for and guide ASEAN in the LTS development process is included in the following Chapter 3.

Figure 3: Exemplary LTS components



Source: Based on World Resources Institute 2018

45 Based on the interviews with Germany and Ukraine on the development of their respective LTS.

3. GOOD PRACTICE FROM SUBMITTED LTS

The information that was collected during interviews with representatives of countries and jurisdictions that have already developed LTS was analysed inductively by forming broader clusters of thematic areas that appeared to be important for the countries during LTS development. Based on the identification of those clusters of information, their aggregation, generalization and qualitative analysis, a matrix of LTS building blocks was developed by the project team comprising four main categories related to LTS development.⁴⁶ Those include: (1) LTS content, (2) LTS process, (3) LTS capacities, and (4) LTS monitoring and implementation. Each category encompasses several specific categories as illustrated in Table 3, all of which represent important considerations for LTS formulation. In the text below, each of those aspects is presented in more detail. The respective sessions are based on interview outcomes as the main source of information, complemented with literature review.

Table 3: Building blocks for LTS development

LTS building blocks	Specific categories
LTS Content	Vision
	Target setting
	Scientific input (input data and modelling)
	Policies and measures
	Market mechanisms
	Climate finance
LTS Process	Steps of LTS development process
	Governance
	Science and policy interplay
	Stakeholder engagement
	Societal and private sector buy-in
LTS Capacities	Identifying capacity gaps
	Means of closing gaps
LTS Monitoring and Implementation	Tracking implementation progress
	Review and updating
	Alignment with NDC process

The study first discusses the category “LTS content”, the content obviously being the actual “face” of any LTS. Nevertheless, the content is an outcome, the quality of which is to a large extent determined by how the process of LTS development is organised. The existing level of capacities, in turn, plays a key role in identifying how the country needs to best organise the LTS development process to invest its scarce planning resources in the most efficient manner. Finally, built-in monitoring and implementation procedures guarantee the strategy’s life after adoption and the actual achievement of LTS objectives.

3.1. LTS Content

3.1.1. Vision and overarching objectives

A good starting point for LTS development and the actual core of the strategy is a robust social and economic vision of where the country wants and needs to be in 2050. The vision is much **broader than the question of the desired emissions level in 2050**. A vision helps a country to determine its desired path of **social and economic development**, taking into consideration the **opportunities offered and threats posed by climate change** in a 1.5 °C compatible world. For example, for the EU, the vision is embodied in the title of its LTS: “A Clean Planet for all – A European strategic long term vision for a prosperous, modern, competitive and climate neutral economy”.⁴⁷

For **least developed countries (LDC)**, a guiding question for developing a vision, for example, could be how to become a middle-income country (MIC), taking into consideration the risks posed by climate change. How to turn decarbonisation into an opportunity for green growth?

For **export-oriented countries**, the guiding question could be, for instance, how to preserve and strengthen their international exporting positions in a 1.5° compatible world. The resulting questions would be, for example, what changes would be necessary in the production chains for the importing countries to still be willing to purchase the products in a changed world, which sectors and areas would need to be strategically supported through investments, etc.

International climate science evidence (e.g. through IPCC reports) gives a clear indication that rapid and deep economic decarbonisation is necessary in all parts of the world in order to avoid the worst of the adverse climate impacts. By conducting an analysis of current and projected **physical as well economic impacts of climate change** – this is where a good foundation for LTS development lies – every individual country can easily come to a conclusion that **a nearly decarbonised economy** is the only viable future scenario in the long term.

Nevertheless, along with being ambitious in the vision, it is necessary to develop:

- **A vision that is shared among all sectors and players;**
- **An achievable vision.**

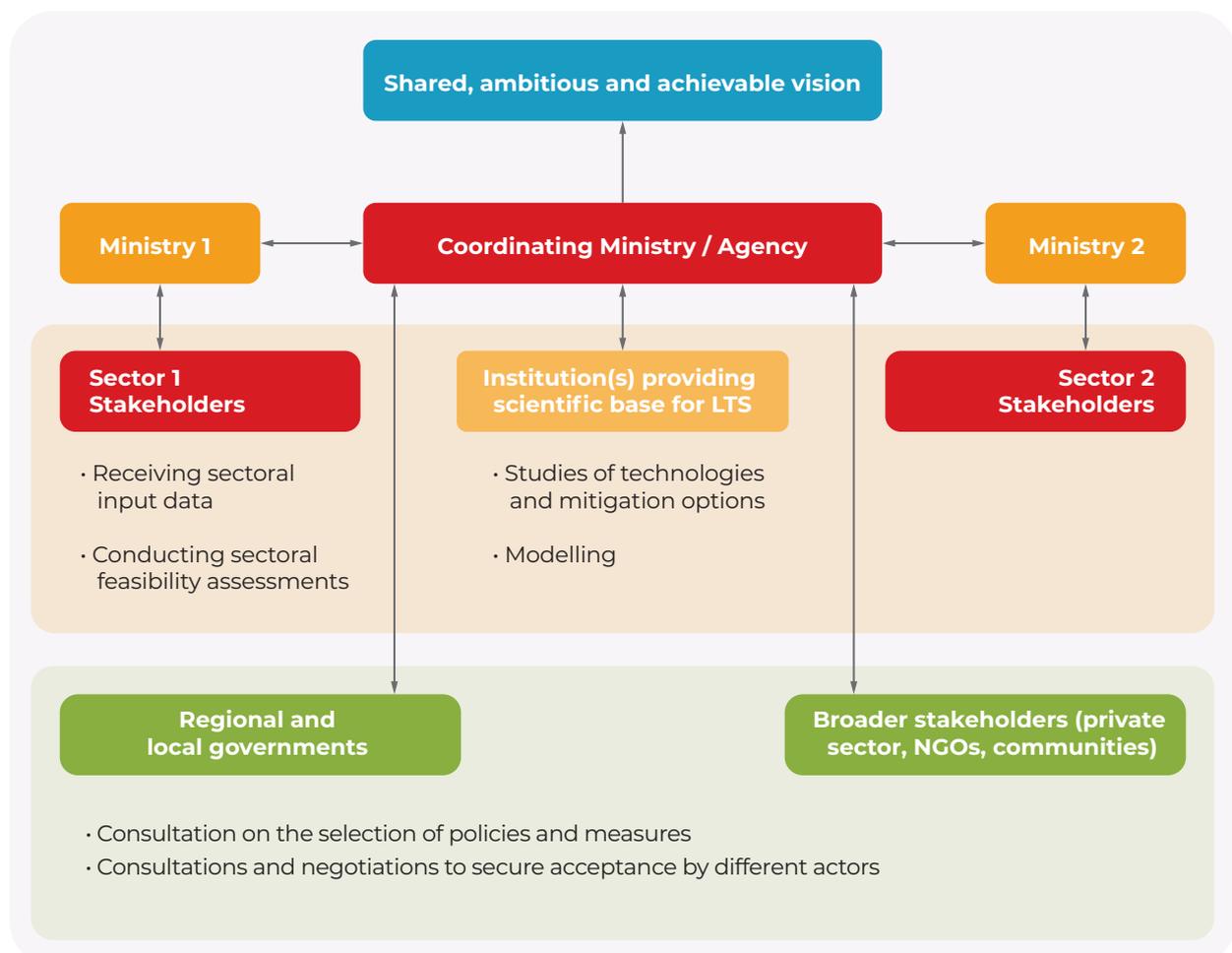
In order to develop a vision that is **shared throughout the society**, countries reach out to larger interest groups (private sector, public sector entities, civil society, etc.) to enrich the conversation and make the society familiar with the upcoming strategy. Doing so can help to ensure an inclusive process that already reflects on potential barriers during the implementation stage. Stakeholder engagement processes may be organised differently depending on where the most opinions are needed from (e.g. from particular sectors or specific stakeholders). More information on the topic at which stage of the LTS development process to engage which stakeholders can be found in the section “LTS process”.

⁴⁷ Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee, the Committee of the Regions and the European Investment Bank: A Clean Planet for all. A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy, COM/2018/773 final, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52018DC0773>.

In order to ensure that the **vision is achievable**, the interviewed countries and jurisdictions: **(1) conducted studies of available and future technologies and sectoral abatement potential;** **(2) conducted sectoral feasibility assessments in bottom-up consultations with sectoral representatives** (see more information in the section “Sectoral pathways”). Scientific institution(s) responsible for providing the basis for LTS development can conduct studies of various technologies and mitigation measures possible for the country, as well as the long-term abatement potential and costs of these options. Technology roadmaps, prepared by the governments in collaboration with industry stakeholders, academic experts, and technical consultants, serve as inputs for estimating the long-term mitigation potential of future technologies. On this basis, modelling – simulating possible mitigation pathways based on the possible technology options in light of national circumstances – is conducted. The process is complemented with consultations with sectoral representatives (feasibility checks).

Figure 4 summarizes ways to ensure that the vision is achievable (through the cooperation and **two-way information flows** between the coordinating entity and the main scientific institution as well as sectoral representatives) and shared across the society (through the cooperation and two-way information flows between the coordinating entity and all other actors involved).

Figure 4: A shared and achievable vision



Source: Own, based on interview outcomes

The vision is normally supported by formulating:

- An economy-wide, quantitative emissions reduction goal for 2050;
- Transformation pathways and major milestones (“big picture”) of what should happen in various sectors to achieve the 2050 goal as well as adaptation action objectives;
- Key milestones in the short / mid-term (e.g. by 2030) including more concrete measures and areas of action (may also include concrete sectoral emissions reduction targets, energy efficiency or renewable energy targets, adaptation action areas, etc.).

In the formulation of the strategy, it is important to find a good balance between not being too vague and not diving too much into detail. The strategy needs to be simple enough to understand but it has to contain the necessary details for others to follow and engage with the strategy. As the time horizon of the strategy extends over 30 years (2020-2050), it needs to give basic orientation over this period of time and at the same time leave enough room for flexibility in the choice of concrete measures and actions to incorporate new advances of science, political commitments, technology developments, etc. The next section gives an overview of global examples of the key considerations that lie behind setting the LTS targets.

3.1.2. Target setting

Goals in the LTS demonstrate the ambition level of the country while at the same time reflecting individual country circumstances. In the global practice, many countries set the long-term goal (especially if it is a goal to achieve climate neutrality) in an aspirational manner⁴⁸ (rather than by aggregating sectoral data or projections). In such cases, the primary objective of scenario modelling (*see also the following section 3.1.3 “Scientific input” for more information*) is not to set the target but rather to determine sectoral pathways needed to achieve the overall target. At the same time, target setting in such cases is supported by scientific evidence accumulated through international and national climate-related reporting, emissions trends and projections, as well as sectoral feasibility checks (*see “Sectoral pathways” below*).

However, there are also examples where the LTS target was set as a pure result of modelling. For instance, in Ukraine the LTS emissions reduction goal is a modelling result without political corrections. The goal is a combined projection for the energy sector, industrial processes and product use (cumulatively covering 85% of the country’s emissions) and LULUCF. Several scenarios were developed for the strategy – (*see the section “Scientific input” for more information on scenario modelling*) – and the emissions reductions achieved by 2050 through the most ambitious scenario were marked as Ukraine’s goal for 2050. At the same time, to ensure the acceptance of the strategy by the whole society, prior to the modelling stage, stakeholder engagement processes were used in Ukraine to determine policies and measures for inclusion in the LTS. Working groups on six thematic areas – future LTS building blocks – were established from representatives of various ministries, the Parliament, regional organisations, industry associations and other sectoral experts, NGOs and the broader public. Based on an initial proposal from the Ministry of Environment, the groups worked on long and shorts lists of policies and measures. The process resulted in the final prioritisation and selection of policies and measures that were further analysed through modelling and used in the LTS.



Case Germany

The target to reduce GHG emissions by **80 to 95% below 1990** emissions levels (without LULUCF) was already defined in the Federal Government's 2010 energy concept prior to the actual development of the LTS. The target was supported by scientific evidence, accumulated for the submission of **national and international reports** (e.g. national inventory reports under UNFCCC; bi-annual reports on GHG emissions projections for the EU). Germany developed reference scenarios for different emissions reductions up to 2050 (80%, 90%, 95% reduction), which helped to **understand what extent of transformation is necessary in various sectors** to achieve the desired emissions reductions. Moreover, the goal was influenced by the **analysis of past emissions trends** in particular sectors.



Case EU

The EU target setting (**achieving climate neutrality by 2050 including LULUCF**) was mainly influenced by scientific evidence and policy responses suggested by IPCC reports and the Paris Agreement combined with rigorous impact assessments on the feasibility of several emission-reduction target levels. Climate change effects that were observed in Europe helped build **public support** for the target. The target was also driven by historical responsibility of the EU, its capacity and its demand to tackle climate change impacts. The Commission came forward with the target.

A major challenge in the target setting is to find a balance between setting theoretically feasible and at the same time ambitious targets. While setting more ambitious targets is always good, they will need to actually be implemented – just increasing the headline target is not enough. The other end of the spectrum are BAU targets that need to necessarily be upgraded.

Finally, in the target setting, it is crucial to ensure alignment with existing policies and strategies. The alignment could be created by being clear how existing policies/ strategies will contribute to achieving the LTS, or how they have to be adjusted to achieve the LTS.

(1) SECTORAL PATHWAYS

Some countries also included quantified sectoral emissions reduction targets in their respective strategies (e.g. France – mid-term and long-term targets; Germany – mid-term targets). Some countries like Singapore or Ukraine also included other (not emissions-based) sectoral targets in their strategies (e.g. energy efficiency and renewable energy targets, share of green buildings, share of clean vehicles, etc.). Sector-specific targets may also either be set by the coordinating entity (e.g. the EU included the goal to fully decarbonise the power sector by 2050 in its LTS) or be included in the strategy as a result of modelling scenarios (two modelled pathways that the EU is going to follow give an indication of which emissions reductions need to occur in different sectors but those are not legally binding sectoral targets).⁴⁹

Irrespective of which of those two approaches is selected, in order to determine sectoral pathways and targets, countries conduct studies of available and future technologies as well as mitigation and adaptation options and abatement potential in every sector. Such studies are normally conducted by the scientific body (university, research institution) responsible for providing the basis for the LTS. The studies, however, need

to be in the next step complemented with consultations with sectoral representatives who have sound and on-the-ground technical understanding of the status quo and opportunities in the respective sectors (in terms of available technologies and their costs, mitigation opportunities, challenges, etc.). One example of how such “sectoral feasibility assessments/ checks” were conducted is described in the box below.



Case EU

Consultations with sectoral actors

Too strong reliance on individual quantitative tools alone is insufficient. In the EU, **from a very early stage input from sectoral stakeholders was used to get the right understanding of the conditions at the sectoral level.** The Commission developed **hypotheses and then assessed their feasibility with sectoral experts** (sectors were invited to present their vision based on the parameters that the Commission put forward): Cross-checking if e.g. the steel sector is able to decarbonise at the suggested speed – what is the current assessment?

Such cross-checking was conducted with sectoral associations and single-standing sectoral actors. It proved to be a very useful **scientific/ technical exercise with an aim to understand existing technologies, potential limits and build on the knowledge of the people who really work in particular sectors.** The exercise brought some surprising and encouraging results, with some industries being really ambitious in their assessments.



Case South Africa

For the LTS, South Africa conducted: **(1) Mitigation Potential Analysis**, with the aim to conduct an updated, bottom-up assessment of mitigation potential in key economic sectors to identify a set of viable options for reducing GHGs. Marginal abatement cost curves for key sectors and subsectors were constructed. They provide estimates of mitigation potential and marginal abatement costs for broad mitigation measures. Estimates of national mitigation potential have been derived from the sectoral MACCs and ranked in terms of level of implementability at national level for each of the technologies. **(2) The Pathways study** to explore the impact of alternative economic growth trajectories on the country’s emissions trajectory, looking at the implementation of structural changes rather than the implementation of purely technical interventions. **(3) The Policies and Measures analysis**, which explored the impact of existing policies and measures, many of which were identified previously, on the emissions trajectory.

(2) LAND USE, LAND USE CHANGE AND FORESTRY (LULUCF) IN THE TARGET SETTING

There is no common approach with regard to the inclusion of LULUCF targets in the LTS. LULUCF is weaker regulated at the international level, and while some countries (e.g. Germany) set 2050 targets that will not be achieved through sinks (Germany only included the preservation of sinks as a goal) and other measures in the LULUCF sector, others (e.g. EU) included sinks as one of the factors contributing to climate neutrality. However, on the way to net zero the role of land use sinks is likely to continue rising. Also in Germany, a large discussion is ongoing because farmers and foresters want their activities to be recognized, and this is not possible in the existing LTS framework. The inclusion of LULUCF contribution may thus only be a question of time.



Case Costa Rica

Costa Rica included several **quantitative LULUCF targets** in its LTS: (1) By 2030, the current forest cover is maintained, and new areas are restored to increase the cover to 60%, without competing with the agricultural sector. (2) By 2050, 4,500 hectares of green areas operate as recreational parks in the greater metropolitan area, and a system of environmental-pedestrian networks that acts as biological corridors and pedestrian corridors is consolidated. (3) By 2050, the rural and coastal landscape allows the restoration and protection of other high carbon ecosystems (Mangroves, wetlands, peatlands, soils). The targets are supported by lists of planned short-, mid- and long-term activities.



Case Ukraine

In Ukraine's LTS, one chapter is completely devoted to the LULUCF sector. The sector absorbed about 5% of the total GHG emissions of Ukraine in 2015 and the country aims to further increase GHG emissions absorption in the LULUCF sector in the long term. The LTS **outlines four major qualitative policies/ targets in the sector**: (1) Optimizing the land use structure, increase in the forest area, wood lines and green plants, enhancement of inter-agency coordination; (2) Improvement of the practices of economic activities based on climate friendly methods of farming and forest management – Climate Smart Agriculture, Climate Smart Forestry; (3) Development and implementation of national forestry development program with the engagement of the best international experience; (4) Promotion of replacement of energy intensive products made of metal, concrete, plastic etc. with products made of sustainable wood (balanced forestry).

Furthermore, the LTS **includes projections of GHG emissions absorption dynamics under different scenarios of Ukraine's forestry sector development**. The analysis of the forestry sector development scenarios was performed with the help of the model of European Forest Institute EFISCEN based on processing information for each forest plot, which is included in the database of the State Forest Agency of Ukraine. The scope of GHG absorption in forests is projected based on two main scenarios until 2050 – "business as usual" and "forward looking scenario", which envisions the achievement of forestry and nature protection activities and targets in accordance with governmental strategies, defined priorities and programs. The third, additional scenario, estimated the scope of GHG absorption in the process of forest cultivation (afforestation).

(3) ADAPTATION TARGETS

So far, countries that included the adaptation part in their LTS targets indicated mostly **qualitative** rather than quantitative adaptation targets and priorities. For example, Mexico's LTS includes two key adaptation objectives: first, to reduce vulnerability of population and productive sectors and increase its resilience and the resistance of strategic infrastructure; and second, to conserve, restore and sustainably manage ecosystems to guarantee their environmental services to promote climate change mitigation and adaptation.

3.1.3. Scientific input (input data and modelling)

Once a robust vision that builds in societal as well as political consensus is formulated, it is necessary to support with adequate **scientific input (quantification) in those areas where it is needed**. Although the strategy needs to be science-driven, it is necessary to bear in mind that the quantitative part is only one part of the strategy. Modelling tools should not pre-empt the political and the societal conversation on the vision for the strategy.



Insights from 2050 Pathways Platform

- While many LTS that were submitted early put a lot of weight on quantification, quantification exercises may appear to be **more challenging and less helpful for fast-growing economies** (like the majority of AMS), which are structurally changing and the growth rates are very fluctuating.
- As ASEAN is very diverse, for some countries in the region (especially LDCs) quantification may appear to be difficult due to **partial data unavailability**:
 1. Developing a strategy that is more **qualitatively enriched** allows to circumvent the need for very thorough quantification until 2050.
 2. **Robust vision** helps to **identify specific areas for quantification** in which it is strategically most important to invest scarce resources (e.g. high priority sectors, technologies, etc.).
 3. There can be different types of models such as **“systems’ dynamic modelling”** that could allow to look at the issue without being extremely quantitative (e.g. New Climate Economy Report uses this approach i.a. for Indonesia).

Normally, quantification of the **energy sector** tends to take the primacy because of its relevance in the **emissions portfolio** but this may be different depending on individual country circumstances (e.g. particular importance of agricultural production, mobility, etc. for some countries). Moreover, analyses to develop **independence from energy imports** represent a clear domestic interest of many countries. Also **sinks** become particularly important on the way to net zero. At the same time, high emissions are not the only factor to look at while identifying the specific areas for quantification – these areas or sectors should rather be important from a **decision-making point of view**. For instance, countries with high resource dependence can consider whether certain resources (e.g. coal) will be important for the rest of the world in the next thirty years (if coal is not going to be in demand, it should not be part of the modelling).



Case Fiji

Fiji's LTS includes a disclaimer that it shall be considered a “living” document, which represents the current understanding of GHG emissions from relevant sectors and current understanding of mitigation actions (including technology, finance, capacity building, and technical assistance needs), which can contribute to meeting the GHG reductions articulated in the four scenarios presented. Fiji reserves the right to periodically update its LTS, to ensure validity, transparency, and accuracy over time. Most notably, **not all data relating to GHG emissions from the different sectors in the LEDS are currently fully known, nor are all mitigation actions fully investigated.**

The collection of additional data and the inclusion of new or improved technology, and its costs over time, will have an impact on future national planning. Such limitations to the analysis are also included in the sections devoted to particular sectors, e.g. “The approach used to develop estimated emissions and sequestration scenarios for coastal wetlands is a simple extrapolation of the only data available in-country for Rewa delta mangrove carbon stocks and estimated emissions and replanting rates”.

In order to deal with data limitations and existing uncertainties, various sector-wide uncertainty rates were included in the modelling exercises depending on the quality of the data used in the sector (e.g. in the waste sector, given the uncertainties surrounding the trend in future generation of waste in Fiji, and taking a more conservative approach, the LTS assumes a total uncertainty level of 30% to methane calculations). Additionally, **stakeholder consultations (national as well as in each sector) and survey questionnaires** (e.g. to estimate current green employment in selected sectors) **were used as means of gathering data for the LTS.**

(1) MODELLING TOOLS

Models are a mathematical means of representing physical and economic systems used to explore and test 2050 pathways scenarios. Currently, a wide variety of tools and models exist, which include energy system models, integrated assessment models, macroeconomic models, and many types of specialized sectoral applications, from electricity dispatch models to land-use models.⁵⁰ Countries do not have to search for an **“ideal model”, but need to find the one that best fits their requirements** based on the analysis of priorities, technical capacities and data availability. As mentioned by one interviewee, “every model is wrong but some of them are useful”: There always will be limitations and aspects that cannot be reflected in the modelling exercise but at the same time modelling helps to flesh out the technical details of desired pathways, test their feasibility, and develop better scenarios.⁵¹

A common situation is **that different views on modelling exist within a country**, which is why it is key to invite the main actors (e.g. academia or other stakeholders) at the modelling stage to give them a chance to express their views. **Peer reviewing the model** itself and the recommendations resulting from the model ensures robustness and enables the institution, which is developing the LTS (e.g. the Ministry of Environment), better defend its assumptions in the conversation with other actors involved. In case there is no in-country solution, modelling can also be done by international consultants. An ideal approach is not to develop a new model for every climate policy document but to continually be refining one model, which helps to have a **common modelling approach to the development of many subsequent political documents** following the LTS development.

Table 4: Modelling tools

 <h3>Case EU</h3> <p>The LTS is mostly based on the energy model PRIMES; it is combined with a model for the agricultural sector and non-CO₂, and uses input from macroeconomic models – resulting in 6-7 models that are used together.⁵² Information is delivered to the EU Commission by the researchers, and DG CLIMA and DG ENERGY work further on them (refining assumptions, checking if the projected developments are reasonable, excluding unrealistic scenarios).</p>	 <h3>Case Ukraine</h3> <p>The LTS is based on the model TIMES-Ukraine (TIMES-MARKAL modelling tool – quite widespread). The model covers about 85% of Ukraine's emissions (energy and industrial processes modelling). Additionally, macroeconomic data was provided to enrich the model. Separate modelling was conducted for LULUCF. A lot of raising awareness work on how the model operates, what input data is used was necessary. Stakeholders were invited to submit their own/ more recent/ more precise data.</p>
 <h3>Case Costa Rica</h3> <p>The LTS is based on the TIMES model; OseMOSYS energy model is currently being developed. Costa Rica applies “Robust Decision-Making” as a modelling framework and “Narrative-based policy-making” as an additional tool. These framework and tool are applied by policy-makers together through the policy-planning tool called “Assumption-based planning”,⁵³ which is based on identifying key assumptions in an already existing plan. With the help of key assumptions, it is possible to identify those scenarios that are connected with extreme effort and those, in which the country has a lot of benefits. The goal of the modelling exercise is, thus, not to show “the best guess” of what the future is going to be like in 30 years but to help develop a useful “decision tree” for policymakers (e.g. what to do for decarbonisation in Costa Rica if in the future there are massive exports and electric vehicles are not as successful as expected – responses might be invest in hydrogen, invest in railways, etc.).</p>	

Source: Own, based on interview outcomes

(2) SCENARIO MODELLING

While formulating LTS, governments have to deal with uncertain factors (such as regarding the deployment of future technologies or innovations) that may affect the achievement of the goals. To deal with those uncertainties, multiple scenarios can be developed to depict the uncertain future:

- Identifying uncertainties that are key for formulating an LTS (examples: use of hydrogen fuel; growth of clean vehicles; pace of energy storage capacity and cost; availability of carbon capture usage and/or storage; carbon removal potential of natural ecosystems);
- Presenting different scenarios with various underlying assumptions, e.g. illustrating the impacts of various policy packages; scenarios showing implementing the same policies at a later stage; or scenarios with different assumptions about identified uncertainties.
- As a result, policymakers can identify material uncertainties, as well as robust policy measures that perform well in multiple scenarios.

⁵² See more information on the models used by the EU here: https://ec.europa.eu/clima/policies/strategies/analysis/models_en.

⁵³ Dewar et al. 1993.



Case EU

- Eight scenarios, **two of which lead to climate neutrality** (those are the “selected pathways”).
- Five of the scenarios look at different technologies and actions, which drive decarbonisation. They vary the intensity of application of electrification, hydrogen and e-fuels (i.e. power-to-X) as well as end user energy efficiency and the role of a circular economy, as actions to reduce emissions. However, those scenarios do not achieve GHG emissions neutrality by 2050.
- **Selected scenarios:** The seventh scenario pushes all zero-carbon energy carriers as well as efficiency, and relies on a negative emissions technology in the form of bioenergy combined with CCS to balance remaining emissions. The eighth scenario builds upon the previous scenario but assesses the impact of a highly circular economy and the potential beneficial role of a change in consumer choices that are less carbon intensive. It also explores how to strengthen the land use sink, to see how much this reduces the need for negative emissions technologies.

(3) SIMPLIFICATION OF MODELLING RESULTS

It is important that at the end of the modelling stage policy-makers in all line ministries are able to draw certain policy conclusions and can actively engage with the modelling results. It is therefore necessary to clearly present in the LTS what are the policy choices that come forward with the models. Simplifying the results of the models also helps the society as a whole and the private sector understand what decisions to make for the future and what investments to make in the right direction.

(4) INPUT DATA

Accurate sectoral data (and sound MRV procedures to acquire such data) is key because high-quality data helps avoid serious errors at the modelling stage, which might lead to wrong policy choices. Also for the discussion with stakeholders, it is difficult to build convincing arguments if they are not supported by data. In the first place, **sectoral statistics (energy balance, agricultural production data, etc.)** and the **emissions inventory** are of particular importance for LTS development. While in many countries, necessary data sets tend to be available in the energy sector, the **forestry sector is normally the weakest in terms of data availability**. In the LTS development, it is crucial to use already existing data – e.g. which is used in **UNFCCC reporting**. In accordance with the Paris Agreement, all countries need to prepare national inventory reports, which is a good way of aggregating the emissions data. Currently, a lot of **international scientific cooperation** is ongoing, and it is possible to gain **access to data** (e.g. macroeconomic, global, regional data) from other research institutions, centres and consultancies worldwide.⁵⁴

Against a backdrop of often insufficient sectoral and other data, scarce resources and limited capacities for LTS development, a **people-centered approach, together with bottom-up information and feedback collection**, can help overcome data gaps, raise awareness, promote evidence-based decision making, while ensuring a just and well-managed transition away from a high-carbon economy.



Case Fiji

People-centered approach and bottom-up data collection

Fiji convened three National Stakeholder Workshops with key national and sub-national government, non-governmental, academic, and private sector **stakeholders to inform them about the LTS process and progress, and to solicit feedback to incorporate into the LTS**. The three workshops addressed: the development of Fiji's 2050 vision for low emission development, both economy-wide and for each sector; scenario development in each sector; and **validation of findings for each sector**.

The first workshop informed stakeholders on the LTS process and described overall global climate change trends. It engaged participants in discussion on Fiji's long-term vision for low emission development to 2050. Sector-specific presentations were given by responsible ministries and agencies, describing relevant current policies, sector development goals and targets, GHG reduction opportunities, and both short-term and long-term low emission projects and financing needs. **Participants developed vision statements for each sector as well as outcome-oriented, measurable, time limited, specific, and practical near- and long-term low emission development goals (as applicable)**. The second consultation was arranged as a **series of separate half-day workshops focusing on individual sectors**. These workshops provided stakeholders with sector-specific presentations on the current emission trends and low emission ambitions and on the analysis and modelling work conducted. The third workshop was held to inform stakeholders on final emission scenarios and actions that had been developed to achieve net zero emissions, **receive final feedback, prioritise actions, and discuss opportunities for implementing the LTS**.

For each sector, four low emission scenarios and associated actions were presented. Participants **provided feedback by prioritising actions while considering a broad range of social, economic, and environmental criteria**. This workshop also offered the first opportunity **to see the effects of mitigation actions across all sectors, and, when considering all sectors in combination, demonstrated a clear pathway for Fiji to achieve net zero emissions overall by the year 2050**.

3.1.4. Policies and measures

The types of policies and measures to be included in the LTS may be subdivided into two main categories as illustrated in Figure 5. Due to multiple uncertainties regarding future technologies, research findings, inventions, etc. it may **not be useful to include a very detailed description** of proposed policies and measures in the LTS. Options must be kept open for new technologies and new ways of working. However, as it is necessary to **invest in future-fit technologies now**, it needs careful consideration which technologies would be mature in the future and which are worth investing in. For example, in the EU, the European Green Deal shows what is needed in the short term to achieve the climate-neutral, competitive vision for 2050⁵⁵.

A good example of ensuring that no contradictions exist between LTS objectives and the current policies can be drawn from New Zealand, which has established a mechanism to ensure that all laws that are passed will have to be investigated in terms of their long-term compatibility with climate goals. Policy alignment (especially with energy policy) is crucial to achieve LTS goals.

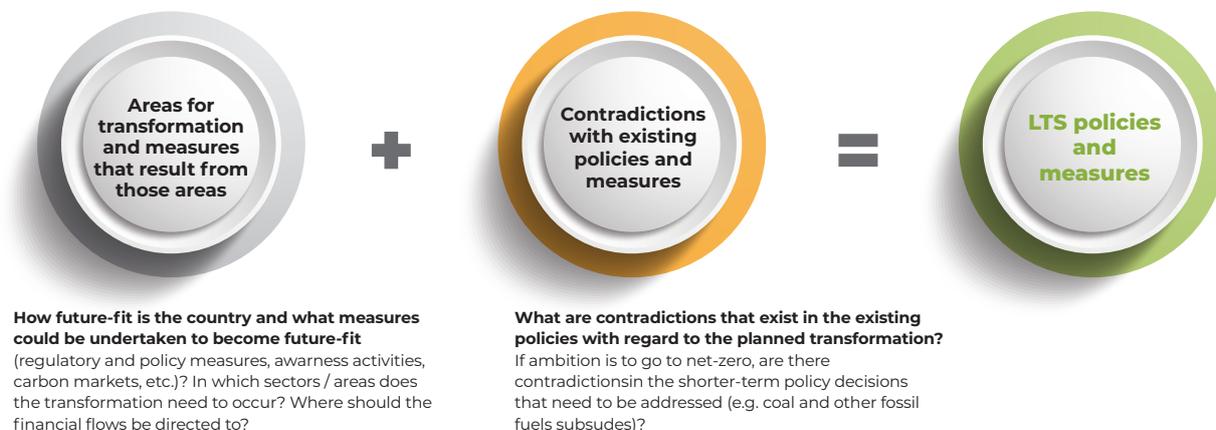


Tip from Germany: Omit detailed measures from LTS (focus on sectoral pathways and milestones at a more general level instead), but develop a short-term program of policies and measures to implement the strategy.

A necessary starting point for identifying potential policies and measures is **determining the baseline**, which implies **taking stock of already existing regulations and policies** in place (EU example – emissions trading system, regulation of car emissions, energy efficiency and renewable energy regulations, etc.). A **systematic mapping of policies that will require 'mainstreaming' to make the transition effective**

(for example, climate-harming subsidies) needs to be conducted at this stage. After having a clear picture of what has already been developed in order to achieve climate and energy goals and which contradictions with regard to the planned transformation exist, in the next step the existing toolbox can be **supplemented with additional measures** needed to achieve the long-term targets.

Figure 5: Policies and Measures in LTS



Source: Own compilation based on interview outcomes

Broad categories of existing climate policy options include, for example: (1) command-and-control regulations; (2) technology support policies; (3) price-based instruments; (4) information and voluntary approaches; (5) funding schemes; (6) research and climate-related assessments. In order to better understand **which policy options exist** to achieve the desired outcomes, some countries (Germany, Ukraine) have used consultations with stakeholders, experts and interested citizens to provide their views on what kind of policies and measures may be reasonable. However, the government needs to provide the initial framework for such a consultation process (an initial list of policies based on best available sources and good practices) and classify the policies along certain sectoral / functional groups. An exemplary matrix for classifying policies and measures used by Ukraine in its LTS development is illustrated in Figure 6. Energy efficiency and renewable energy measures tend to be regarded as “no-regret measures” broadly supported by all societal actors.

Figure 6: Policies and Measures Matrix Example

Sectors, Mechanisms	Codes & Standards	Market-Based and Pricing Mechanisms	Funding Mechanisms	Voluntary Agreements	Implementation Mechanisms	Information and Education
Energy supply	?	?	?	?	?	?
Industrial	?	?	?	?	?	?
Residential / Commercial / Institutional	?	?	?	?	?	?
Transportation and Land Use	?	?	?	?	?	?
Agriculture/ Forestry / Fisheries	?	?	?	?	?	?
Waste Management	?	?	?	?	?	?
Cross Cutting	?	?	?	?	?	?

Source: Ministry of Energy and Environment Protection of Ukraine

(1) REFINING POLICY LIST / PRIORITIZING POLICIES

After the initial list of policies is completed, the process of distilling, refining, and aggregating the key policies into larger groups begins. In order to assess and prioritize policy options, governmental institutions together with sectoral experts and stakeholders conduct **the multi-criteria analysis** of benefits and trade-offs. In particular, the criteria of assessment may include potential impacts of a particular policy in terms of **GHG emissions reductions potential, economic growth and other economic benefits, health and environmental protection, technical feasibility, energy security implications, investment growth, considerations of fairness and equity, etc.** The figure below provides an example of assessment criteria that were used by Ukraine during its LTS development.

Figure 7: Multi-Criteria Analysis Example

 Economic	 Energy	 Environment	 Equity	 Feasibility
Jobs, Income, and or Growth	Diversity and or Independence	GHG Cuts Now and Later	Income	Complexity, Ease of Technical Analysis
New Markets and Investments			Age	
\$ Total Costs	Reliability Now and or Later	Health – Air Quality, Water Quality, Other	Place	Technical, Market, Program, Legal
Cost Effectiveness \$/GHGs Cut	Access and or Affordability	Land, Water, Wildlife Conservation	Ethnicity	Social/Political

Source: Ministry of Energy and Environment Protection of Ukraine

Global examples

Ukraine followed a formalised process of prioritizing and assessing 78 initially selected policy options according to the following assessment criteria: GHG reduction potential, carbon intensity; Micro- and macroeconomic impacts; Energy security and sustainability; Environment, resource sustainability and efficiency; Equity, fairness for individuals, groups, locations. The prioritization process resulted in 30 aggregated policies and measures that were further assessed through modelling and play a key role in Ukraine’s LTS.

Example from the development of the **Mexican Climate Change Strategy** (served as a basis for LTS): After the initial list of policies was ready, the job of the Secretariat for Environment and Natural Resources (SEMARNAT) was to critically analyse those policies taking into consideration the country context (e.g. do electric cars need to first be promoted in the public or the private sector?). SEMARNAT elaborated and filtered the policies on the basis of various factors such as **cost-efficiency**. SEMARNAT asked for feedback from knowledgeable experts on specific topics (such as hydrogen).

(2) HOW TO ORGANISE POLICIES AND MEASURES IN THE STRATEGY

Normally, the strategies use mitigation and adaptation as major building blocks. Additional categories may include cross-sectoral areas, governance issues, international cooperation, finance, etc. Mitigation action can be divided by sector (example – France) but there also are alternative practices (e.g. division by functional / thematic areas such as energy intensity, sustainable cities, cleaner fuels, etc.). The adaptation part may, for instance, be subdivided into areas representing various objects of adaptation action (resilient society; infrastructure and productive systems; ecosystems based adaptation). Some examples of how the measures can be formulated include strengthening climate reporting of companies, promoting use of industrial waste heat, introduction of a carbon pricing mechanism, carbon border adjustment mechanism to avoid carbon leakage, promoting alternatives to the private car, encouraging modal shift for freight toward train and ship, etc.

The EU strategy emphasises the need for action in seven strategic areas: energy efficiency; deployment of renewables; clean, safe and connected mobility; competitive industry and circular economy; infrastructure and interconnections; bio-economy and natural carbon sinks; carbon capture and storage to address remaining emissions.

3.1.5. Market mechanisms

(1) DOMESTIC MARKET MECHANISMS

Having a **carbon price** increasing over time is important to signal to the companies the need to invest in decarbonisation. The carbon price can be created by a variety of mechanisms. While an emissions trading system has an in-built emissions reduction factor and the emissions cap determines the overall emissions level, which is useful as a policy to assist the goal achievement, also a tax or a standard can play a similar role. Market mechanisms can play an important role of a **transition tool in the mid-term** – allowing certain sectors to trade provides the opportunity to reduce emissions where they are most favourable and gives the private sector flexibility while ensuring that overall emissions decrease and that the sectors covered follow their emission reduction trajectories. Trading may not necessarily occur in carbon emissions but also in other units, e.g. in quantified energy efficiency gains. The exact design of the mechanism determines how incentivised the covered sectors are to invest in decarbonisation. Introduction of a domestic market mechanism normally helps to raise private sector awareness about the necessity of transformation.

While markets can play an important role in the transition, the closer the country gets to climate neutrality, the less important the role of market mechanisms becomes. The market shrinks over time and other ways forward become necessary such as the creation of carbon sinks.

Global practice – market approaches in submitted LTS



In **Costa Rica, the Green tax reform** will be the first step in setting a carbon price. The price may start with the debate on the economic evaluation of negative externalities, such as pollution. The process must respond to an integral analysis of the country tax structure and define actions that allow coherency to the public policy packages of decarbonization, taking into account the distribution costs of the various measures. Priority actions include the implementation of carbon pricing schemes, such as the Emissions Levy, to mobile and fixed sources; and the consolidation process of the elimination of fossil fuel subsidies.



Ukraine aims to implement a **domestic emissions trading system** as a part of its LTS. The country also aims to improve its **GHG emissions taxation system** and the targeted use of the revenues obtained.



In **South Africa**, the **Carbon Tax Act** was brought into effect from 1 June 2019. At present, the tax rate is low. However, the tightening of this policy intervention will be achieved through reducing the allowances and increasing the tax rate. Post-2020, the carbon tax and **the carbon budgeting system** will be aligned. Carbon Budgets set a maximum volume of emissions from certain activities that individual entities are allowed to emit over three rolling five-year periods. The alignment process may include the option of imposing a higher tax rate as a penalty for emissions exceeding the carbon budget.

(2) INTERNATIONAL MARKET MECHANISMS

Similar to and even to a greater extent than domestic market mechanisms, international market mechanisms as offsetting instruments are not a desirable long-term solution on the way to net zero where an in-country transformation is necessary instead of depending on other countries. As a result, many countries do not look at international market mechanisms as a means of LTS implementation.

Land and geographic sinks could be one way to create cooperative market mechanisms as regional approaches to achieving climate neutrality. Cooperation on **ocean sinks (“blue carbon”)** could be another area for potential market collaboration (but to a lesser extent than forests).

Such regional market approaches on sinks might be especially interesting for smaller countries with high emissions and less land mass to have sinks. The mechanisms could potentially also engage other countries from outside the region that might be interested in such forms of cooperation and have close ties with some ASEAN countries (e.g. Korea, Japan).

3.1.6. Climate finance

There are different ways to look at climate and sustainable finance in the LTS context. First, the question is how to best attract investment for LTS implementation. Another aspect is which financial mechanisms a LTS can include to better support the transition (e.g. of certain regions and population groups). Third, the question is how a LTS can guide private sector finance flows to become sustainable and compatible with the strategy goals.

(1) BRINGING IN THE PERSPECTIVE OF FINANCIAL INSTITUTIONS

For the LTS to be more attractive for private as well as public investment (more financially viable), it is necessary to **engage with actors from the financial sector (domestic and international, private and public financial institutions, bilateral donors, MDBs) early on (already at the visioning stage)**. Apart from providing general information on what their current funding priorities are and what they are likely to fund in the near future, they can make concrete suggestions on how the strategy must be designed and what it must contain in order to be more attractive for investment (e.g. breaking the LTS down into specific policies, etc.). Financial institutions must not dictate the terms, but their recommendations on the design of the strategy appear to be very useful in practice (e.g. South Africa, India are actively engaging the financial sector in the development of climate policy documents). For the financial institutions to better understand the country's priorities, participation of governmental financial institutions such as Treasuries in the discussions can be particularly useful.

(2) FINANCIAL MECHANISMS THAT SUPPORT THE TRANSITION

A LTS can include various financial mechanisms which provide support for the transition of certain regions and population groups that are in particular need of support. Those can include, for example, domestic or regional public funding mechanisms such as energy and climate funds. International funding sources may also be better accessible when a LTS exist and scope of the political strategy shows a clear long-term perspective.

In the EU, such mechanisms include, for example, the Green Deal Investment Plan and the Just Transition Mechanism, which will provide support for the regions that have it more difficult to transition. Discussions are already being held with Member States to identify which regions and sectors to support. Such mechanisms were also important to get the Member States on board in the LTS adoption process.

(3) GUIDING PRIVATE SECTOR FINANCE FLOWS THROUGH LTS

In light of the necessity of complementing public finance flows with private sector finance, LTS can be a helpful tool to guide private sector finance flows towards the achievement of LTS objectives.

The **International Platform on Sustainable Finance** (including i.a. Indonesia and Singapore as members) launched in 2019 aims to scale up the mobilisation of private capital towards environmentally sustainable investments. It is a multilateral forum of dialogue between policymakers that are in charge of developing sustainable finance regulatory measures to help investors identifying and seizing sustainable investment opportunities that contribute to climate and environmental objectives. Members exchange and disseminate information to promote best practices, compare their different initiatives and identify barriers and opportunities of sustainable finance, while respecting national and regional contexts. Where appropriate, willing members can further strive to align their initiatives and approaches.

3.2. LTS Development Process

3.2.1. Steps of LTS development process

As one of the interviewees mentioned, the LTS process may not be a very difficult one but it is very time-consuming (a “baby-sitting process”) – see Figure 8. Overall, if the process is actively going forward, it may take **about two years**, given that in the beginning there are already good modelling instruments that can be developed further to create the necessary model, and there is sound sectoral data. Depending on initial data availability, it is worth investing **additional 6-9 months for mapping and refining the input data**.

At the start of the process, time may be needed to establish the coordinating entity (if not established yet), determining how the process will be organized, distributing the roles and responsibilities. Building the scientific base (“quantification” or the “analytical part”) may last around 1-2 years, depending on the quality of the existing toolbox. Consultations within the government tend to last about half a year. Stakeholder consultations may run in parallel with the modelling stage and with the actual drafting. In some countries, the actual drafting of the strategy was a speedy process, which took only several months but this depends on the quality of the input received from science and stakeholders.

The process (after organisational matters are settled) always starts with vision development (Step 1). The vision is in the next step supported by quantification (Step 2). Whereas in some cases (e.g. Costa Rica), quantification was done almost in parallel with the actual drafting of the strategy (the processes informed each other), the modelling can also be done prior to the actual drafting (e.g. EU). Input received from science is used to formulate the zero draft of the LTS (Steps 3 and 4). Afterwards, the draft undergoes consultations within the government that normally last about half a year (Step 5). To secure a whole-of-nation approach

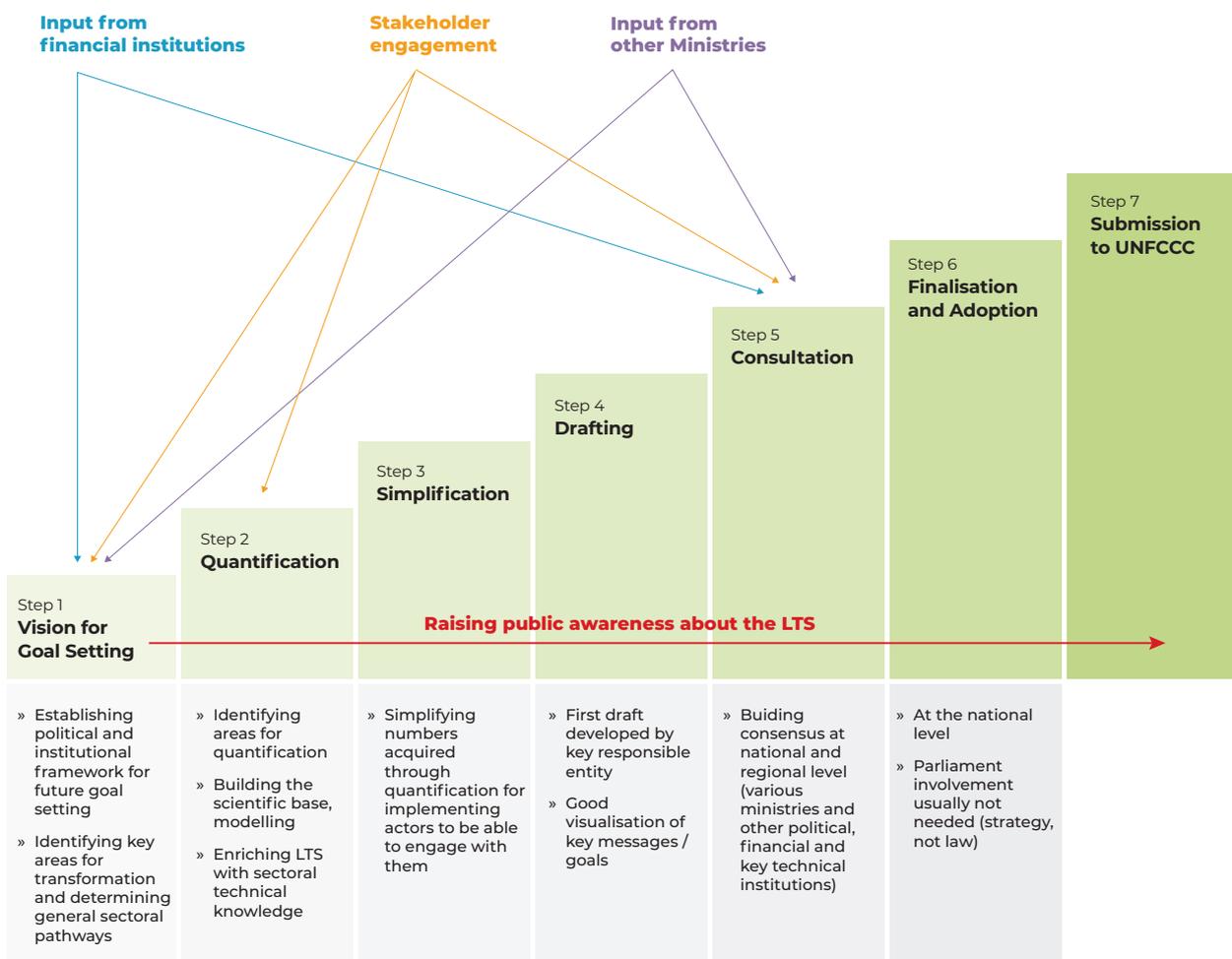
and arrive at Steps 6 and 7, it is absolutely necessary to receive input from key stakeholders. Stakeholder engagement processes are normally used:

- at the stage of vision development for enriching the vision (including input from **financial institutions** to make the strategy more financially viable and fundable); input from key sectoral actors to gain understanding of various sectoral visions; input from a broader range of stakeholders can be helpful in the choice of policies and measures;
- at the modelling stage to receive input from **academia and sectoral actors**;
- at the drafting stage to gather comments on the draft from all key stakeholders.

Importantly, Step 5 (Consultation) includes consultations not only at the national but also at the subnational / local level to enrich the first draft with respective regional and local visions and ensure the acceptance of the strategy at all levels.

The process of selection of policies and measures can either be organised in parallel with the drafting (after the quantification stage), or the modelling can be conducted after the initial policy selection to better assess impacts of selected / prioritised policies. Consultations within the government normally start when the first draft is ready. The whole process of LTS development is supported by creating public awareness about the ongoing strategy development and conveying the message that this is the direction of travel the country will follow for the coming years.

Figure 8: Steps of the LTS Development Process



Source: Own based on interview outcomes

Lesson learnt from Mexico

In Mexico, a political decision was made to develop the Mid-century strategy in a time-saving approach without a lengthy negotiation process and broad stakeholder engagement. The Ministry of Policy and Planning assigned the drafting to the main technical institution working on climate change issues (National Institute of Ecology and Climate Change). The Ministry of Environment was not directly involved in the process. The result was a sound academic paper presented to the world, which, however, is not widely accepted and not well-known at the national level (by the society, private sector and other ministries).

Make it an open process! It is useless to publish a strategy for 2050 without at least discussing it within the government. International commitment is important but a target cannot be achieved domestically if it is unknown by implementing agencies.

3.2.2. Governance

To make the LTS vision more robust, interministerial buy-in is necessary. Normally, climate policy is hosted within the **Ministry of Environment**. However, **it often tends not to be a powerful ministry** in the larger Cabinet, which bears the risk that the importance of the LTS might be reduced. Having some **entity under the Head of State (or under oversight of the Head of State)** responsible for LTS development tends to be a more successful model among countries in obtaining the governmental buy-in (e.g. Singapore hosts climate change under the Prime Minister's Office). The Head of State being convinced about climate action is normally one of the key success factors for LTS development. Building on **existing institutional architecture established e.g. for the NDC development** helps to avoid duplications in the work and ensures consistency – many AMS such as Indonesia, Vietnam or Singapore already have robust institutional arrangements for NDC development.



Tip from 2050 Pathways Platform

Within the responsible entity, it is good to have one to three people directly responsible for LTS development ("project management team"). Those people do not necessarily need to have specific technical knowledge but rather be able to coordinate the process well ("move the machinery" for LTS development going forward).

Normally, LTS development involves **interministerial coordination** processes (e.g. Ministries of Environment, Energy, Economy, Transport, Finance, International Cooperation, Agriculture, Planning, Peace and Justice, Central Bank, Treasury etc. may need to be involved in the process). While in the majority of cases, one Ministry or entity is fully responsible for managing the process, and other ministries provide their feedback on the strategy draft, in the EU the process was co-led by DG CLIMA and DG ENERGY (with DG ECFIN providing additional input at the modelling stage). As the objective of long-term climate neutrality concerns all economic sectors and spheres of life, the involvement of a broad spectrum of ministries is useful despite making the process more lengthy and complicated. The engagement of **Parliamentarians** can make a lot of difference for building the legal basis for LTS implementation.



Case Germany

The Ministry of Environment, Nature Conservation and Nuclear Safety managed the LTS process. It delivered a complete first draft of the strategy comprising the LTS context, vision, milestones and measures (with input received from stakeholders). The draft was then consulted and agreed with the other Ministries over a period of several months. Concrete sector-specific goals for 2030 were the most controversial part.

SUBNATIONAL GOVERNANCE

The extent of involvement of subnational actors such as regional governments into LTS development highly depends on how the governance is generally structured in the country (how federal the country is, how autonomous different regions are, etc.). In Germany, for example, Federal states and municipalities contributed to the process of putting forward policies and measures.

One factor that so far does not get enough attention **is the high importance of engagement with cities** in the development of LTS. For instance, in ASEAN as a region having numerous mega-cities that hold a major share of population, **engaging with cities early on to ensure that the LTS has direct benefits for them** and (not just the country at large) is key for getting support for the strategy. Forerunner cities may also make the point for climate neutrality themselves and may be allies in the LTS development (e.g. those that are members of the Covenant of Mayors or the regions that are part of the Under2Coalition).

3.2.3. Science and policy interplay

In the interviewed countries, quantification for the strategy was performed nationally by scientific institutions (universities, institutes, consortiums of research institutions) specializing in climate change issues. Developing countries and emerging economies also received modelling support from international support projects (*see more details on this in the section "LTS Capacities"*).

The University of Costa Rica provided the scientific basis for the Costa Rican LTS at the national level, building on initial modelling support from the project "Deep Decarbonisation Pathways – Latin-America and the Caribbean" conducted by the Inter-American Development Bank. The Institute of Economy and Forecasting of the Academy of Sciences of Ukraine was the key institution supporting the Ministry of Energy and Environmental Protection of Ukraine with modelling exercises for the LTS, building on international support projects for initial model development (mainly USAID projects). In Mexico, the National Institute of Ecology and Climate Change ("technical arm of the Ministry of Environment") was in charge of all calculations and conducting vulnerability assessments of municipalities in Mexico. International modelling support by IDB was provided at the initial stage. In Germany, the Ministry of Environment, Nature Conservation and Nuclear Safety issued a national tender for conducting the modelling for the LTS (development of reference scenarios). The tender was won and the work was conducted by a research consortium led by Oeko-Institute. The EU used a suite of consultancies for LTS-related modelling, mostly experts working on the PRIMES model based at the National Technical University of Athens in Greece.

3.2.4. Stakeholder engagement

The opinions of the general public, the civil society and private sector associations are usually most needed at the stage of the selection of policies and measures. Using the media (including social media channels) is a helpful tool to "socialise" the strategy and explain the ongoing LTS development process to interested groups and the wider public. A variety of formats for stakeholder engagement can be used to build climate awareness, including through conferences, establishing working groups, expert workshops, outreach programmes, campaigns and public surveys, etc. Some examples of how stakeholder engagement was organised in some countries can be found below.



Case Germany

The participation process was conducted prior to the Ministry for Environment developing the first draft of the Climate Action Plan 2050. The aim of stakeholder engagement was limited to **gathering ideas on short-term measures for LTS implementation until 2030**. From June 2015 to March 2016, two processes ran in parallel. The first one was the **citizens' participation process** (which was innovative – normally, the government engaged only in conversations with “classic” stakeholders such as NGOs, trade unions, etc.). Citizens were not chosen representatively, but randomly (e.g. via calls in different cities). This was an intentional bottom-up process to see what suggestions can come from the society. The process helped raise awareness about the strategy and some suggestions were included in the Climate Action Plan.

The second process was **classic stakeholder participation** of business associations (not single companies), trade unions, federal states, municipalities and NGOs. The new approach was to have conversations with everyone at one table, not with each stakeholder group separately. This was a challenging approach, however, this process, which took about $\frac{3}{4}$ of the year comprising several conferences and events brought very constructive results. As a result of both processes, a catalogue containing **97 proposals for measures** was presented to the Federal Environment Minister, which were a valuable input to the Climate Action Plan.



Case Ukraine

For Ukraine, a wide participatory process in drafting a political strategy was a novel approach. Stakeholder engagement was used to determine **policies and measures for inclusion in the LTS**. At the starting conference with participation of representatives of various ministries, the Parliament, regional organisations, industry associations and other sectoral experts, NGOs and the broader public, working groups on six thematic areas – future LTS building blocks – were established (all those present at the conference could join one or more groups).

When working groups met separately, there was always initial input from the Ministry of Environment, which helped to create the framework for discussion. Each group had one coordinator (national expert in this area) who summarised the results of the group work. The second conference was held half a year after the first one for presenting the resulting list of policies and measures. The process resulted in the final prioritisation and selection of policies and measures that were further analysed through modelling and used in the LTS.



Tips from Costa Rica

Bring in potentially **contentious stakeholders at the modelling (technical) level** instead of having to engage with them at a more **political level (co-developing the LTS)**. Speaking about numbers and technical details makes the conversation more constructive. At the technical level, you would need to deal with other types of people – scientists and technical experts rather than business or policy people. By the time the discussion reaches high-level decision-makers, they will not anymore be in a position to criticise the entire model and all your results. It is good to hold discussions of the models **in a university setting**, where the atmosphere is completely different from e.g. a luxurious hotel, which is much more productive for LTS development.

3.2.5. Societal and private sector buy-in

PRIVATE SECTOR

NGO support for the strategy is not sufficient, it is important that the business is interested in being part of the transformation. Although there is a widely held belief that climate action may not be in the interest of the private sector, having an LTS is in the interest of the private sector – a long-term framework and clarity about the future policy of the government is necessary for planning investment and other economic decisions.

Tip 1: In the dialogue with the private sector on LTS, it can be helpful to put the arguments in the frame of **opportunities and threats (potential negative impacts on the value chain) resulting from climate change (domestically and in countries the companies are exporting to)**. Profits of the private sector are going to be hurt or increased based on how the companies position themselves: *Many companies in ASEAN countries are producing for the world – is the world in the next decades going to accept what these companies are producing?*



Case EU

Primarily, the LTS shows a pathway towards much more sustainable growth, which applies for developing and emerging economies as well. The impact assessments demonstrate that the impacts of a low-carbon transition are likely to be moderate and if there is a well developed enabling framework, they will be positive. The EU LTS in-depth analysis identified several positive macroeconomic elements of the green transition such as:

1. Positive impacts of a low-carbon transition for growth and jobs, with GDP impact up to +2%;
2. Co-benefits: decrease in energy imports; positive impacts on public health, etc. It is estimated that in the period 2031-50 the decarbonisation scenarios would bring cumulative savings (over 20 years) in the fossil fuels import bill ranging from EUR 1.4 trillion to EUR 3 trillion.

Tip 2: Identify “**the winners**” (companies that will not be affected or will benefit from LTS policies and measures) and mobilize them.

Tip 3: Conducting adequate **economic impact assessments for various sectors** is essential for addressing concerns of the private sector: Show the benefits of climate policy measures, also to those already taken in other countries to act as role models for domestic action.

Tip 4: Use international cooperation to bring private sector representatives from various countries together **to discuss the same private sector concerns** such as competitiveness issues (e.g. learning from the private sector in Germany – this model was successful in Mexico). Companies can build communities to learn together how to face a new policy such as an emissions trading system and how to collaborate effectively with the government in shaping this policy.

Tip 5: Raise awareness of the private sector about climate policy and the LTS, **and involve them in the LTS development process** (see the example of Ukraine below). A Private Sector Committee can be established for the companies to have institutional space to collaborate with the government.



Case Ukraine

The broad involvement of companies in the LTS process in Ukraine helped to weaken the mining sector (coal) lobby, and resulted in the emerging green lobby within the business. The majority of the companies shared the opinion that measures like energy efficiency or the introduction of new technologies bring benefits to their respective sectors. Companies started to constructively put forward measures most suitable for them in the LTS framework, which helped the government a lot in the process of selecting LTS policies and measures.

Tip 6: Argue with **international obligations** resulting from the Paris Agreement. Another helpful argument may be emphasizing that other regional partners (China, Japan, Korea, India, etc.) are already taking enhanced climate action.

GENERAL PUBLIC

Making the society aware that the LTS is the direction of travel and familiarizing the public about the LTS development process and its outcomes are key for the LTS to become a nationally accepted document. A variety of tools depending on country contexts can be used for “socialising the strategy” (e.g. 2050 Pathways Platform provided support for organising a citizens’ faire in Costa Rica, issuing podcasts in Chile, printing pamphlets for distribution by regional and local administrations in Bhutan). Using the media, for example, by organizing briefings and discussions for journalists, public campaigns and social media channels (depending on what preferred channels are used by the public in every particular country) can also be helpful. Communication in native languages and the translation of all studies and documents prepared by donors or consultants is essential for public acceptance. Finally, in many countries, direct support for LTS development coming from the Head of State is a factor that matters to the society and can make a big difference.

VISUALISATION / DESIGN ELEMENT

An important aspect to make the vision and the strategy as a whole better understandable to the own society as well as to other countries is the element of visualization. Good practice examples of visual / interactive elements to “socialize” the strategy include, for example:

- 2050 UK Calculator helped to visualize the changes in the economy that are needed for achieving LTS goals in UK in a more interactive way;⁵⁶
- A map illustrating the vulnerabilities of various municipalities helped to make the adaptation part in Mexico’s LTS more convincing.

3.3. LTS Capacities

3.3.1. Identifying capacity gaps

Broad areas where the interviewed countries faced capacity gaps during LTS development included technical resources (for quantification/ modelling); lack of manpower/ personnel shortage in ministries and other agencies involved (and the need to establish new agencies); financial resources needed to develop the strategy (e.g. paying for consultants); and the lack of sectoral data and robust MRV procedures.

What is more, **technology mapping appeared to be a major gap**. Countries found it difficult to understand what technologies in the future could look like, and what technologies are currently available (uncertainty

regarding price, maturity level, phase, etc.). At the sectoral level (cement, steel, etc.) there is a lack of understanding (no clear overview of) which countries or companies have certain technologies. Moreover, another barrier for LTS development was the lack of **policy and planning background**: While developed countries' LTS are essentially a summary of policies that are already in place, developing countries often do not have such strategies and policies in place yet to include them in the country's LTS.



Case Ukraine

Major gaps in Ukraine included, for example, the lack of common vision and consensus in the society and in the political elites regarding the socio-economic development of the country in the mid- and long term and the lack of long-term planning processes (normally planning is conducted for the next 2-3 years). This resulted in unclarity regarding strategically important sectors and potential paths for the country's development in the coming decades. Unclarity regarding many crucial macroeconomic indicators (such as energy consumption levels, population size) was an additional challenge for the LTS development. While all these uncertainties needed to be dealt with in the process of LTS development, in the end the LTS appeared to be an "ice-breaking document" that paved the way for the adoption of other relevant policy documents such as the Strategy of Green Economic Transition. The LTS triggered calculations that are extremely important and used in other policy documents as well.

Some countries such as Mexico highlighted the change of institutional roles, personnel and the resulting change of interaction / communication patterns between ministries and agencies caused by regular changes of government one of the major challenges. Constant changes and the fact that Environment Ministries tend to suffer a lot from budget cuts during crisis periods often leads to **lacking political continuity** in strategy development and the need for building up new capacities from scratch. Due to this, the process of **tracking LTS progress is often interrupted**. Another issue that was identified as a barrier for LTS development was the **lack of policy and policy goals' alignment** in different sectors (most importantly, climate and energy policies). Finally, many countries tend to simplify **all climate change implications** (e.g. the interconnection between climate and fiscal vulnerability, impacts of climate change for the economy).

3.3.2. Means of closing gaps⁵⁷

(1) EXTERNAL ASSISTANCE FOR QUANTIFICATION

Countries that lack the capacities or technical expertise needed to carry out long-term quantitative projections and modelling could consider collaborating with governments or research institutions in other countries in order to exchange tools, methodological approaches, and models.

■ Learning within ASEAN possible

Indonesia, Malaysia, Singapore have internal modelling capacities and could share their modelling experience with other ASEAN countries.

⁵⁷ One way of closing knowledge gaps is the use of guides and manuals that have already been developed by some international institutions and are largely publicly available (see section «4.5 Existing international tools and manuals: How to develop an LTS?» for more information on the existing materials). At the same time, as existing guides do not take the particular circumstances of AMS into consideration, developing a specific guide or manual for LTS development and implementation in ASEAN would be useful.

While some countries (e.g. Ukraine) used international support to develop the initial model serving as a basis for LTS development, others participated in international research networks with a focus on long-term climate modelling: The Deep Decarbonisation Pathways Project (DDPP), for example, is a global collaboration of energy research teams charting practical pathways to deeply reducing greenhouse gas emissions in their own countries. In Mexico, a consultancy was commissioned by international donors to conduct a technical study proposing climate change policies for each sector; Ukraine also relied on initial proposals from international consultants regarding potential policies for inclusion in the LTS. In Ukraine, a study assessing economic impacts was also conducted by international consultants.

Costa Rica takes part in the Deep Decarbonization Pathway Project (DDPP/LAC) financed by IDB, which was extremely helpful as scientific base for LTS development: Representatives of academia build robust decarbonisation models for their individual countries with the support of universities in Europe and the US (“big brother approach”) – meeting three times a year to discuss their findings and modelling efforts and to share information. Such networks allow to enhance the knowledge curve much faster.

(2) TECHNOLOGY MAPPING

While there is still limited information at the international level on the available technologies needed for long-term decarbonisation, technology is key for transformation in fast-growing economies. One way forward could be establishing networks with sectoral experts, institutions, and countries that have recently invested a lot in the question of technology suitable for achieving the LTS objectives. According to the interview with 2050 Pathways Platform, the frontrunners include primarily **Australia, Japan and Singapore** (the latter mostly in abatement technologies).

(3) BUILDING DOMESTIC CAPACITIES

Even if capacities are lacking, work needs to be done to ensure that capacities for quantification and technical work are established in-house as much as possible (e.g. hosted in universities that tend to have good reputation in the society). Leaving such capacities behind after the end of the international consultancy helps to renew or revisit quantification over the period of time instead of constantly depending on donors – creating self-sufficiency is key to be able to update and implement the LTS. Furthermore, relying on local experts instead of international consultants helps make the planning of the LTS process more flexible and efficient (no time difference, common language, etc.). **International cooperation can therefore be regarded as a useful means of building capacities at the local level.** One of the preferred models is hiring local experts and financing them through donors instead of having the work done by international consultants. In case some work (e.g. recommendations for policies to be included in LTS) is done by international consultants, the governments (as it was done in Ukraine and Mexico) invested time and effort in critically analysing those policies and filtering or modifying them taking into consideration the country context.

(4) KNOWLEDGE TRANSFER AND EXPERTS EXCHANGE

Organising **knowledge transfer, expert exchange and study conferences** (where national or international experts cover specific LTS-related topics such as approaches to strategic planning, sectoral methodologies, modelling, etc.) were named as a helpful tool to raise awareness and advance the knowledge level of government officials, the Parliament, academia, different ministries, etc. In addition, **study tours** to other countries for actors directly involved in the LTS development process were mentioned as useful for building capacity and raising awareness.

3.4. LTS Implementation and Monitoring

3.4.1. Tracking implementation progress

(1) WHAT SHOULD AN LTS CONTAIN?

Although not all submitted LTS include provisions on monitoring and tracking implementation progress of the LTS as well as its periodic review, the vast majority of the interviewees agreed that the inclusion of these provisions in the strategy is important. In particular, the following aspects need to be included: (1) when and in which periodic cycles the strategy will be reviewed and updated; (2) what the monitoring and tracking progress procedures look like; (3) which participation formats will be available during the monitoring and revision procedures. Some countries also described the next steps such as the foreseen adoption of a program of concrete short- and mid-term measures in their LTS.

(2) ADDITIONAL SHORT-TERM POLICY DOCUMENT FOR TRACKING PROGRESS

Most interviewees shared the view that the essential LTS progress tracking needs to focus primarily on short-term targets and actions (e.g. on the achievement of milestones towards 2030). The LTS should thus inform short-term policy-making that can be best controlled at the moment. To better realise this, some countries have issued additional policy documents – climate change programmes that list concrete sectoral measures in the mid-term (e.g. Germany’s Climate Action Programme with measures until 2030; a similar instrument is the Climate Change Special Programme in Mexico that is foreseen to be published every six years. This approach needs to include mechanisms for tracking climate policy progress; an alternative way for tracking short-term sectoral progress are carbon budgets).



Case Germany

Germany’s Climate Action Programme 2030 provides for annual climate action reports as a central monitoring instrument. In addition to monitoring total emissions, the programme helps to conduct sector-specific monitoring (e.g. climate action reports are divided into specific sectors). Another instrument of tracking progress in implementing climate policy in Germany are annual reports to the EU.

At the same time, some countries share an alternative view that since LTS are not stand-alone documents but rather an integral part of the NDC cycle, there is no need to develop a separate monitoring system and other documents for LTS implementation.

Tracking short-term progress is possible through **reporting under the Paris Agreement** including tracking NDC implementation progress and the global stocktake once in 5 years to assess the collective progress made towards achieving the long-term goals.

Although not specifically referred to by interviewee countries, regular participatory reporting of the agencies involved may be a good way of monitoring and tracking LTS implementation progress.

(3) CREATING THE LEGAL BASIS FOR TRACKING PROGRESS

For getting to net zero, it is important for the countries to have **legislation in place to make the LTS objectives binding** – the extent of economic and societal transformation that needs to take place is too big to happen without enabling legislation.

In Germany, the Federal Climate Change Act made sectoral LTS targets for 2030 binding and established more detailed procedures for tracking LTS implementation progress.

In the EU, the Climate Law (if adopted – currently under development) would make the LTS target of climate neutrality binding for the Member States and establish a process for the Commission to check whether the EU is on track to meet the 2050 target and suggest adjustments to the process if necessary.

(4) SOFTWARE SOLUTIONS

One way of having a good tracking overview can be a software solution – an electronic platform that can be used by all actors involved in the LTS implementation process (e.g. relevant ministries and key sectoral actors) simultaneously to publish their new data and findings as well as information on progress made. It is, however, important that such solutions are fully owned by the responsible authorities, user-friendly and well-accepted at the national level (for example, in Mexico one evaluation platform was developed by a company that owned the Internet Protocol and therefore, the software could not be updated by the government; the second platform developed externally was neither automatized nor efficient to fulfil the government's objectives).

3.4.2. Review and updating

Due to the very long timeframe of the LTS, the underlying assumptions and realities are bound to change overtime, which is why the strategy needs periodic review and updating procedures. Where possible, it makes sense to align the review process with the Paris Agreement cycles of tracking progress (review after global stocktakes or ambition raising) as well as with other national or regional policy updating processes.

Germany's Climate Action Plan will be reviewed and updated accompanied by a public dialogue process with broad participation by the federal states, local authorities, the private sector, civil society and the public every five years. In particular, sectoral visions and milestones will be adapted and updated to reflect the current circumstances. **Ukraine's** strategy needs to be updated every 10 years (policies and measures, forecasts will need to be updated/ extended). **Mexico's** General Law on Climate Change requires updating mitigation policies at least every ten years and adaptation policies at least every six.

3.4.3. Alignment with NDC process

The overarching objective of every LTS is to determine the long-term trajectory for the NDCs to be laid on this trajectory. The NDC process, therefore, needs to be informed by the LTS. Having an LTS in place makes it easier to agree on NDC targets because the LTS provides a framework for NDC development. The aim of the subsequent NDCs is thus to provide concrete answers on the question how the LTS goals will be achieved in the short term. As mentioned by one interviewee, one of the major differences between the NDC and the LTS can be described as follows: "The NDC is the commitment to the UNFCCC while the LTS is the commitment to yourself: Nobody is going to MRV your LTS whereas the NDC is something you will be held accountable to". While LTS are strategies without a legal status, NDCs, in contrast, normally need Parliament approval – while the LTS defines the trajectory, an NDC contains a defined concrete obligation.



Tip from 2050 Pathways Platform – some examples of countries who did really well in:

- **Vision development** – Iceland, Norway, Sweden;
- **Quantification** – France; Fiji; South Africa; US;
- **In-country process** – Costa Rica;
- **LTS implementation process** – France, Germany, UK.

4. REGIONAL COOPERATION IN LTS DEVELOPMENT

4.1. Examples of regional cooperation in LTS process

Regional cooperation on LTS development and implementation can bring a wide range of benefits to participating countries. Although there have so far not been many regional cooperation examples focusing primarily on LTS development, the analysis of the existing ones illustrates that the role of regional organisations (including informal international institutions such as partnerships) may include the following dimensions:

- Shaping the common vision for the regional long-term transformation (e.g. EU);
- Facilitating LTS-related technical cooperation (scientific, modelling community of experts like the Deep Decarbonization Pathways Project, DDP);
- Transnational platforms for learning, exchange and sharing good practices on LTS and NDC implementation (LEDS Global Partnership; 2050 Pathways Platform; NDC Partnership);
- Finding common ways of dealing with climate-related challenges (e.g. disaster risk reduction and management; energy security considerations, etc.);
- Topic-specific or sector-specific regional initiatives (indirectly) related to LTS (e.g. on MRV or carbon pricing).

4.1.1. DDP-LAC

Apart from the example of the EU Member States, regional cooperation on LTS-related issues is also taking place in other parts of the world. So far, the closest example of regional cooperation directly focusing on LTS has been the exchange in the Latin American region. In particular, Latin-American and Caribbean countries have been cooperating under the framework of the Deep Decarbonization Pathways Project implemented through the Inter American Development Bank.⁵⁸ The Deep Decarbonization Pathways Project in Latin America and the Caribbean (DDP-LAC) investigated how six countries (Argentina, Colombia, Costa Rica, Ecuador, Mexico and Peru) can increase their standard of living and develop while reducing net CO₂ emissions to net-zero by mid to late century, with appropriate reductions for other GHGs. The cooperation had a technical nature and focused on scientific modelling for the development of nation-wide deep decarbonisation pathways. In particular, the project pursued the following objectives:⁵⁹

- *The building of energy and emissions models where they did not previously exist to allow the establishment of domestic capacities for analysis of emissions and development goals.*
- *The building of a regional modelling community of practice where one did not previously exist, in order to facilitate knowledge sharing across countries and the bottom-up emergence of a regional approach to the deep decarbonization challenge.*
- *The formation and modelling of qualitative narrative and quantitative scenario reference cases, NDCs and DDPs, covering the most important emissions sources.*
- *Using these capacities, approach and results to conduct a structured and sustained engagement with policymakers and stakeholders for the purpose of informing domestic climate policy processes, Long-Term Strategies and eventually revised NDCs to the Paris Agreement.*

In building and enriching the models, selected scientific institutions from the host countries gained buddy support from the institutions based in Brazil, France, Sweden and the US (each institution had its specific

buddy)⁶⁰. The outcomes were discussed during four workshops with the participation of all countries involved and their support teams. At the fourth workshop, a seminar was held comparing and contrasting draft economy-wide and sectoral DDP results from all the teams. The teams could then see where their results stood compared to the other teams in terms of tonnes per capita and driving variables by sector, and reassess where the differences made sense or not. Afterwards, they had the opportunity to re-simulate their DDPs.

■ Example: DDP-LAC project

The choice of the model in every country was made depending on the national sectoral profiles and priorities. Additionally, every team was asked to prepare a political economy narrative of how their country may reach net-zero emissions from the current status quo, formulated in a qualitative or semi-quantitative manner and speaking the language of key stakeholders. Each narrative discussed current emission sources, on what end-use or sectoral demands they are based on, and described how each of passenger and freight transport, residential and commercial buildings, industry, agriculture and land use might transform towards achieving the goal of net-zero emissions. The teams then simulated these narratives in their models.

Finally, each of the teams was asked to fill in a common “dashboard” for each of their scenarios. The dashboard indicators included country-wide indicators for population, economic structure, energy system emissions, and land use CO₂ flows, and components for each of the economic sub-sectors: activity, energy efficiency/ intensity, structural change, and GHG intensity of energy. Where relevant, emissions of non-CO₂ gases were also requested. The dashboard results could be compared by the country teams against initial benchmark national and sectoral emission drivers compatible with the collective climate objective. The common dashboard also enabled the comparison of assumptions across countries and learning about the possibility of different actions.

The resulting pathways presented a self-assessment by in-country researchers of which physical sector transformations can be chosen to put the domestic economy on track with the net-zero emissions objective. The DDP-LAC project has shown that pathways can be developed for LAC countries to reach net-zero GHG emissions while benefitting from economic growth, improved air quality, lower cost and higher quality transport, and other benefits.⁶¹

Despite the primary focus of the cooperation on the modelling side, the interview with the supporting organisation 2050 Pathways Platform revealed that in their discussions, the teams also touched upon the topic of climate finance for supporting long-term deep decarbonisation. In particular, the discussion covered potential threats and opportunities in relation to fiscal impacts of climate change and what the long-term transformation requires from the financial sector at large. The interview also revealed that the regional cooperation within the DDP-LAC project benefitted a lot from a common language in the region.

60 Ibid.

61 Bataille et al. 2020.

4.1.2. LEDS Global Partnership cooperation

LEDS Global Partnership was established as a voluntary transnational network at the technical level with an objective to facilitate peer learning, technical cooperation and information exchange to support the development and implementation of low emission development strategies. Within the Partnership, practitioners and representatives from government agencies, technical institutes, international agencies, and NGOs in each region set priorities for learning, collaboration, and advisory support. In addition to regional platforms in Africa, Asia, Europe and Eurasia, and Latin America and the Caribbean, LEDS Global Partnership also has six global technical working groups: agriculture, forestry and other land use; benefits of LEDS; energy; finance; subnational integration; and transport.⁶² Recently, the Partnership has also been providing assistance to its members in their efforts to recover from the global COVID-19 pandemic, and the resulting economic crisis.⁶³

Being one of the four regional platforms of LEDS Global Partnership, the Asia LEDS Partnership is a voluntary regional network that aims to advance the development of country-led and country-specific strategic plans to promote economic growth while reducing GHG emissions without causing trade-offs with other environmental pressures. The Asia LEDS Partnership includes, among other members, 45 Government Ministries/ Agencies from 14 Asian countries (Nepal, Malaysia, Vietnam, Thailand, Indonesia, Cambodia, Marshal Islands, Myanmar, Pakistan, Philippines, Taiwan/ Republic of China, Bangladesh, Bhutan, Sri Lanka).⁶⁴ Four priority areas that the Asia LEDS Partnership has been working on in 2018-2020 include energy, transport, finance and climate governance. Activities for these priority areas are planned through the four Asia LEDS Partnership Communities of Practice⁶⁵ (CoPs):

- *Finance (presenting options on blended capital and green bonds to support achieving NDC targets);*
- *Grid-Scale Renewable Energy (renewable energy development, grid integration, competitive procurement, zoning and financing);*
- *Clean Mobility (discussion on challenges and opportunities in usage of clean fuels and electric mobility for public transport);*
- *Multi-Level Climate Governance (Discussion on issues and opportunities in effectively integrating multi-level governance for achieving Multi-Level Climate Governance CoP NDC targets).*

4.1.3. 2050 Pathways Platform

The 2050 Pathways Platform is a multi-stakeholder initiative launched at COP 22 to support countries seeking to develop long-term, net zero-GHG, climate-resilient and sustainable-development pathways. The Platform positions itself as a space for collective problem-solving and represents a network of broader constellation of cities, states, and companies engaged in long-term low-emissions planning of their own and in support of national strategies. Currently, members include 32 countries, 15 cities, 15 regions and states, and 196 companies. The Platform also provides a useful source of policy and technical guidelines, manuals and publications to develop and implement LTS.⁶⁶

4.1.4. Other regional cooperation examples (indirectly or directly related to LTS)

One example of **sectoral regional LTS-related cooperation** is the cooperation between Ghana, Kenya, Uganda and Zambia with an objective to support formulating long-term, climate-resilient development strategies for agriculture.⁶⁷ The Africa Group of Negotiators Experts Support has partnered with several organizations, including the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), to support the formulation of such long-term strategies and to update the agriculture component of the NDCs for the four countries. A situation analysis of relevant policy frameworks and development plans is underway to establish the status of the agriculture sector. This will identify needed actions for these countries to shift from the BAU scenario and create agricultural transformation. Next, a national multi-stakeholder consultation will bring together key stakeholders who will interrogate and validate the analysis and help define the scope of the LTS. In the next step, future climate scenarios/ pathways will be developed to inform the choices of the most appropriate options and agree on priority mitigation and adaptation actions. A national stakeholder validation workshop will then allow to finalise agriculture strategies and updated NDCs. Lessons learned from the processes in Ghana, Kenya, Uganda and Zambia will be documented as a guideline to be shared with other countries and sectors interested in adopting a similar process.

Another example of regional LTS-related cooperation is the East African Alliance on Carbon Markets and Climate Finance, which was launched in 2019 to enhance **the long-term vision of Eastern African countries on carbon markets and climate finance**.⁶⁸ It further aims to foster an active and coordinated participation of delegates from the East African region in UNFCCC negotiations as well as other international fora, and to facilitate and accelerate implementation of the countries' NDCs. In addition, it seeks to enhance and support the readiness to implement Article 6 of the Paris Agreement, and strengthen regional collaboration on climate finance. Currently, members include Burundi, Ethiopia, Kenya, Rwanda, Tanzania and Uganda.⁶⁹

A successful example of **regional cooperation on MRV issues and carbon markets** is the Pacific Alliance, a trade bloc for regional integration consisting of Chile, Colombia, Mexico and Peru. Among the multiple goals of the Alliance, there is an explicit commitment to the environment and green growth and to address the drivers and challenges of climate change. In addition to significant efforts to adapt to the changes and build more resilient infrastructure, each of the countries have committed to ambitious reductions in their GHG emissions. The Technical Sub-group on MRV and Climate Change was created to strengthen and advance the harmonization and alignment of climate MRV systems for the reduction of GHG and Short-lived Climate Pollutants (SLCPs). The Sub-group is focused on harmonizing and converging the national climate MRV systems in order to strength domestic climate policies, stimulate technical cooperation and technology transfer, monitor progress towards the NDCs, and potentiate a regional carbon market.⁷⁰ The Sub-group supports exchanging knowledge at the regional level, and strengthening capacities at the national level in order to advance the creation and implementation of effective climate policies. A series of technical baseline studies was conducted across each of the member countries to synthesize the current status of the MRV systems. In a complementary initiative, the Sub-group simultaneously launches a series of technical baseline studies on the MRV of Climate Finance and the MRV of GHG Emissions and SLCPs Inventories.⁷¹ Along with MRV issues, countries also exchange views on the roles of different market and non-market approaches in the achievement of their NDCs. They discuss potential pathways and cooperative approaches for implementing NDCs, the relationship between project-level MRV and NDC-level accounting, and share reflections on pilot activities and Article 6 implementation.⁷²

The Southern African Development Community (SADC) countries have adopted a **regional Climate Change Strategy & Action Plan** in 2015 to provide a broad outline for harmonized and coordinated regional and national actions to address and respond to the impacts of climate change. In particular, the strategy provided lists of Strategic Interventions and Actions for Adaptation and Mitigation, and focused on specific means of the strategy's implementation, including resource mobilization, capacity building, technology transfer as well as the monitoring and evaluation framework. The strategy is currently under review.⁷³

73 [SADC Secretariat 2019](#).

One area of cooperation within the South Asian Association for Regional Cooperation (SAARC) is “Environment, Natural Disasters and Biotechnology”. The frameworks established by member states in the aftermath of the 2004 Indian Ocean tsunami (not caused by climate change) provide a **regional response to both natural and climate-related disasters**. In 2006, the SAARC Disaster Management Centre (SDMC) was established to advise policy and facilitate capacity building. In 2008, SAARC agreed on the Natural Disaster Rapid Response Mechanism, in order to adopt a coordinated and planned approach to natural disasters. In November 2016, the SDMC merged the SAARC Meteorological Research Centre, the SAARC Forestry Centre and the SAARC Coastal Zone Management Centre.⁷⁴ In 2010, SAARC established an Expert Group on Climate Change.

In the Southeast Asia region, the Southeast Asia Disaster Risk Insurance Facility, supported by Singapore, Japan, and the World Bank, is ASEAN’s first regional catastrophe risk financing facility and a key initiative in strengthening ASEAN’s economic and climate resilience to disaster risk and addressing the natural catastrophe protection gap in ASEAN.⁷⁵

4.2. Existing international tools and manuals: How to develop an LTS?

More and more international organisations, research institutes and think tanks are developing practice-oriented resources focusing on various aspects of LTS formulation and implementation. In particular, the **2050 Pathways Platform** provides tools, guides and other useful resources⁷⁶ such as a Strategic Mitigation, Adaptation and Resilience Tool; Horizon to Horizon guide, etc. The **OECD** has issued a Working Paper on cross-country experience in the formulation of LTS as well as an OECD/ IEA Climate Change Expert Group paper “Key questions guiding the process of setting up LTS”.⁷⁷ What is more, the **World Resources Institute** has published several tools and publications focusing on LTS.⁷⁸ Finally, the **NewClimate Institute** recently launched the ‘NewClimate LTS Hub’ that provides information on developing LTS.⁷⁹ The list of tools and resources mentioned is not exhaustive.

74 See e.g.: <https://www.thethirdpole.net/2018/09/06/is-saarc-prepared-to-combat-climate-change-and-its-security-risks/>

75 [Southeast Asia Disaster Risk Insurance Facility 2021](#).

76 [The 2050 Pathways Platform 2020](#).

77 Aguilar Jaber et al. 2020; Rocha and Falduto 2019.

78 World Resources Institute 2017.

79 [NewClimate Institute 2020](#).

5. LONG-TERM STRATEGIES IN ASEAN: STATUS QUO AND WAYS FORWARD

The previous chapter presented accumulated global practice examples and lessons learned from already developed LTS that can guide ASEAN and its Member States in the LTS development process. The objective of this chapter is to identify where ASEAN and AMS currently stand in the LTS development process, the barriers that they face and opportunities that can be taken. The resulting overview of the status quo in ASEAN will be the basis for providing an answer to the question how ASEAN and AMS can best move forward in the LTS formulation process, taking into account best global practices and the regional circumstances, in the following Chapter 5.

Section 5.1 describes climate policy commitments and requirements of AMS in the context of the UNFCCC and the Paris Agreement. The following section 5.2 gives a short overview of recent regional climate policy developments in ASEAN. Section 5.3 discusses the rationale for ASEAN and AMS to develop LTS. Section 5.4 presents opportunities and challenges in ASEAN with regard to LTS development. Methodologically, this part builds on the evaluation matrix based on four main categories (“LTS Content”, “LTS Development Process”, “LTS Capacities” and “LTS Monitoring and Implementation”) described in Chapter 3 and analytically discusses each of those categories to conclude where AMS stand in those areas and what current challenges and opportunities can be identified. Finally, section 5.5 presents the outcomes of the status quo analysis and section 5.6 discusses cross-cutting issues.

5.1. ASEAN requirements and climate policy commitments

ASEAN is committed to contribute to the achievement of the global climate mitigation and adaptation goals under the UNFCCC framework. All AMS have signed and ratified **the Paris Agreement**. All AMS have submitted their **Intended Nationally Determined Contributions (INDCs)** that became their **first Nationally Determined Contributions (NDCs)**⁸⁰ to the UNFCCC Secretariat.⁸¹ In addition, Singapore as the first country updated its first NDC in 2020 to make a more specific and ambitious commitment. Other AMS are also currently actively working on the updates to their NDCs. Table 5 contains an overview of the current NDC commitments of AMS.

Table 5: NDC commitments of AMS

AMS	Emission reduction (unconditional)	Emission reduction (conditional)	Reference year	Target year
 Brunei Darussalam	20%		BAU	2030
 Cambodia	-	27% (+ LULUCF)	BAU	2030
 Indonesia	29%	Up to 41%	BAU (2010-)	2030
 Lao PDR	Activity related targets: <ul style="list-style-type: none"> • Forests: increase forest cover to 70% of total land area • Energy: reduce renewable energy to 30% of energy consumption 		2000-2015	2015-2030
 Malaysia	35% (per unit of GDP)	45% (per unit of GDP)	2015	2030
 Myanmar	Sectors are identified for mitigation but without specific emission reduction targets			

AMS	Emission reduction (unconditional)	Emission reduction (conditional)	Reference year	Target year
 Philippines	-	- 70%	BAU (2000-)	2030
 Singapore	Peaking of GHG emissions no higher than 65 MtCO ₂ e	-	Absolute target	2030
 Thailand	20%	25%	BAU (2005-)	2030
 Viet Nam	8%	25%	BAU (2010-)	2030

Source: Fifth ASEAN State of the Environment Report 2017, and Singapore's Update of its First NDC

Furthermore, AMS have actively been involved in the process of fulfilling reporting requirements under UNFCCC. All AMS have submitted one or several National Communications.⁸² Many AMS have also submitted one or several Biennial Update Reports.⁸³ Two AMS – Singapore and Indonesia – have already developed and submitted its LTS to the UNFCCC Secretariat.⁸⁴

Table 6: UNFCCC reporting by AMS

UNFCCC reporting by AMS	National Communications	Biennial Update Reports
 Brunei Darussalam	2 (latest submission 2017)	-
 Cambodia	2 (latest submission 2016)	1 (submission in 2020)
 Indonesia	3 (latest submission 2018)	2 (latest submission 2018)
 Lao PDR	2 (latest submission 2013)	1 (submission in 2020)
 Malaysia	3 (latest submission 2018)	3 (latest submission 2020)
 Myanmar	1 (submission in 2012)	-
 Philippines	2 (latest submission 2014)	-
 Singapore	4 (latest submission 2018)	4 (latest submission 2020)
 Thailand	3 (latest submission 2018)	3 (latest submission 2020)
 Viet Nam	3 (latest submission 2019)	2 (latest submission 2017)

Source: UNFCCC

82 [UNFCCC National Communications](#).

83 [UNFCCC BURs](#) and Indonesia's LTS https://unfccc.int/sites/default/files/resource/Indonesia_LTS-LCCR_2021.pdf

84 [Singapore's LTS](#).

5.2. Recent regional climate policy developments in ASEAN

Recognising the importance of environmental cooperation for sustainable development and regional integration, ASEAN has a long history of promoting environmental cooperation among its member states. The ASEAN Working Group on Climate Change (AWGCC) was established in 2009 as a consultative and collaborative platform to fulfil the following objectives:⁸⁵

- Enhance regional cooperation and action to address the adverse impacts of climate change on socio-economic development in AMS; including through cooperation and information sharing with other stakeholders such as the private sector, local community, regional and international partners, etc.;
- Formulate the region's interests, concerns and priorities in ASEAN Joint Statements on Climate Change to be articulated at annual UNFCCC COP sessions; and
- Serve as a consultative forum to promote a coordination and collaboration amongst various ASEAN Sectoral Bodies dealing with sectors impacted by climate change such as energy, forestry, agriculture, transportation, science and technology, disaster management, etc, to enhance the coordination and integration of efforts in addressing climate change.

ASEAN countries have been responding to climate change by focusing on the implementation of relevant actions in the **ASEAN Socio-Cultural Community (ASCC) Blueprint 2025**. In order to realise the relevant strategic measures in the ASCC Blueprint 2025, AWGCC is guided by the **AWGCC Action Plan** that comprises priority actions until 2025. To support the implementation of the **ASEAN 2025: Forging Ahead Together**, the 26th Meeting of the ASEAN Senior Officials on Environment (ASOEN) on 9-10 September 2015 agreed to develop an **ASEAN Strategic Plan on Environment (ASPEN)**. ASPEN will serve as a comprehensive guide for ASEAN cooperation on environment for the period of 2016 to 2025.

Climate change is one of the strategic priorities of ASPEN comprising five programmatic areas under the AWGCC Action Plan: (1) adaptation and resilience, (2) mitigation, (3) technology transfer, (4) climate finance, and (v) cross-sectoral coordination and global partnerships.⁸⁶ Furthermore, in consideration of several significant international developments in the area of climate change in recent years, the AWGCC has updated its Action Plan in 2020.

The new Action Plan now covers eight core themes, namely (1) climate change adaptation, (2) long-term planning and assessment of NDCs, (3) climate change mitigation, (4) climate modelling and assessment, (5) MRV and stock-take of greenhouse gas emissions, (6) climate financing and market, (7) cross-sectoral coordination and (8) technology transfer. Due to the cross-sectoral nature of climate issues, climate change is addressed not only by AWGCC, but also by other relevant working groups in the environment sector and beyond (such as agriculture and forestry, energy and transport, and science and technology).

Table 7: Examples of recent regional climate policy cooperation in ASEAN

Areas of cooperation	Exemplary regional activities
Policy development	<ul style="list-style-type: none"> • ASEAN publishes its State of the Environment Report periodically. The aim is to provide policymakers and relevant stakeholders with key information and facts to make informed decisions and develop strategies on addressing pressures and impacts to environmental systems. The Fifth ASEAN State of Environment Report was launched on 12 September 2017 in Brunei Darussalam, covering, among other areas, climate change. • ASEAN is also developing the ASEAN State of Climate Change Report that will provide an overall outlook of the state of play of climate change issues, including in the context of ASEAN. The Report will provide recommendations on key priorities / potential areas of cooperation for the development of a regional strategy for climate change adaptation and mitigation in ASEAN to strengthen regional action on climate change.

Areas of cooperation	Exemplary regional activities
	<ul style="list-style-type: none"> • Efforts are also ongoing to build up AMS' capacities in analysing climate change projections and applying scenarios to climate risk assessments. One such initiative is the ASEAN Regional Climate Data, Analysis and Projections workshop series led by the ASEAN Specialised Meteorological Centre (ASMC) that engages ASEAN National Meteorological and Hydrological Services, international and regional climate experts and climate information users to encourage regional collaboration and information sharing in research areas relevant to climate change projections. Three workshops have been held thus far and future workshops and further engagements are being planned.
Carbon Pricing	<ul style="list-style-type: none"> • ASEAN-CiACA Phase 1: In 2017, the AWGCC engaged in the UNFCCC initiative "Collaborative Instruments for Ambitious Climate Action (CiACA)", which aims to assist Parties in the development of carbon pricing approaches for implementing their NDCs. A workshop was held in Singapore in October 2017 to introduce key concepts of carbon pricing and highlight the opportunity for collaborative approaches.
MRV	<ul style="list-style-type: none"> • ASEAN-CiACA Phase 2: A regional scoping study that focused on MRV as a possible starting point for considering a regional carbon market for AMS was conducted. Building on the results of this study, the PaSTI-JAIF Project (Partnership to Strengthen Transparency for co-Innovation under the Japan-ASEAN Integration Fund) was adopted by the AWGCC in 2019, which mainly aims at the development and implementation of facility/ company level MRV systems for GHG emissions in AMS. The project will contribute to the design of the roadmap on the development of facility-level regional monitoring and reporting guidelines. • The South-East Asia MRV Regional Network supports NC/BUR preparation through peer-to-peer review, sharing best practices and lessons learned.
Adaptation	<ul style="list-style-type: none"> • ASEAN is working to complement national responses through regional initiatives, namely ASEAN Agreement on Disaster Management and Emergency Response, which includes mechanisms to improve joint responses to emergencies related to extreme climate events. Adhering to the Sendai Framework for Disaster Risk Reduction 2015-2030, AMS have fully committed to prevent new and reduce existing disaster risk, reduce hazard exposure and vulnerability to disasters, and increase preparedness for response and recovery, thus strengthening resilience.⁸⁷ Additionally, there is an ongoing effort to establish a Southeast Asia Disaster Risk Insurance Facility, aiming to improve disaster risk assessment, and financing and insurance solutions. At the same time, ASEAN continues to mainstream disaster risk reduction (DRR) into climate change adaptation policy by (1) facilitating the establishment of a clear institutional and policy framework on DRR and adaptation integration at the regional and national level, and (2) supporting capacity building initiatives for AMS on hazard and risk mapping through integration of future climate change projections to minimise the potential impacts posed by drought, floods, and landslide disasters. • ASEAN has worked with India on two major initiatives: First, the ASEAN-India Project on Enhancing Climate Change Adaptation at the Local Level in Southeast Asia supported a scoping study on the needs of AMS related to climate change adaptation. The project established a virtual network of existing ASEAN Partner Institutions on Climate Change Adaptation, and fostered the exchange of information on good practices and communication. Second, the ASEAN-India Project on Climate Change Projections and Assessment of Impacts: Modelling and Capacity Building Programme for India and ASEAN region focused on building capacity of climate experts from AMS to analyze the current climate variability and project future climate change using the latest climate modeling applications.⁸⁸

87 The ASEAN 2020.

88 ASEAN Secretariat 2017.

Areas of cooperation	Exemplary regional activities
	<ul style="list-style-type: none"> • The initiative ASEAN Partner Institutions on Climate Change Adaptation ("ASEANadapt"), established in 2016, is composed of researchers and practitioners from all AMS. By identifying national needs and priorities, "ASEANadapt" is able to share locally tested tools, techniques, methods, approaches, and innovations for adaptation. • In September 2019, the regional training course on "Climate Change Adaptation" in Bangkok was conducted by the Climate Change International and Technical Training Center, where central government officials of AMS were invited. The aim was to provide essential knowledge related to the planning of adaptation policies and measures based on science-based impact assessment, and also practical approach to formulate monitoring and evaluation of adaptation measures.⁸⁹
Climate Finance	<ul style="list-style-type: none"> • Through the support of the UNFCCC Secretariat, a Technical Workshop on Needs-based Climate Finance was conducted recently to design the ASEAN Climate Finance Strategy, which will guide the development of the regional climate finance strategy. The strategy will determine quantitative and qualitative climate finance needs, including geographic coverage, time span, sector coverage and consensus on socio-economic and climate change scenarios as the basis for framing current and future needs. • The ASEAN Capital Markets Forum developed ASEAN Green Bond Standards based on the International Capital Market Association's Green Bond Principles to enhance transparency, consistency and uniformity of ASEAN Green Bonds, which will also contribute to the development of a new asset class, reduce due diligence cost and help investors to make informed investment decisions. ASEAN Green Bond Standards aim to provide more specific guidance on how the Green Bond Principles are to be applied across ASEAN in order for green bonds to be labelled as ASEAN Green Bonds.⁹⁰
Sectoral cooperation	<ul style="list-style-type: none"> • Energy sector: ASEAN Plan of Action for Energy Cooperation 2016-2025; a common target to increase the share of renewable energy in the ASEAN Energy Mix to 23% by 2025, from 9.4% in 2014; to reduce energy intensity by 30% by 2025⁹¹ based on 2005 levels. ASEAN SHINE programme seeks to harmonise energy performance testing standards and Minimum Energy Performance Standards for lighting and air-conditioners across AMS. • Transport sector: Through the endorsement of the Kuala Lumpur Transport Strategic Plan (ASEAN Transport Strategic Plan) 2016-2025, and the ASEAN Fuel Economy Roadmap for the Transport Sector 2018-2025, AMS have agreed to actively pursue sustainable transport through formulating a regional policy framework on sustainable transport supporting low carbon modes of transport, energy efficiency, user friendly transport initiatives, integration of transport and land use planning. ASEAN aims to initiate and support the development and implementation of fuel economy policies and standards as well as policies towards cleaner fuels, vehicles and vessels, and develop monitoring frameworks and harmonized approaches for indicators on energy and GHG emissions in the transport sector.⁹² AMS have also agreed on a common goal to reduce the average fuel consumption per 100 km of new light-duty vehicles sold in ASEAN by 26% between 2015 and 2025.⁹³ • AFOLU sector: Food, Agriculture, Forestry Cooperation Vision 2025 has a Strategic Thrust number 4 for building resilience that contributes to net zero. Scientists from the CGIAR group actively utilize climate forecasting and long-term scenarios; FAO Regional Asia Pacific office on the land use sector offers a host of technical scientific resources that ASEAN can utilize for LTS planning.

89 [JICA 2019](#).

90 ASEAN Capital Markets Forum 2018.

91 ASEAN Secretariat 2019.

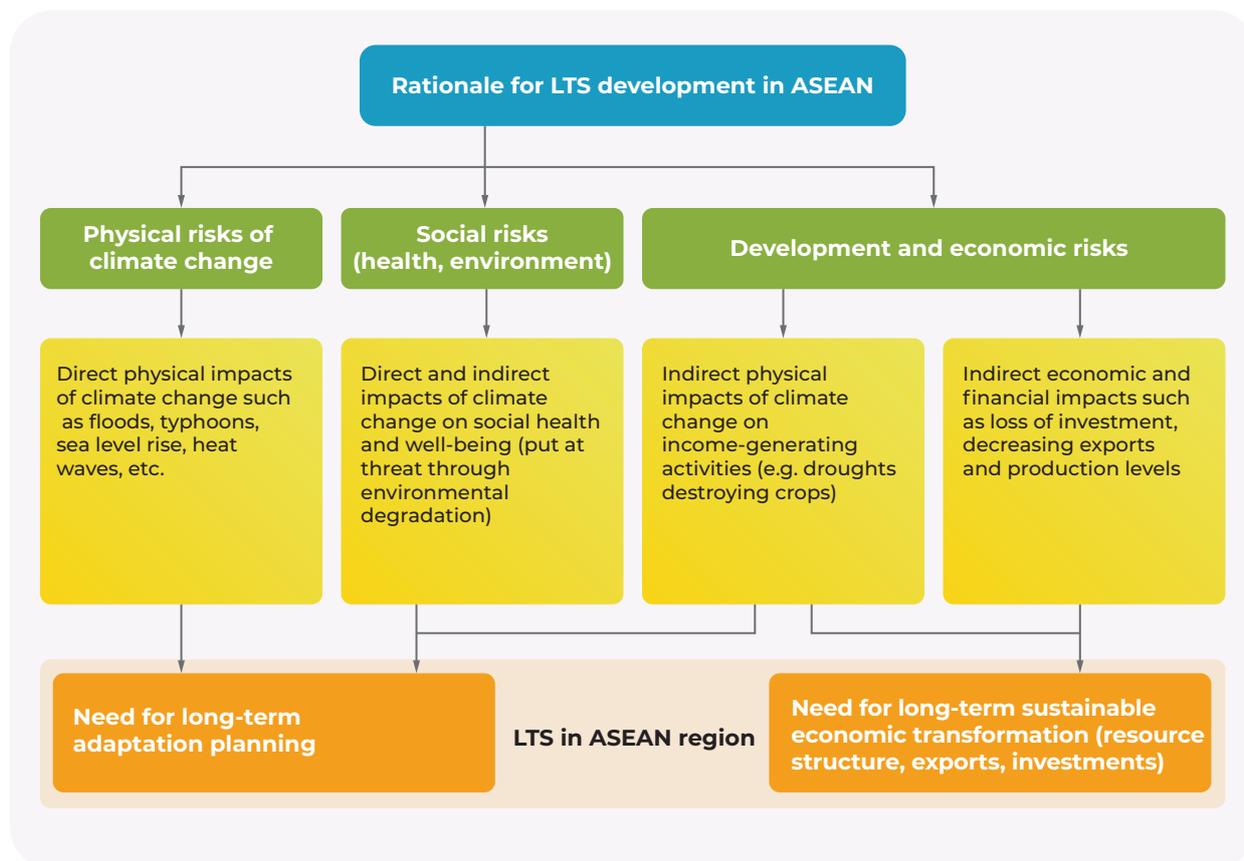
92 ASEAN Secretariat 2017.

93 ASEAN Secretariat 2019.

5.3. Rationale behind LTS development in ASEAN

According to the ASEAN Community Vision 2025, ASEAN envisions, among other strategic priorities, to be a sustainable Community that promotes social development and environmental protection through effective mechanisms to meet current and future needs of the peoples, and a resilient community with enhanced capacity and capability to adapt and respond to social and economic vulnerabilities, disasters, climate change as well as emerging threats and challenges.⁹⁴ Three main dimensions that are key for LTS development in the region can be derived from the ASEAN Vision 2025 (see Figure 9).

Figure 9: Rationale for LTS development in ASEAN



Source: Own compilation

With the population density substantially higher than the world average, 14% of the world total coastlines, 34% of the world total coral reefs, 60% of global tropical peatlands, extensive mangrove and forest landscapes that support livelihoods, a large share of population living below the national poverty lines and high urbanisation rates, ASEAN is one of the world’s most vulnerable regions to climate change impacts such as droughts, floods, typhoons, sea level rise, and heat waves.⁹⁵ One major argument for the development of LTS in AMS is, therefore, **long-term adaptation planning** that would help the region establish **robust regional and national mechanisms for adequate responses** to climate change impacts. This concerns not only long-term planning of how to best cope with natural disasters and slow onset events (e.g. sea-level rise) as **direct physical impacts of climate change** but also planning responses to the **risks to social health and well-being** posed by climate change.

94 ASEAN Secretariat 2015.

Furthermore, as sustainable economic growth and development are high priorities of the ASEAN Community, it is necessary **to eliminate the risks that climate change poses for economic and social development**. Those include not only **physical climate change implications** (e.g. physical impacts on economic and income-generating activities – e.g. destruction of agricultural production and fisheries through climate change – that may be addressed through adaptation action) but also **indirect economic and financial risks**. The latter implies that with the world as a whole moves towards climate neutrality, certain resources (such as coal and other fossil fuels) are likely not to be in demand any longer, the exports of companies can be affected because certain production standards may not be acceptable anymore, or international investment opportunities may be lost because certain areas will not be supported through investment in the future. In order to avoid this “worst case scenario” for ASEAN development, a long-term climate-smart economic transformation is necessary. To ensure that economic growth and prosperity is preserved for decades ahead, ASEAN needs to now face crucial choices that will influence its energy mix and emissions profile, which, in turn, will play a major role for its global economic standing. Drafting and implementing an ambitious LTS for the region will help avoid the lock-in in emissions-intensive energy sources and put Southeast Asia on a sustainable development path.

The Asian Development Bank (ADB) estimated that climate change impacts could lead to the **reduction of the region’s GDP by 11% in 2100 under the BAU emissions scenario**.⁹⁶ The cost-benefit analysis of adaptation conducted by ADB (comparing the cost associated with different levels of adaptation efforts with benefits from avoided climate change impacts) showed that the annual benefit of avoided damage from climate change is likely to exceed the annual cost by 2060. By 2100, benefits could reach 1.9% of GDP, compared to the cost of 0.2% of GDP.⁹⁷

At the same time, with regard to mitigation action, the International Renewable Energy Agency (IRENA) came to the conclusion that Southeast Asia could meet about **41% of all its energy needs from renewable energy by 2030** and create additional **6.7 million green jobs by 2050**.⁹⁸ Enhanced efforts to improve building and equipment efficiency could help reduce the growth in cooling demand in 2040 by around half.⁹⁹ Moreover, preventing deforestation and enhancing agricultural productivity can lead to significant emissions reductions.¹⁰⁰ The reduction in carbon emissions can be achieved without a tangible fall in GDP per capita.¹⁰¹

To conclude, for ASEAN and AMS, the development of LTS goes far beyond fulfilling international climate policy commitments. It is for economic, development, social and environmental reasons in the direct interest of AMS and the region as a whole and fully consistent with ASEAN Vision 2025. Long-term climate policy planning will give ASEAN a more clear sense of common direction of travel and ensure predictability for all stakeholders involved including politicians, implementing ministries and agencies, the private sector, the financial sector and the society as a whole.

5.4. Opportunities and challenges in ASEAN related to LTS

To analyse opportunities and challenges related to LTS in ASEAN, a survey among AMS was conducted in spring 2020. All climate policy focal points of the AMS shared insights on the status and prospects of LTS development processes. In addition, focus areas of the respective strategies were identified and major capacity needs highlighted. Finally, survey participants were also asked about the potential contribution of EU and ASEAN to support the development of a long-term perspective on climate policy throughout the region. The outcomes of the survey were in the next step complemented and verified through virtual bilateral consultations with AMS.

In the following, we summarise key findings of the survey and bilateral consultations along the assessment matrix described in detail in Chapter 3. The section provides a summary of outcomes for each of the analysed subcategories, and the upcoming section 5.5 aims to answer the questions posed in Table 8 with a view to making recommendations for next steps and entry points for the cooperation at the regional level.

Table 8: Assessment of status quo of LTS development in ASEAN

Prerequisites for LTS development	Status quo in ASEAN
LTS Content	
<i>Vision</i>	<ul style="list-style-type: none"> • Are there robust long-term socio-economic visions in AMS (e.g. anchored in development plans)? • Do AMS have clear understanding of long-term climate change implications for their economies and societies? • Do AMS have a clear picture of where they want to be in 2050 taking into consideration those climate change implications? • Has any high-level policy, strategy or other political document for long-term climate planning already been issued in AMS?
<i>Target setting</i>	<ul style="list-style-type: none"> • Have AMS set long-term greenhouse gas emissions reductions targets (for 2050 or later)? • Do they have any long-term sectoral climate-related targets in place? • Do they have long-term adaptation targets?
<i>Scientific input (input data and modelling)</i>	<ul style="list-style-type: none"> • Are there suitable scientific and research institutions that can provide support for LTS development in AMS? • Is there modelling capacity? • Have AMS issued any studies or other documents assessing the countries' (sectoral) mitigation potentials, opportunities, measures or costs? • Is adequate data (emissions data, other sectoral data, data on climate impacts) in place to support LTS formulation (e.g. accumulated through UNFCCC reporting)? • Are there robust MRV procedures in place?
<i>Policies and measures</i>	<ul style="list-style-type: none"> • Have AMS identified main areas (sectors, adaptation priorities) for transformation? • What climate policies are already in place to be used as a baseline for LTS? • Do AMS have clear understanding of long-term climate policy options that they have? • Have the countries already put forward any long-term sectoral mitigation or adaptation measures? • Has any analysis of potential conflicts of climate policies with other sectoral policies been conducted?

Prerequisites for LTS development	Status quo in ASEAN
Market mechanisms	<ul style="list-style-type: none"> Which economic instruments and market mechanisms are there at the national, regional, international level? Are AMS going to use domestic market mechanisms as part of their LTS? Are AMS going to use international market mechanisms as part of their LTS?
Climate finance	<ul style="list-style-type: none"> Have AMS been engaging financial institutions in the development of LTS or other climate policy documents? Is there a strategy on which financial instruments can support the transformation? Are there mechanisms in place to support sustainable private finance flows?
LTS Development Process	
Steps of LTS development process	<ul style="list-style-type: none"> Do AMS have clarity on how to organise the LTS development process?
Governance	<ul style="list-style-type: none"> Are there regional coordination and cooperation mechanisms in place in ASEAN that can support LTS development? Have AMS determined a range of institutions that should be involved in the LTS process at the national level? Are there mechanisms in place to support subnational and local actors' involvement in the LTS process?
Science and policy interplay	<ul style="list-style-type: none"> Are there robust mechanisms in place for smooth coordination between the LTS development team at the government and scientific institutions that provide data and modelling support?
Stakeholder engagement	<ul style="list-style-type: none"> Are there established procedures for stakeholder engagement in climate policy development processes to receive the necessary inputs (from sectoral actors, private sector, general public)?
Societal and private sector buy-in	<ul style="list-style-type: none"> Do AMS have understanding of how best to gain public and private sector support for the LTS development?
LTS Capacities	
Identifying capacity gaps	<ul style="list-style-type: none"> What are areas where AMS have already gained experience that could be relevant for LTS development? Do AMS have clarity about what are current barriers for LTS development? Do AMS have understanding of available and potential future technologies?
Means of closing gaps	<ul style="list-style-type: none"> Have donor projects been conducted to close the existing gaps? Has work been done to build domestic capacities? Are there technology or other cooperation projects ongoing (regional, international) that can be helpful for LTS development? Have areas been identified where AMS can assist each other during the LTS development process? Have areas been identified where international knowledge exchange is required?
LTS Monitoring and Implementation	
Tracking implementation progress	<ul style="list-style-type: none"> Are there monitoring processes in place that can potentially be used for LTS monitoring?
Review and updating	<ul style="list-style-type: none"> Are there review processes in place that can potentially be used for LTS review?
Alignment with NDC process	<ul style="list-style-type: none"> Are AMS developing their NDCs as a part of a more long-term perspective?

5.4.1. LTS Content

Singapore and Indonesia are the only AMS so far that **have already developed their LTS** and submitted them to the UNFCCC. Nevertheless, also other AMS have experience in formulating climate policy documents, setting climate-related targets, putting forward mitigation and adaptation policies and conducting scientific assessments to support climate policy development. Such experience will be extremely helpful for LTS formulation in AMS.

A. VISION

Questionnaire results indicate that AMS put a lot of weight on ensuring the consistency of climate change targets with national socio-economic development objectives, green growth strategies, sustainable development goals, and other international agreements that the countries are committed to. Along with **Singapore and Indonesia** that already have a **clear climate policy long-term vision, seven other AMS** mentioned that they issued **high-level policies and strategies that will be helpful to establish long-term climate policy planning** (Cambodia, Lao PDR, Malaysia, Myanmar, Philippines, Thailand, Viet Nam). Some countries, however, explicitly mentioned that the current policy planning does not go beyond 2030.

Example: Singapore's vision for a low-carbon and climate-resilient future (extracts from Singapore's LTS)

“Along with the rest of the global community, Singapore will play our part to reduce emissions in support of the long-term temperature goal of the Paris Agreement. [...] This will require serious and concerted efforts across our industry, economy and society. We also need to rely on global advances in low-carbon technology and on increased international collaboration, to realise such an aspiration. At the same time, we will pursue active and systematic adaptation efforts. As a small low-lying, island city-state, Singapore is particularly vulnerable to the effects of climate change. We face an existential threat from sea level rise and will increasingly experience other climate impacts such as increased temperature, prolonged dry spells, more intense rainfall, and exposure to vector-borne diseases. Globally, there will be greater pressures on resources, particularly for water, energy, food and raw materials, most of which Singapore imports. We will need to continue to pursue innovative solutions to optimize our resources in a carbon- and resource-constrained world.”

Based on these considerations, Singapore has determined three main strategic pillars (overarching objectives) that its LTS builds upon:

- To transform our industry, economy, and society;
- Harness emerging technologies as they mature;
- Pursue and leverage international collaborations.

Source: National Climate Change Secretariat Strategy Group, Prime Minister's Office, Singapore 2020

Whereas in most AMS such policy development experience largely focuses on the short- and mid-term policies (such as the Myanmar Climate Change Strategy 2018-2030 or the Cambodia Climate Change Strategic Plan 2014-2023), there are also some examples of more long-term climate policy planning documents that can and should inform future LTS formulation.

Good practice examples from AMS

In **Thailand**, the Cabinet endorsed the “Thailand Climate Change Master Plan 2015-2050” in 2015 as the long-term implementation framework for climate policy; climate policy has also been integrated into the National Strategy (2018-2037). **Indonesia** has launched the Low Carbon Development Initiative 2045 with a view to providing scientific assistance to policy-makers in formulating the country's LTS; the country also has experience with Long-term National Development Planning. In **the Philippines**, sectoral mitigation analysis up to 2040, which was conducted to inform NDC development, is aligned with development goals of the country as National Development Plan 2040 which represents the collective long-term vision and aspirations of the country in the next 25 years.

Sources: Thailand Climate Change Master Plan 2015-2050; Low Carbon Development Initiative 2045; questionnaire received from the Environmental Management Bureau of the Philippines

During bilateral consultations, some AMS expressed the view that a common regional long-term climate policy vision until 2050 of ASEAN could help them develop long-term climate strategies at the national level. However, almost all AMS stressed that agreeing on a common long-term regional climate policy framework would be very challenging due to diverging national political, economic and social contexts. The common ground emerged from the consultations was the view that **certain elements of a long-term regional climate policy vision (such as general sectoral pathways without setting common goals) or a joint regional framework for development including climate policy as an element** could be feasible to agree upon and foster LTS formulation and implementation in AMS.

As part of **the more general climate policy formulation experience, seven AMS** underlined various experience ranging from NDC formulation to Climate Change Policies and Climate Change Strategy (Cambodia, Indonesia, Lao PDR, Myanmar, Philippines, Singapore, Thailand). Lao PDR emphasized that its NDC is mainstreamed into the National Socio-Economic Development Plan, incorporated with the National Green Growth Strategy and the Sustainable Development Goals. Indonesia, Myanmar and Philippines also stated that they are in the **process of reformulating the NDC – a process, which needs to be aligned with the LTS development process** (through the use of the same data, same models, projections and the NDC making a solid contribution to the long-term climate objectives). Cambodia mentioned financial and technical constraints in the NDC reformulation process. Lao PDR mentioned planning for the development of the **National Adaptation Plan (NAP)**. Brunei Darussalam launched its first Brunei Darussalam National Climate Change Policy (BNCCP), which is the basis for its NDC.

B. TARGET SETTING AND SECTORAL PRIORITIES

The majority of AMS have started to develop several key elements of the LTS. Six AMS have already set **long-term GHG reduction strategies** or are in the process to do so (Cambodia, Indonesia, Lao PDR, Myanmar, Philippines, Singapore).

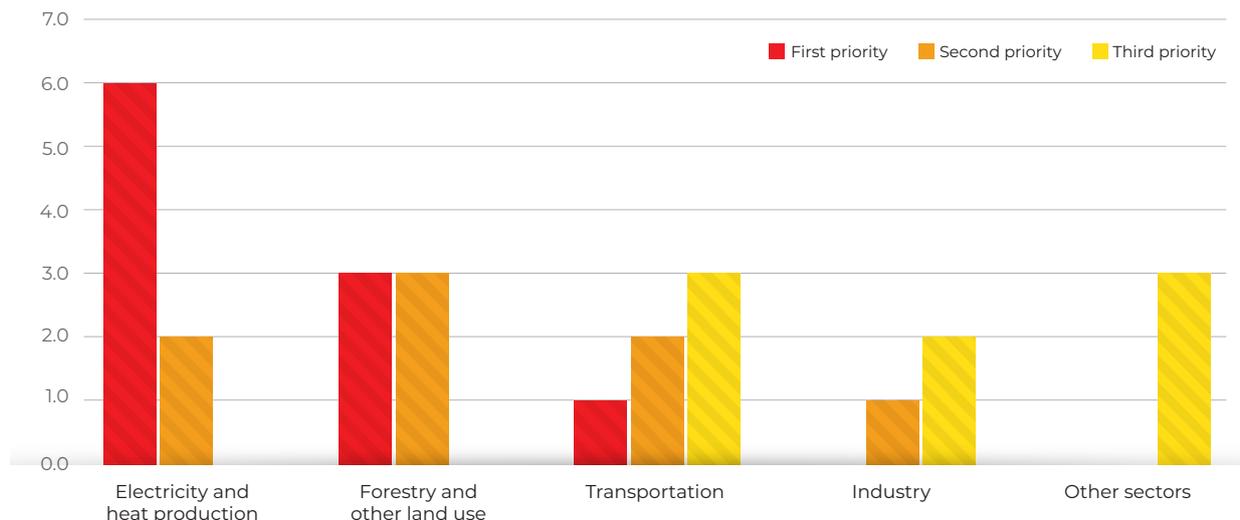
■ Good practice examples from AMS

Singapore has announced that its long-term low-emissions development strategy aspiration is to halve the emissions from its 2030 peak, to 33 MtCO_{2e} by 2050, with a view to achieving net-zero emissions as soon as viable in the second half of the century. Singapore's enhanced NDC (submitted in 2020) reflects its commitment to peak emissions at no higher than 65 MtCO_{2e} around 2030. **Lao PDR** is currently conducting scientific assessments of the possibility of a net zero 2050 target.

Source: Questionnaire results

AMS identified quite different **sectoral priorities** that are particularly important for decarbonising the economy of the respective countries (see figure below). At the same time, **energy** and in particular **electricity and heat production are referred to as 1st priority by six AMS** (Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore, Thailand) and ranked as 2nd priority by some other AMS (Lao PDR, Myanmar). The most important sector for **three countries is forestry and other land use** (Cambodia, Lao PDR, Malaysia, Myanmar), also ranked by some other countries as 2nd priority (Brunei Darussalam, Indonesia). **Transportation** is also a high priority of several AMS (Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, the Philippines). Singapore, in comparison with other AMS, puts more emphasis on decarbonizing its **industry sector** (however, also for Indonesia and Myanmar industrial emissions are ranked 3rd on the priority list; Brunei Darussalam also explicitly mentioned industrial emissions as one potential LTS focus area). Viet Nam indicated that a ranking does not make sense at this stage due to the changes in the socio-economic development strategy of the country. Thailand mentioned that to better prioritize the sectors, a technical study and in-depth analysis is needed but indicated that energy is the most important sector because it is the majority source of emissions and has high potential in terms of GHG emission reduction.

Figure 10: Sectors key for LTS development



C. SCIENTIFIC INPUT (INPUT DATA AND MODELLING)

Half of the AMS have already published studies or other documents to guide the strategic climate policy development process (Cambodia, Indonesia, Lao PDR, Myanmar, the Philippines). Among the documents are roadmaps or studies on the NDCs of the countries, national communication reports (under UNFCCC) or low-carbon development studies. Seven countries replied that they have some existing in-country analytical capacities for conducting LTS-related research and long-term scenario modelling (Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore). However, some countries indicated that the capacities are only being established (see Table 9 below for more information on good practice).

Lao PDR described several scenarios that were developed to inform the update of the country’s NDC in 2020. In particular, three scenarios were developed: The baseline scenario, which is a reference case, illustrates future GHG emission levels most likely to occur in the absence of GHG mitigation activities. An unconditional mitigation scenario reflects GHG emission reductions efforts that Lao PDR can commit to, considering own resources and existing levels of support from developed country Parties. And finally, a conditional mitigation scenario represents additional GHG emission reductions efforts that Lao PDR could achieve, contingent upon increased levels of financial support from developed country Parties (the conditional scenario goes to net zero GHG emissions by 2050).

Table 9: Analytical and modelling capacities in AMS



Case Cambodia

An assessment of a **possible GHG emissions reductions towards 2050** was conducted during the preparation of the second National Communication; the country has also conducted a more concrete assessment of potential emissions reduction by 2030 for its first NDC. Besides, the country has conducted an assessment of the **climate change impacts on the economic growth by 2050**, in which it is expected that climate change is projected to impact the GDP growth by around 0.3% by 2050.



Case Myanmar

In Myanmar, under UNFCCC reporting, National GHG Inventory and Mitigation Options Technical Working Group members are building capacities on GHG mitigation assessment modelling tools such as **'Greenhouse Gas Abatement Cost Model – GACMO'** and **LEAP**. The Ministry of Electricity and Energy also has extensive experience in using the LEAP modelling tool for energy planning and has been conducting 'Future Outlook – Myanmar' to project future GHG emissions in almost all sectors, which will soon be published. The Yezin Agriculture University is providing scientific background for the agricultural sector.



Case Philippines

National government agencies have conducted sectoral mitigation analysis up to 2040 to inform NDC development. An "Economy-wide Analysis and Emissions Scenario Building for the Formulation of the Philippines' NDC" were carried out by economic modelling experts in 2019. The Philippines' Mitigation Cost-Benefit Analysis was initially undertaken in 2015 and updated in 2018: During the project, representatives from sectoral agencies learnt about the analysis process including in the use of **Long-Range Energy Alternatives Planning (LEAP) models** and the Marginal Abatement Cost Curve (MACC). Sectoral agencies were also trained to apply a Multi-Criteria Analysis to prioritize mitigation measures.



Case Singapore

A rigorous modelling exercise was conducted under the supervision of the government agencies under the Inter-Ministerial Committee on Climate Change, to develop the key mitigation strategies and low-emissions pathways for Singapore. Relevant government agencies worked together to iteratively evaluate possible mitigation measures in terms of cost effectiveness and practicability, taking into account the objectives of the Paris Agreement temperature goal and the latest findings from IPCC. Several research institutes were also engaged to study the various technologies and mitigation measures possible for Singapore, as well as the long-term abatement potential and costs of these options. A **recursive-dynamic numerical model, MARKAL**, was used to simulate possible mitigation pathways, based on the available technology options. Technology roadmaps, prepared by the Government in collaboration with industry stakeholders, academic experts, and technical consultants, served as inputs for estimating the long-term mitigation potential of future technologies in Singapore.¹⁰²

Source: questionnaire results

102 The technology roadmaps can be downloaded at: <http://www.nccs.gov.sg/media/technology-roadmaps>.

Despite the fact that many AMS confirmed the existence of in-country analytical capacities, it can be derived from the questionnaire results that **not in all countries those capacities are sufficient to inform the LTS process**. For example, Myanmar names “familiarity with modelling tools” as one barrier for LTS development; Brunei Darussalam mentions “limited information to develop long-term projection models”. The Philippines emphasize that there is still a need for continuous capacity building, sharing of knowledge, good practices and practical application within the mandates of national agencies. Several AMS indicate the insufficient level of technical capacities of relevant agencies at the national and local levels on climate related subjects for LTS development (Cambodia, Viet Nam, Lao PDR, Malaysia).

Malaysia mentions the need to conduct a **technology needs assessment** to determine the type of technology needed to decarbonize its economy. Malaysia also **needs technical capacity to implement mitigation modelling, NDC tracking, GHG inventory, and preparation of climate reports under the Paris Agreement**.

Scientific basis for the adaptation section

Some AMS are also building the specific scientific base for the adaptation part of the LTS, for example, through conducting regional vulnerability assessments. At the same time, Malaysia explicitly mentioned the **need to enhance technical capacity to conduct vulnerability assessments**.

■ Good practice examples from AMS

Myanmar has conducted three pilot projects for assessing vulnerability in Hakha Township in Chin State (Mountainous Area), Pakokku Township in Magway Region (Dry Zone Area) and Laputta Township in Ayeyarwaddy Region (Delta area) in terms of socio-economic impacts, eco-system impacts and urban-regional territorial impacts. Vulnerability assessments conducted in **Brunei Darussalam** have shown that the country has medium to high climate change exposure and is prone to four key risks including flood, forest fires, strong wind and land slides.

Sources: Questionnaires received from the Ministry of Natural Resources and Environmental Conservation of Myanmar and the Ministry of Energy, Manpower and Industry of Brunei Darussalam

MRV and data

Seven AMS have **experience with the establishment of MRV procedures** (Cambodia,¹⁰³ Indonesia, Malaysia, Myanmar, Philippines, Singapore, Thailand). For instance, Singapore highlighted that the experience in putting in place a robust domestic MRV system for tracking and reporting of GHG emissions was especially useful in the preparation of inputs to support the long-term scenario modelling work.

At the same time, some AMS indicated that **MRV procedures and their application on the ground** need to be improved to build a sound basis for LTS development. More generally, countries referred to the **lack or limited availability of accurate sectoral data** and credible methodologies to measure the outcomes of policies and actions.

For example, **the Philippines** have developed a national MRV system “National Integrated Climate Change Database and Information Exchange System”, however, there is still a need to improve the sectoral and local MRV. **Lao PDR** mentioned the lack of accurate and available knowledge, data and credible methodologies to measure the outcomes as well as the capacity on MRV application as existing barriers that hinder the achievement of climate policy targets. Relevant sectors have to be trained to implement the MRV system in a coordinated manner. **Brunei Darussalam** mentioned limited availability of data and means of verification of its accuracy from different data sources/ providers as one of the barriers for LTS development. **Malaysia** referred to the need of enhancing national level MRV and developing facility level MRV for mitigation actions.

Some **MRV harmonization efforts** with a focus on company level MRV have already been undertaken in the context of carbon pricing. In particular, the AWGCC in 2017 engaged in the UNFCCC's Collaborative Instruments for Ambitious Climate Action (CiACA), which aims to assist Parties in the development of carbon pricing approaches for implementing their NDCs. In this framework, common understanding of carbon pricing among AMS was reached, and scoping study was conducted on **MRV harmonization** and review of carbon pricing instruments adopted in the countries. Building on the results of this study, the PASTI-JAIF Project (Partnership to Strengthen Transparency for Co-Innovation under the Japan-ASEAN Integration Fund) was launched by the AWGCC in 2019, which mainly aims at the development and implementation of **facility / company level MRV systems** for GHG emissions in AMS. The aims are to identify what tools, methodologies and approaches need to be used, what incentive mechanisms are to be applied to whom, and how to engage the private sector in this undertaking. Ultimately, the project expects the AMS to contribute to the design of the roadmap in the development of the **facility-level regional monitoring and reporting guideline**.

Source: UNFCCC Regional Collaboration Centre – Bangkok 2019

D. POLICIES AND MEASURES

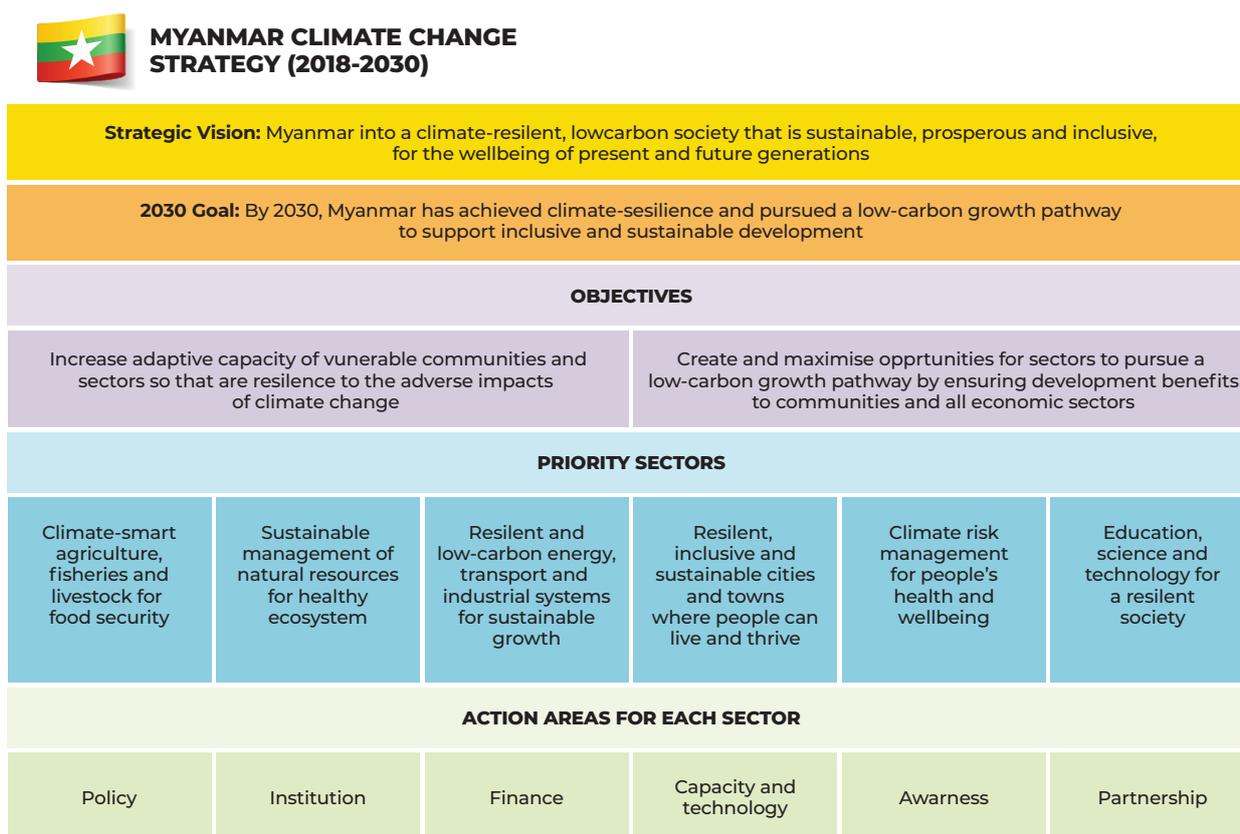
To support the implementation, half of AMS responded that they had adopted some **mid-term or long-term mitigation and adaptation policies and measures** (Cambodia, Indonesia, Lao PDR, Myanmar, the Philippines). The primary focus, however, lies on measures up to 2030. In particular, the **Myanmar Climate Change Strategy until 2030** launched in 2019 guides the way to achieve **six priority sectoral outcomes** (see Figure 11). To achieve those sectoral outcomes, the strategy puts forward five main pillars of action: (1) An overarching policy framework, (2) A multi-stakeholder institutional mechanism, (3) A financial mechanism, (4) A capacity-strengthening framework, and (5) A monitoring, evaluation and learning framework, crucial to successfully implement the strategy. Each of the six priority sectors are encouraged to generate specific results to build the foundation for the desired sectoral outcomes. A study on low carbon development towards 2050 in **Cambodia** conducted in 2016 proposed policies and 12 strategies together with a number of activities to reduce GHG emissions.¹⁰⁴ **Brunei Darussalam** has identified several priority areas that the LTS can focus on:¹⁰⁵

- **Industrial emissions:** reducing overall industrial emissions through zero routine flaring and to As Low As Reasonably Practicable (ALARP);
- **Electric vehicles:** reducing carbon emissions from land transportation sector by increasing electric vehicles in total fleet share;
- **New and Renewable Energy:** Currently, renewable energy sources come from a 1.2 MW solar PV power plant, Tenaga Suria Brunei (0.14% of the total power generation mix) and a 3.3 MWp Brunei Shell Petroleum Flagship Solar PV Plant (0.4% of the the total power generation mix). There is a need to promote the utilisation of renewable energy to reduce reliance on fossil fuels consumption.
- **Power Management:** The emissions from power generation are currently the biggest in the energy sector. Brunei Darussalam seeks to reduce emissions from the power sector by focusing on increasing energy efficiency and conservation at both supply and demand side.
- **Waste Management:** reducing GHG contribution, mainly methane emissions, by minimising the amount of waste that needs to be disposed of through waste minimisation, adoption of best practices and innovative technologies;
- **Forest Cover:** increasing carbon sinks through afforestation and reforestation programmes.

104 Questionnaire received from the National Council for Sustainable Development/ Ministry of Environment.

105 Questionnaire received from the Brunei Climate Change Secretariat, Ministry of Development of Brunei Darussalam.

Figure 11: Conceptual Framework of the Myanmar Climate Change Strategy



Source: [Myanmar Climate Change Strategy \(2018-2030\)](#)

During NDC preparation and reporting under UNFCCC, countries have identified **some particular sectoral priority areas** that need to be addressed to decarbonize the economy. For example, in Lao PDR, the sector Agriculture, Forestry and Land Use (AFOLU) is the major source of GHG. The largest contributor to the overall emissions in this sector are emissions from **biomass burning on forest land**, which are therefore a priority for Lao PDR.

Some AMS are already at the advanced stage of creating a **legal and regulatory basis for low-carbon development** including both mitigation and adaptation policies and regulations. For example, the **Philippines** have laid a profound legal basis for climate policies including laws, plans and regulations on adaptation, mitigation, disaster risk reduction, land use, low-carbon tourism and mainstreaming climate change into budgets and policies. Policies with a mid-term time horizon include e.g. the National Disaster Risk Reduction and Management Plan (2011-2028)¹⁰⁶ or the National Disaster Preparedness Plan (2015-2028).¹⁰⁷ Some sectoral strategies, policies and measures related to climate change are also in place.

Adaptation policies and measures

Nearly all AMS referred to the **adaptation** (Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand) as a priority area to be included in the LTS. Singapore aims at addressing seven major climate-related risks through adaptation action. Those are protecting the coasts; protecting the water supply and alleviating floods; enhancing climate and ecological resilience through

¹⁰⁶ [National Disaster Risk Reduction and Management Plan \(2011-2028\) of the Philippines.](#)

¹⁰⁷ [National Disaster Preparedness Plan \(2015-2028\) of the Philippines.](#)

greenery and biodiversity conservation management; strengthening resilience in public health – reducing the risk of dengue; strengthening food security; keeping cool in a warming world (climate-smart urban planning), and keeping buildings and infrastructure safe.

■ Adaptation priorities of AMS

Brunei Darussalam has identified **four key adaptation risks** including flood, forest fires, strong wind and land slides. The country is also highly susceptible to the impact of the rising sea level. **Lao PDR** mentioned the need for effective responses and adaptation strategies for climate-induced disasters, especially floods, as a specific area of action.

Myanmar's National Adaptation Programme of Action report established a framework for the integration of urgent adaptation needs into the economic and social goals of the country, identified the specific national adaptation needs, and criteria for selecting and prioritizing adaptation options. Then, 32 Priority Adaptation Projects (four projects in each of the 8 key sectors) were identified to address the immediate needs for building climate change resilience of vulnerable communities.

E. MARKET MECHANISMS

Eight AMS have introduced or are considering introducing a **domestic carbon pricing mechanism** (Singapore – carbon tax already in place; Brunei Darussalam, Indonesia, the Philippines, Thailand and Viet Nam – carbon pricing options analysed; Cambodia – interest in carbon pricing mechanisms; Malaysia – potential interest in a domestic financial mechanism for a specific sector such as forestry) as one of the pillars to implement the LTS. The Philippines mentioned the possibility of embarking on domestic carbon market mechanisms as the Philippine Clean Air Act allows emissions trading among pollution sources; also carbon tax options are being explored (see box below).

Furthermore, **five countries** referred to **international market-based mechanisms** (Cambodia, Lao PDR, Myanmar, the Philippines, Singapore) as areas where they already have past experience and potential ways to implement the LTS in the future. In particular, the Philippines expressed interest in voluntary cooperation through international transfers of mitigation outcomes under **Article 6 of the Paris Agreement**. Singapore intends to study how to best leverage robust international market mechanisms to complement domestic mitigation efforts. Cambodia, Lao PDR and Myanmar mentioned existing experience with the **Clean Development Mechanism (CDM)** under the Kyoto Protocol and participation in the **Joint Crediting Mechanism (JCM)** with Japan that can be built upon and extended in the future. Cambodia also mentioned **voluntary carbon market** experience. Myanmar also referred to **REDD+** experience.

■ Domestic carbon pricing in AMS

In **Singapore**, the **carbon tax** is considered to be the key policy instrument to encourage companies to reduce their emissions. The tax covers around 80% of the country's total GHG emissions, which is one of the highest carbon tax coverage globally.

Brunei Darussalam intends to introduce carbon pricing applicable to all industrial facilities and power utilities emitting beyond a carbon emission limit threshold at a carbon price per CO₂e, by 2025, to reduce carbon intensity from the industrial sector and new power utilities.

F. CLIMATE FINANCE

Seven AMS stressed **the importance of climate finance** (Cambodia, Lao PDR, Malaysia, Myanmar, the Philippines, Thailand, Viet Nam) as a means of implementing the LTS.

In particular, the Philippines stressed the need to translate the identified climate policy measures and the LTS as a whole into a **viable business proposal** where the private sector, investors and donors can buy into.

The Philippines made a distinction: Whereas public financing will prioritize adaptation, the government will at the same time provide a policy environment that will enable participation of the private sector to optimize mitigation opportunities and reduce business risks towards a climate smart development.

■ Climate finance aspirations of AMS

In line with its mid-term Climate Change Strategy, **Myanmar** intends **to set up a financial mechanism** to mobilise and channel climate finance for inclusive investment in climate-resilient and low-carbon development. Key elements of such a financial mechanism include: (1) Establishing a climate change fund. (2) Using appropriate financial instruments (introducing a range of financial instruments – grants, guarantees, climate-smart insurance, loans, equity and debt-based financial instruments). (3) Using financial management systems to govern the flow of climate finance (integrating climate change priorities into planning and budget allocation systems and using financial management systems such as auditing, reporting and procurement systems to manage climate finance effectively).

Also **Lao PDR** intends to set up the **centralized national climate finance mechanism** with effective and efficient implementation and transparent auditing.

In the area of climate finance, AMS are currently working on the design of **the ASEAN Climate Finance Mobilization and Access Strategy**. The work will include framing the scope for quantifying and qualifying climate finance needs, including geographic coverage, time span, sector coverage and consensus on socio-economic and climate change scenarios to use as the basis for framing current and future needs. Pipeline projects would also be developed in line with the handbook / guidelines of the ASEAN Climate Finance Strategy to mobilise and access to climate finance.¹⁰⁸

Lao PDR requested support from developed country parties in **designing innovative financial mechanisms** that blend public and private capital as a means of mitigating risks and unlocking private sector investment in climate projects.

The Philippines, Cambodia, Lao PDR, Myanmar and Viet Nam mentioned seeking financing sources for LTS implementation (e.g. **implementation of concrete projects and policies**). Cambodia emphasized that while most of the budget from donor projects is spent on the technical assistance, finance needs to be redirected towards the actual implementation of climate policies and actions. The Philippines stressed the need of finance to develop and adopt **the most appropriate technologies** to improve adaptive capacities and resilience and pursue low-carbon development.

5.4.2. LTS Process

All respondents mentioned a **broad spectrum of experiences** that may help to inform the LTS development process, which also indicates that the LTS process **does not need to start from scratch**.

108 UNFCCC Secretariat 2019.

A. STEPS OF LTS DEVELOPMENT PROCESS

AMS are at various stages of LTS development. So far, Singapore and Indonesia are the only AMS that have already formulated and formally submitted their LTS. Thailand is currently formulating its LTS. Other AMS like Brunei Darussalam, Cambodia, Lao PDR or Myanmar are at the beginning of the process. Some AMS like Malaysia, Viet Nam and the Philippines mentioned that so far, the work on updating the NDCs had been a particular focus and the work on the LTS will build upon the NDC efforts.

B. GOVERNANCE

Seven AMS mentioned already **existing institutional and coordination arrangements that will be used for or built upon during LTS development** such as established focal points; cross-sectoral or vertical coordination mechanisms. Examples are councils, committees or commissions for sustainable development or climate change, ministries as focal points as well as working groups. Several countries stressed the importance of using existing national coordination mechanisms in order to ensure continuity and effectiveness of the climate policy, **as opposed to creating new project-based or temporary institutional arrangements** for LTS development and implementation. In the selection of relevant stakeholders, Indonesia mentions that in the LTS formulation it uses the same approaches as for NDC development: Relevant stakeholders are identified through **stakeholder mapping** – the actors contributing to responding to climate change either at the political or at the technical level are involved.

A wide range of ministries accompanies the LTS development process in the AMS, some respondents even mentioned that all ministries should be involved in the process. Cambodia, Lao PDR and the Philippines provided comprehensive lists of ministries and institutions that will be involved. One country (Thailand) referred to **a working group** established to formulate the LTS, which will be composed of government agencies and experts.

■ Good practice examples from AMS

The development of **Singapore's** LTS was overseen by the **Inter-Ministerial Committee on Climate Change**, which is chaired by a Senior Minister and supported by the National Climate Change Secretariat, the national coordinating agency for climate change issues under the Strategy Group, **Prime Minister's Office**. Under the Committee, the Long-Term Emissions and Mitigation Working Group is responsible for envisioning Singapore's post-2020 future in a carbon-constrained world. The Working Group provides the planning framework for government agencies to work together to discuss and identify mitigation actions through a combination of top-down and bottom-up analysis. A whole-of-government/ nation approach driven by the Committee was adopted to develop possible climate measures for the LTS.

Source: National Climate Change Secretariat Strategy Group, Prime Minister's Office, Singapore 2020

In **Indonesia, one ministry is acting as a coordinator** of the LTS development process (in Indonesia, it is the Ministry of Environment and Forestry, which is the National Focal Point to the UNFCCC). The ministry is at the same time coordinating with other ministries that are responsible for particular sectors and appointed as focal points of those sectors through cross-sectoral coordination arrangements.

An alternative approach, which is more widespread among AMS, is hosting climate policy development within the **inter-ministerial high-level committee or commission** chaired by the **Prime Minister's Office**. Such structures are likely to be utilised by the countries in the LTS development process. For example, **Viet Nam** has a National Committee on Climate Change chaired by the Prime Minister, and the LTS will formally be issued by the Prime Minister. The Committee will coordinate its work with all line ministries. **Thailand** has a National Committee on Climate Change Policy, chaired by the Prime Minister. The Committee includes a working group on mitigation policy and planning that consists of sectoral experts and relevant line ministries and agencies. In **Cambodia**, the National Council for Sustainable Development was established comprising 25 Ministries and all provinces to review policy and approve of the implementation plans and policies. The climate change technical working group was established to coordinate the work with internal stakeholders. In **Myanmar**, the National Environmental Conservation and Climate Change Central Committee is the highest institution in charge of climate policy chaired by the Vice-President. It is composed of six working committees, including the 'Climate Change Adaptation and Mitigation Working Committee', at national level and 15 Environmental Conservation and Climate Change Supervision Committees at the subnational level. Ten line ministries are assigned as focal agencies to implement six main sectoral priority areas in line with the Climate Change Strategy. In **Brunei Darussalam**, climate governance consists of the Brunei Darussalam National Council on Climate Change (comprises four key ministers and a deputy minister and is co-chaired by the Ministers of Development and Energy), the Executive Committee on Climate Change and three Working Groups: on Mitigation, Adaptation and Resilience, and Support Framework. **The Philippines** have an "**NDC Technical Working Group**" composed of permanent and alternate representatives from national agencies who assume roles relevant to policy-making, planning, and implementation of programs and projects that support climate change adaptation and mitigation. The TWG also calls upon representatives from other government agencies, including local government agencies, as well as business, civil society and the academia. The Climate Change Commission acts as the overall lead in the NDC development process that constantly coordinates and provides guidance and technical support to the sectoral lead agencies.

Although there are robust institutional structures that are being or will be used in the LTS development process, some AMS highlighted that **cross-sectoral coordination mechanisms are insufficient at the moment**. For instance, Lao PDR mentioned that the coordination among key sectors is one of the current challenges. Viet Nam also highlighted that coordination between focal points is challenging, although progress is being made with regard to identifying their respective roles in the process. Myanmar saw political commitment of concerned sectors as a challenge. The Philippines considered that LTS need to be embedded in the development plans and sectoral strategies of concerned ministries, which may also be challenging.

Similar to **cross-sectoral** coordination mechanisms, a potential area for support is **vertical coordination and the involvement of the subnational and local levels** into the process of LTS formulation.

For example, Indonesia emphasized various understanding of climate change **at the national and subnational level** and saw it as a potential barrier for LTS development. Lao PDR spoke of insufficient institutional arrangements for sustainable management of resources and appropriate **community participation** as well as limited technical capacity of relevant agencies at the local levels. None of the AMS mentioned the **involvement of cities** in the LTS development process, whereas this area needs to be a particular priority in the ASEAN region. On a positive note, in the Philippines, the National Climate Action Plan integrates climate change in the plans and strategies of local governments. This experience can be built upon in the LTS strategy process.

Finally, the Philippines also stressed the importance of the involvement of **legislative bodies** (congress, senate) in the development of the necessary policies supporting the LTS.

C. SCIENCE AND POLICY INTERPLAY

An **institution that can provide scientific background in the areas relevant for LTS development** to the policy-making institutions is missing in Brunei Darussalam – an element existing in all other AMS with a broad spectrum reaching from governmental agencies and universities to other national authorities.

Despite the existence of adequate scientific support at the national level, some AMS highlight that **the interaction and coordination between the science and policy-makers** is insufficient. For instance, Indonesia mentions the lacking linkages of the scientific modelling/projections with policy development. Lao PDR stresses the importance of enhancing political and academic interaction.

D. STAKEHOLDER ENGAGEMENT

According to the questionnaire results, **all AMS have put in place national processes to involve stakeholders in climate policy development**. To facilitate such processes, climate change or development councils and committees in addition to working groups are used. Six AMS explicitly mentioned their experiences in arranging sectoral and other stakeholder engagement procedures. Five AMS have experience with sectoral engagement mechanisms. That includes party and non-party stakeholders, technical forums for information sharing and discussing policy benefits and the interests of stakeholders, as well as public consultations. Other mentioned formats include workshops, focus group discussions at the technical and the scientific level, coordination meetings and bilateral meetings.

The experience in the engagement of sectoral and other stakeholders can also be drawn from the recent **NDC formulation exercises and the adoption of other strategic climate policy documents**. For example, in **Brunei Darussalam**, an inclusive Executive Committee on Climate Change has been established, which is composed of Permanent Secretaries of key government agencies, Chief Executive Officers and Managing Directors of industry operators, Presidents of professional associations, academia and non-governmental organisations. The Working Groups on Mitigation, Adaptation and Resilience, and Support Framework consist of officers from the private and public sectors, academia as well as NGOs. Through this collaborative process and stakeholder engagement, inputs on potential GHG mitigation measures were received and used as a basis to drive the development of the Brunei Darussalam's National Climate Change Policy.

■ Good practice examples from AMS

Singapore's LTS was prepared by government agencies under the Inter-Ministerial Committee on Climate Change, in consultation with academia, industry and civil society whose opinions and expert views were gathered through research projects, surveys, and other stakeholder engagement processes. The Government also undertook an extensive **public consultation** (consultation documents are in free access) between July and September 2019 on potential long-term low-emissions strategies for Singapore. The consultation was aimed at seeking views on **measures and actions** that could be taken by the government, businesses, households and individuals towards becoming a low-carbon global city-state. About 2,000 responses from the public, various NGOs, green groups, green councils, academics, non-profit organisations, companies and business organisations were received. Several engagement sessions were organised from August 2019 to January 2020 to facilitate in-depth discussions with **experts and stakeholders across a wide variety of sectors**, which include the transport, industry, buildings, infocommunications and logistics sectors.

Source: Questionnaire received from the National Environment Agency of Singapore

In **the Philippines**, there have been consultations conducted by lead sectoral agencies, mostly in the form of focus group discussions and meetings to finalize the sectoral measures on top of the "NDC Technical Working Group" meetings and stakeholder consultations initiated by the Climate Change Commission. Several trainings and workshops have also been conducted to enhance the capacity of the sectoral agencies

and some experts/ consultants were engaged as well to provide technical support. Sectoral agencies have also undertaken stakeholder engagement processes for each of the identified measures and strategies. Thus far, inputs derived from these activities are being taken into consideration in the recalibration process of the sectoral NDCs.

E. SOCIETAL AND PRIVATE SECTOR BUY-IN

At the regional level, ASEAN is committed to lifting the quality of life of its peoples through cooperative activities that are people-oriented, people-centred, and geared towards the promotion of sustainable development. ASEAN works with many partners, international organisations, civil societies, and the private sector at different levels and sectors dealing with climate change issues.¹⁰⁹ For instance, civil society representatives recently engaged with the ASEAN Working Group on Climate Change and submitted their Statement to be taken into account in the formulation of the ASEAN Joint Statement on Climate Change at the UNFCCC COP26. Moreover, annual **ASEAN Climate Change Partnership Conferences** are a regular platform for engagement with various ASEAN sectoral bodies, dialogue and development partners, as well as the private sector. The Conferences aim to enhance ASEAN-wide cross-sectoral and multi-partner coordination in addressing climate change issues in the region.¹¹⁰ Dialogues involving various stakeholders also take place between ASEAN and its international partners – for example, in September 2020, the UK COP26 Presidency, in collaboration with ASEAN and IRENA, hosted a virtual **ASEAN-COP26 Climate Dialogue on NDCs and LTS** for senior government officials from all AMS, national and international experts and practitioners. The aim was to share experiences in meeting and enhancing climate pledges under the Paris Agreement and lessons on developing LTS.¹¹¹

At the national level, AMS share the view that it is crucial to include representatives from the private and business sectors, NGOs, civil society organisations and local governments to gain first-hand information on the current and emerging situations on the ground as well as to gather their views and perspectives on the LTS in order to secure societal and private sector buy-in of climate action undertaken by the government. It should be noted that some AMS mentioned concerns that the acceptance by the public might be one of the potential challenges for LTS development and implementation.

In addition to this, one way of “socialising” the LTS content to the public is the inclusion of **visual or interactive design elements** that convey a clear picture of the main messages on the way towards low-carbon development. A good practice example is provided by Singapore’s graph used in its LTS to visualize the main LTS building blocks including quantitative and key qualitative targets in various sectors and different pillars the strategy is based on.¹¹²

5.4.3. LTS Capacities

A. IDENTIFYING CAPACITY GAPS

When it comes to identifying existing capacity gaps that hinder LTS development, several categories of challenges can be summarized based on the questionnaire findings:

Data availability and accuracy for long-term modelling and target setting

Several AMS (Brunei Darussalam, Lao PDR, the Philippines) emphasized the limited availability of (accurate) data and information needed to develop long-term projection models. The challenges range from the difficulty to identify the correct data, over the limited availability of data from different sources/ providers to lacking means of verification of its accuracy. At the core of the challenge lies inefficient data collection and archiving. Some of the data needed to develop long-term projection models is not included in the existing reporting systems. Strengthening the MRV systems and particularly the need to improve sectoral and local MRV have been identified as an area where capacity building is needed by several AMS (Lao PDR, the Philippines).

Modelling tools and technical (analytical) capacities to formulate the LTS

Limited knowledge of modelling tools (Myanmar) as well as weak technical capacities to prepare long-term GHG emission projections and reduction targets up to 2050 (Brunei Darussalam) were mentioned as further obstacles for LTS development. Moreover, Thailand referred to the need of conducting analysis for GHG emission reduction approaches for policy makers to be able to identify the specific sectoral targets. Lao PDR highlighted the need of development of projections including business-as-usual scenarios for different economic trajectories beyond 2020.

Technical and financial constraints to implement policies and measures

Lao PDR explicitly mentioned weak technical capacity of relevant agencies at national and local levels on climate change issues to apply MRV procedures and measure the outcomes of policies and measures. In addition, limited financial resources for project and policy implementation (translating the proposed activities into concrete implementation) on the ground have been referred to as a barrier for LTS implementation (Cambodia).

Linkages between scientific modelling and policy-making

Thailand mentioned that getting recommendations on how to use scientific data and evidence would lead to better decision-making and policy-making. Weak linkages between scientific modelling/ projections and policy development have been referred to as a challenge by Indonesia, also Lao PDR sees the necessity of improving political and academic interaction.

Societal and private sector buy-in

Some AMS explicitly mentioned concerns that the acceptance by the public and the private sector might be one of the potential obstacles for LTS development and implementation.

In particular, **Thailand** mentioned that the acceptance of the public could be challenging because mitigation measures need investment and might have economic impacts in all sectors. Therefore, the government has to raise awareness and understanding to avoid social conflicts. Viet Nam is interested in the EU experience of mobilising the finance and willingness of the private sector to participate in the LTS development and implementation process.

Other challenges

Other challenges mentioned include weak cross-sectoral coordination mechanisms and lacking political commitment of concerned sectors, insufficient arrangements to ensure local level participation, limited human resources, the limited availability of new technologies, a lack of an efficient reporting system as well as the COVID-19 pandemic and its impacts on climate policy.

B. MEANS OF CLOSING GAPS

At the same time, some of the existing gaps are already being addressed: LTS-related efforts of AMS are supported by numerous donors, among them ADB, FAO, GGGI, IFAD, JICA, World Bank, UNEP, UNHABITAT, UNDP as well as other organisations such as CIFOR, Oxfam, Wildlife Conservation Society or World Wildlife Fund and German Development Partners (GIZ, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety).

Both the Philippines and Cambodia mentioned that more benefits and transformative impacts could be realized if donor projects in the future had a stronger focus on implementation rather than technical assistance. Also the challenge of sustaining the programs and knowledge after the projects end was highlighted by the Philippines.

Collaboration within ASEAN

To overcome some of the barriers identified, sharing knowledge and good practices can be an effective way forward. The AMS outlined some potential entry points for ASEAN regional partners to support them during the LTS development process:

- Capacity building and technical assistance;
- Sharing know-how / knowledge (regionally within ASEAN or with international partners like the EU) on various topics related to:
 - » Setting sectoral emissions reduction and adaptation targets;
 - » Determining long-term climate policies and measures;
 - » Using scientific data and modelling for long-term strategy development;
 - » Tracking progress of climate policies;
 - » Technologies are key for long-term climate-friendly transformation of the economy;
 - » Establishing market mechanisms (including potential regional mechanisms);
 - » Climate finance topics;
 - » Nature-based solutions;
 - » Adaptation / disaster risk reduction policies and measures;
 - » Institutional arrangements for LTS development.
- Policy advisory support.
- Collaboration with other international partners

■ Suggestions on collaboration within ASEAN from AMS

The Philippines proposed to organize technical capacity building and knowledge sharing within ASEAN with a focus on the following aspects:

Data – conducting an assessment of existing gaps on activity data requirements for the purposes of estimating national GHG emissions, and charting out options for addressing gaps identified on data availability and collection processes (e.g. the preparation of sector-specific spreadsheets, technical guidelines, toolkits, etc.).

MRV – sharing experience on the development and implementation of an efficient and effective MRV system on GHG emissions:

- Conducting a study to identify policies and measures to improve the existing GHG reporting system in all sectors;
- Designing an improved and more effective GHG reporting system for all sectors;
- Developing appropriate incentive mechanisms for private sector engagement;
- Continuous knowledge and skills enhancement of sectoral GHG inventory teams established to effectively conduct inventory, reporting, quality assurance, quality control.

Technologies – conducting a study on the applicability and feasibility of emerging advanced and energy-efficient low-carbon technologies, e.g. in the transport, refrigeration and air conditioning and waste sectors.

Adaptation – sharing experience and good practices to ensure safer and climate-resilient communities, ecosystems and infrastructure:

- Assessing and strengthening resilience of critical infrastructure (i.e., wastewater treatment facilities, water utilities, waste disposal facilities, landfills, air quality monitoring stations, hazardous waste storage facilities, etc.);
- Developing sectoral impact models for climate-sensitive sectors;
- Strengthening capacity to establish and maintain national climate change statistics, including population vulnerabilities and targeted adaptation and mitigation actions.

Nature-based Solutions – sharing success stories and good practices on documented and evidence-based nature-based solutions to climate change mitigation and adaptation.

Climate Finance – facilitating access to sustainable climate finance mechanisms and investments.

With respect to the EU or other international partners, AMS representatives mentioned a range of topics as interesting for exchange of knowledge and good practices as listed in the table below.

Table 10: Topics of interest for collaboration

Topics	BRN	IDN	KHM	LAO	MYS	MMR	PHL	SGP	THA	VNM
Setting (sectoral) emission reduction goals	•		•		•	•	•		•	•
Institutional arrangements	•	•	•		•	•	•		•	•
Coordination between the regional and the Member States' levels (e.g. common goal setting arrangements)		•		•	•	•	•		•	•
Stakeholder engagement			•	•	•	•	•		•	•
Putting forward sectoral activities	•			•	•		•		•	•
Means of tracking progress	•	•	•	•	•	•	•		•	•
Identification of adaptation co-benefits	•			•	•	•	•		•	•
Financial arrangements	•		•	•	•		•		•	•

Source: questionnaire results

5.4.4. LTS Monitoring and Implementation

Whereas the experience with tracking climate policy progress including the implementation of policies and actions and the achievement of targets will be increasingly important throughout the LTS implementation period, some AMS have indicated certain challenges in this regard.

A. TRACKING IMPLEMENTATION PROGRESS

For example, Lao PDR outlined that it has very limited experience in monitoring the impact of climate actions and the progress on the achievement of climate policy goals. In particular, the country indicated the need for the development of templates for reporting of mitigation actions, a database for mitigation actions, an MRV framework for Nationally Appropriate Mitigation Actions as well as a tracking system for climate finance. The Philippines also mentioned the necessity to institutionalize an efficient reporting system. Brunei Darussalam required a robust carbon inventory that is accurate and reliable in order to monitor, report and verify GHG emissions and removals.

B. REVIEW AND UPDATING

Singapore as the only country that has already finalised its LTS intended to update and refine the document over time to take into account new developments from emerging climate-friendly technological solutions and other prevailing conditions and developments at the international, regional or domestic level.

C. ALIGNMENT WITH NDC PROCESS

The questionnaires indicated the willingness of AMS to utilise existing NDC formulation experience, arrangements and institutional structures for LTS development (e.g. Indonesia, the Philippines). Singapore's LTS document mentions that its long-term low emissions aspiration was developed taking into account its enhanced NDC, and that the LTS document will serve as a reference point to inform its subsequent NDCs under the Paris Agreement and will be updated from time to time to take into account new developments from emerging climate-friendly technological solutions and other prevailing conditions and developments at the international, regional or domestic level.¹¹³

At the same time, the questionnaires suggested that some countries do not have full appreciation of the importance of the LTS as an overarching framework and foundation for the formulation of subsequent NDCs. This suggests that they hold the perception that the development of NDCs leads and informs the LTS formulation process, which ideally needs to be reverse.

5.5. Summary of LTS-related opportunities and challenges in ASEAN

The table below provides an essential summary of the information provided in more detail in subchapter 5.4 and aims to answer questioned posed in Table 11. In particular, it reflects the status quo in AMS with respect to all analysed categories (blue – content-related; yellow – process-related; grey – capacity-related; green – monitoring & review of climate policies). **While indicating that AMS have already established many elements that will build the basis for LTS development, the analysis also illustrates that there remain particular areas where support in the form of regional or international collaboration could provide valuable guidance for AMS and foster LTS formulation in the region (highlighted in bold).**

Table 11: LTS Status Quo in AMS

LTS building blocks	Status quo in ASEAN
Vision	<ul style="list-style-type: none"> Seven AMS mentioned having issued high-level policies and strategies (largely, short- and mid-term) that will help establish long-term climate policy planning Long-term policies and analyses have been developed in some AMS (“Thailand Climate Change Master Plan 2015-2050”; Low Carbon Development Initiative 2045 in Indonesia as scientific assistance for policy-makers, etc.) In some AMS, current policy planning/ visioning does not go beyond 2030
Target setting	<ul style="list-style-type: none"> Six AMS have either set long-term GHG reduction targets or are in the process to do so; however, some AMS mention technical constraints (e.g. the difficulty of determining the peaking year) Electricity and heat production ranked as 1st priority by six AMS and as 2nd priority by two other AMS. Forestry and other land use, ranked by three AMS as 1st priority and by three AMS as 2nd priority. Transportation is also a high priority of six AMS.
Scientific input (input data, modelling and MRV)	<ul style="list-style-type: none"> Six AMS referred to having existing in-country analytical capacities for conducting LTS-related research and long-term scenario modelling Some AMS explicitly mentioned ongoing modelling and assessment exercises that will build the basis for LTS (e.g. sectoral mitigation analysis up to 2040 in the Philippines; sectoral modelling and assessment of mitigation potential in Malaysia) However, not in all AMS those capacities are sufficient to inform the LTS process. As barriers, countries indicated “familiarity with modelling tools”, “limited information to develop long-term projection models”, “very limited capacity for the AFOLU sector”, a need for continuous capacity building and sharing of knowledge Four AMS indicate the insufficient level of technical capacities of relevant agencies at the national and local levels and the need for capacity building for local experts/institutions One AMS specifically referred to insufficient technical capacity to implement mitigation modelling, NDC tracking, enhancing national level MRV, developing facility level MRV for mitigation actions, vulnerability assessments, GHG inventory, and preparation of climate reports One AMS highlighted the need to conduct a technology needs assessment to determine the type of technology needed to decarbonize the economy Seven AMS have experience with the establishment of MRV procedures; however, some AMS indicate that local and sectoral MRV procedures and their application on the ground need to be improved Countries refer to the lack or limited availability of accurate sectoral data and credible methodologies to measure the outcomes of policies and actions

LTS building blocks	Status quo in ASEAN
Policies and measures	<ul style="list-style-type: none"> Seven AMS have adopted some mitigation and adaptation policies and measures that will be relevant for LTS development During NDC preparation and reporting under UNFCCC, countries have identified some particular sectoral priority areas that need to be addressed to decarbonize the economy as well as adaptation priorities Some AMS are already at the advanced stage of creating a legal and regulatory basis for low-carbon development
Market mechanisms	<ul style="list-style-type: none"> Eight AMS have introduced, plan to introduce or are interested in introducing a domestic carbon pricing mechanism (Singapore already has a carbon tax in place; Malaysia mentioned potential interest in a mechanism in a specific sector such as forestry) Five AMS referred to experience with and / or interest in international markets
Climate finance	<ul style="list-style-type: none"> Seven AMS stressed the importance of climate finance for LTS implementation One AMS stressed the need to translate identified climate policy measures and the LTS as a whole into a viable business proposal While some AMS have set or are in the process of establishing national mechanisms to mobilise and channel climate finance, the ASEAN Climate Finance Mobilization and Access Strategy is expected to provide an important guiding role
LTS process	<ul style="list-style-type: none"> Only one AMS has not initiated the LTS process so far Some AMS are interested to learn how LTS process is organised in other AMS
Governance	<ul style="list-style-type: none"> Seven AMS mentioned already existing institutional and coordination arrangements that will be used for or built upon for LTS development Some AMS highlight that cross-sectoral coordination mechanisms are insufficient at the moment; another challenge is vertical coordination and the involvement of subnational and local levels
Science and policy interplay	<ul style="list-style-type: none"> One AMS mentioned a lack of an institution that can provide scientific background for LTS development; in some AMS, technical expertise of relevant institutions needs to be enhanced in order to provide LTS modelling Some AMS highlighted that the interaction and coordination between the science and policy-makers is insufficient
Stakeholder engagement	<ul style="list-style-type: none"> All AMS have put in place some kind of process to involve stakeholders in climate policy development; five AMS explicitly mention experience in sectoral engagement mechanisms Formats include technical forums for information sharing and discussing policy benefits and the interests of stakeholders, public consultations, workshops, focus group discussions at technical/ scientific level, coordination and bilateral meetings.
Societal and private sector buy-in	<ul style="list-style-type: none"> Along with the existence of societal and private sector engagement platforms and initiatives, some AMS mentioned concerns that the acceptance by the public and the private sector might be a challenge
Identified capacity gaps / challenges	<ul style="list-style-type: none"> The following main challenges have been identified by AMS so far: <ul style="list-style-type: none"> Data availability and accuracy for long-term modelling and target setting Modelling tools and technical (analytical) capacities to formulate the LTS Technical and financial constraints to implement policies and measures Insufficient linkages between scientific modelling and policy-making Potential challenges regarding societal and private sector buy-in
Monitoring & review	<ul style="list-style-type: none"> Some AMS mentioned limited experience in monitoring the impacts of climate actions and the progress on the achievement of climate policy goals Some AMS mentioned the necessity to institutionalize an efficient reporting system and a robust carbon inventory that is accurate and reliable in order to monitor, report and verify GHG emissions and removals

Source: questionnaire results and bilateral consultations

5.6. Cross-cutting areas

As LTS are normally designed as overarching policy documents guiding countries and regions for decades ahead, they often include references to strategic priorities, policies, measures and actions in areas that extend beyond the boundaries of a particular sector. Those areas include, for example, international cooperation; public health; education and public awareness; technological solutions; gender and human rights; and other areas depending on specific country priorities. The rationale behind including cross-sectoral and cross-cutting issues in LTS is that different domains and multiple sectors of policy-making are interconnected and can thus not be effectively resolved unless they are addressed as being fully interrelated and interdependent (as evident from the adoption of Sustainable Development Goals).¹¹⁴ For instance, unless the population and the politicians are aware of the interdependencies of climate, health, water, energy, and food issues, a green economy will be difficult to secure, and unsustainable practices are destined to continue.

While there is no obligation for countries to cover particular cross-sectoral or cross-cutting issues in their LTS, it can be derived from the submitted LTS that under this section, countries normally include two main types of information. First, the information can include envisaged policies and measures in the sectors beyond the “traditionally covered” sectors of energy, industrial processes, agriculture, land-use change and forestry, and waste. This may, for example, cover strategic measures for the tourism sector, in case this sector is important for the economic development of a country and is responsible for a substantial share of emissions, or is particularly vulnerable to climate change impacts. Second, it may also contain envisaged efforts of the countries with regard to international cooperation, market-based instruments, the development of particular technologies or innovation policy. Such areas are only included in case they are expected to directly contribute to the achievement of LTS objectives. Overall, the resulting list of cross-cutting issues is very individual to the priorities and circumstances of every particular country. It is recommended to bear cross-cutting issues in mind while analysing sectoral policies and measures for inclusion in the LTS.

Fiji's LTS specifically covers the areas Green Jobs and Employment, Gender and Equity, Green City Development, Biodiversity Conservation, and Education, Capacity Building, and Awareness Raising. Along with the sectors traditionally covered by mitigation and adaptation interventions, Fiji emphasizes action to be taken in the Tourism, Commercial, and Industrial and Manufacturing Sectors.

Singapore's LTS mentions emerging technological solutions, promoting sustainable finance, as well as effective international collaboration (regional power grids, market-based mechanisms, etc.) and building international partnerships as additional pillars for achieving its LTS objectives.

Sources: Government of the Republic of Fiji 2018; National Climate Change Secretariat Strategy Group, Prime Minister's Office, Singapore 2020.

6. IMPACTS OF COVID-19 ON LTS DEVELOPMENT IN ASEAN

AMS have been significantly impacted by the COVID-19 pandemic. According to the Asian Development Outlook, in Southeast Asia, strict quarantines and travel restrictions resulted in economic declines, requiring steep downgrades to 2020 GDP growth forecasts for almost every economy. Especially the economies of Malaysia, the Philippines, Singapore, and Thailand are expected to shrink by 5% or more in 2020.¹¹⁵ Subregional GDP is projected to 3.8% recession in 2020, with the forecast of 5.5% growth in 2021, enabled crucially by domestic stimulus. Resilient exports of petrochemicals from Brunei Darussalam, agricultural products from Myanmar, and electronics from Viet Nam are forecast to keep these three source economies in growth territory in 2020.¹¹⁶ The pandemic has forced large scale social restrictions and border controls, which severely affected manufacturing and supply chains, the travel industry, and retail businesses. Businesses had to shut down or scale down, resulting in extensive job losses.¹¹⁷

On a more positive note, the economic downturn has contracted overall energy demand and energy-related carbon dioxide emissions as well as emissions of sulphur oxides and nitrogen oxides, while the situation differs across sectors (e.g. increased power use in the residential segment against a drop in educational and commercial buildings).¹¹⁸ However, such environmental gains are going to be temporary.

In the course of bilateral consultations, AMS representatives were asked which implications of the COVID-19 pandemic they consider to be important with regard to LTS development in their respective countries. The results, summarized in the table below, indicate that despite AMS named a number of negative implications (such as slowing down of coordination and operationalization processes, fewer resources for climate action, constraints in data collection, etc.) they also mentioned opportunities (e.g. regarding green recovery) resulting from the crisis.

Table 12: COVID-19 Implications for LTS Development

Negative Impacts	Positive Impacts
<ul style="list-style-type: none"> Incomes of the government decline, budget primarily allocated for healthcare purposes with fewer resources for climate action Limited movement, operationalization slowed down, some functions of ministries are restricted Constraints in data collection Any types of stakeholder engagement are limited to virtual meetings; some consultations and technical meetings needed to be cancelled or postponed Expected delays in the implementation of climate change measures There is some possibility that NDC targets set before COVID-19 might be revisited Private sector affected by COVID-19 – less budget to invest in low-carbon production processes and services Impacts on socio-economic development: higher vulnerability of vulnerable groups Labour force impacts, loss of job and income 	<ul style="list-style-type: none"> COVID-19 as opportunity for ecosystem and economic recovery that promotes climate-resilient and sustainable development New opportunities for strengthening climate change activities (recovering of factories and businesses in a low-carbon manner) Actors can easily connect remotely – higher interaction, connectivity Climate action in general so far not supposed to be affected by COVID-19

Source: Based on bilateral consultations with AMS

As COVID-19 continues to determine the global agenda, countries and regions of the world are adopting recovery packages to cope with the long-term consequences of the pandemic (e.g. Recovery Plan for Europe). In light of the scale and the impacts of the crisis, ASEAN has recognized that addressing the crisis requires coordinated actions not only within the region but also in cooperation with its international partners. While the immediate priority for the region is to overcome the pandemic, ASEAN has developed a collective and

long-term socio-economic recovery strategy – the ASEAN Comprehensive Recovery Framework (ACRF).¹¹⁹ The framework articulates ASEAN response through the different stages of recovery, by focusing on key sectors and segments of society that are most affected by the pandemic, setting broad strategies and identifying measures for recovery in line with sectoral and regional priorities. ACRF focuses on five broad strategic areas: (1) enhancing health systems; (2) strengthening human security; (3) maximising the potential of intra-ASEAN market and broader economic integration; (4) accelerating inclusive digital transformation; and (v) advancing towards a more sustainable and resilient future.¹²⁰ In order to implement the ACRF, ASEAN has already developed an Implementation Plan indicating the envisaged outputs, timeline and responsible bodies for each strategic area.

The fifth strategic area, which is the most relevant to LTS development and implementation, emphasizes ASEAN's commitment to develop a recovery framework that is durable, long-lasting, and inclusive, capable of safeguarding the region's natural resources, social fabric, and the prosperity of its people. This strategic area recognizes that a return to 'business as usual' is no longer an option for ASEAN in the post-pandemic world, and a paradigm shift will be required to enable systemic change needed for a sustainable and resilient future. The area encompasses action in seven key dimensions:¹²¹

1. *Promoting sustainable development in all dimensions;*
2. *Facilitating transition to sustainable energy (for example, designing economic stimulus packages within AMS which consider green measures, such as leveraging fiscal spending pertaining to energy supply and demand infrastructure in support of energy decarbonization in ASEAN; identification of specific measures within AMS to support investments that deploy clean electricity sources, expand and modernise power grids, improve the energy efficiency of appliances, buildings, and industrial equipment and increase the spread of cleaner transport and use of sustainable biofuels and other clean energy innovations, as well as generate green jobs);*
3. *Building green infrastructure and addressing basic infrastructure gaps;*
4. *Promoting sustainable and responsible investment;*
5. *Promoting high-value industries, sustainability, and productivity in agriculture (such as climate-smart agriculture)*
6. *Managing disaster risks and strengthening disaster management (including strengthening disaster risk awareness and monitoring instruments, disaster prevention and mitigation programmes, and disaster preparedness mechanisms to achieve resilient future); and*
7. *Promoting sustainable financing (integrating environment, social, and/or governance criteria into financing decisions).*

119 ASEAN Secretariat 2020.

Furthermore, sustaining some of the ongoing practices after the end of the pandemic – such as moving almost all activities to the Internet (e.g. work, meetings and shopping); the avoidance of long-distance air travel; lower use of transport systems, etc. might not only lessen the rebound in energy demand, air pollution, and CO₂ emissions, but also contribute to a low-carbon future.¹²² ASEAN could exploit the current low fossil fuel prices to phase out fossil fuel subsidies. After the pandemic, governments could institute well-targeted subsidy reforms to benefit those who are in need of energy for their basic cooking, lighting, and transportation needs whereas savings from reduced subsidies could help release government funds for other priorities and facilitate the clean energy transition.¹²³

Overall, for ASEAN the pandemic has presented both an enormous challenge and tremendous opportunities for a climate-smart and green recovery. A low-carbon recovery could not only initiate the significant GHG emission reductions needed to achieve decarbonization by mid-century, but also have the potential to create more job opportunities and economic growth than a high-carbon recovery would.¹²⁴

7. CONCLUSION AND RECOMMENDATIONS FOR NEXT STEPS

At the current stage, AMS have already established many elements that are key for LTS development. At the same time, the analysis illustrates that there are areas where support in the form of regional or international collaboration could provide valuable guidance for AMS. A set of recommendations can be proposed based on the analysis conducted during the study development as summarized in Figure 12.

7.1. Potential entry points for ASEAN regional cooperation on LTS

Figure 12: Potential entry points for ASEAN LTS cooperation



Source: aggregated results from questionnaire findings and interviews with AMS

1. INITIATE AN ASEAN POLITICAL EXCHANGE ON ELEMENTS OF A REGIONAL LONG-TERM LOW GHG EMISSION DEVELOPMENT VISION

Several AMS expressed the view that having a common regional long-term low GHG emission development vision for ASEAN could help them develop and refine their national LTS. At the same time, other AMS stressed the very different national circumstances and contexts in AMS, due to which the development of a common regional vision may not be feasible. To find the middle ground, it can be valuable to reach some extent of alignment on **general pathways and milestones for particular sectors** (“Where ASEAN wants to be in 2050 in terms of economic and social development, taking into consideration the risks posed by climate change? What kinds of sectoral transformation would be necessary for that? What benefits will long-term low GHG emission development bring to the region?”) without focusing on common target setting.¹²⁵ The starting point for the discussion could thus be the exchange on a **joint regional framework for low GHG emission development**. The benefit of such a framework would be creating additional political momentum for LTS to complement the current strong focus on NDCs in many AMS.

In order to support the creation of such a regional framework, ASEAN as a regional organisation can use the results of this study as well as experience from past and ongoing cooperation on climate and development within ASEAN, to establish an ongoing and enabling exchange on levers for implementing long-term low GHG emission development. The framework will help to jointly identify progress on selected elements of LTS in the AMS which helps to draw the “big picture” for the region as a whole and selected sectoral low GHG emission pathways in ASEAN until 2050. To this end, regional as well as individual consultations with AMS on how to organise such a framework could be initiated with AMS to share priorities for such an exchange and the potential contributions by AMS. This may result in a structure where AMS are rotating in hosting exchange events together with ASEAN.

2. ORGANISE SPECIFIC TECHNICAL SESSIONS IN SELECTED AREAS & SECTORS RELATED TO LTS

First technical session: LTS modelling, feasibility & impacts assessment

Technical experts working on LTS could share their **experience in the application of different modelling tools** and developing projections and scenarios for the LTS, and demonstrate which sectoral, economic and emissions data and how exactly is applied to develop such projections. Such an exchange could help AMS find the modelling tool that best suits their circumstances.

Another aspect that such technical exchange can focus on is **how economic impact assessments are conducted in other AMS**. Some AMS have challenges to assess which implications certain mitigation targets will have for the economy, which leads to difficulties in determining LTS targets. Furthermore, for some AMS it is a challenge to determine how far emissions can be driven down in various sectors, which is why sharing **experience with conducting sectoral impact assessments** (within ASEAN but also with experienced partners such as the EU) would be extremely helpful.

To overcome these challenges, **the first technical session could focus on two questions:** (1) how to conduct technological feasibility studies and assess sectoral mitigation potential to set feasible LTS goals; (2) how to identify impacts of climate policy on macroeconomic factors. The exchange on these issues could take place both within ASEAN and between ASEAN and its international partners. The major sectoral focus could lie on the energy and the AFOLU sectors as major sources of greenhouse gases.

Second technical session: Data basis for LTS development

Several challenges related to data have been identified during the analysis including incomplete sets of historical data, lacking / outdated data in certain sectors, need for improvement of the MRV of data; data providers having limited knowledge about data collection requirements (data providers do not compile / do not disclose all the necessary data) and inconsistencies in data collection. To overcome these challenges, technical exchange could focus on (1) sharing experience with data collection and management in various sectors; (2) organising regional trainings for data providers; (3) exchange on regional MRV guidelines and/or standards; (4) sharing experience how existing data gaps can be overcome in developing LTS projections.

Third technical session: LTS development process & review progress system

Some AMS considered it valuable to learn how the LTS process is organised in other AMS to inform their national processes. Ways to secure the whole-of-nation approach and guarantee acceptance of the LTS by (1) all sectors; (2) the private sector have been identified as areas of particular interest for exchange within ASEAN and between ASEAN and its international partners. Another aspect where AMS seek knowledge exchange is tracking progress of climate policies (identification of performance indicators; improvement of climate policies and measures).

On a more technical level, the study recommends developing a guiding manual for LTS formulation and implementation review progress system based on the main LTS building blocks identified in the study and the thematic areas mentioned above. What is more, especially for the technical sessions on modelling and data collection, regional capacity building trainings for the staff of research institutions and data providers respectively would be very useful for further catalysing LTS development in AMS. ASEAN may not only facilitate the exchange within the region but also build the bridges to international partners such as the EU.

3. ESTABLISH ASEAN REGIONAL EXCHANGES IN KEY AREAS FOR LTS DEVELOPMENT:

Cooperation on emerging low-carbon technologies

Regional cooperation on R&D and deployment of needle-moving low-carbon technological solutions, for example, relating to Carbon Capture, Utilisation and Storage (CCUS), low-carbon hydrogen (as alternative fuel and industrial feedstock), energy storage systems and energy efficiency can help AMS decarbonise their industry sectors. Such exchange could focus on (1) information regarding the availability of and experience with particular technologies; conducting technology needs assessments; (2) co-developing or jointly developing specific technologies that are identified as key triggers for transformation; (3) for countries where geological formations to store carbon are restricted, finding partners with carbon storage opportunities within the region for dialogue on cooperation approaches. There is scope for AMS to work closely with international partners to build capacity and cooperate on harnessing these emerging low-carbon technologies.

Market mechanisms

A regional network for carbon pricing could be established with an aim to share experiences with carbon pricing instruments (for those AMS who are willing to search for the most suitable instrument and start its development). For those AMS who are willing to go one level deeper in the cooperation, it would also be conceivable to start a regional discussion on the possibilities of future regional / bilateral market mechanisms (e.g. under Article 6 of the Paris Agreement). Due to the lack of cost-effective carbon removal technology in the short-run, some AMS may face restricted opportunities for in-country mitigation and removals, and would be interested in finding partners within the region for discussion on potential joint market-based approaches. Cooperation on oceans and sinks ("blue carbon") could also be discussed in the framework of the dialogue on market mechanisms (but to a lesser extent than forests).

Adaptation in the context of LTS

ASEAN cooperation on adaptation is ongoing but in the light of the study results, it can be complemented with the following forms of cooperation:

- Enhancing technical capacities of AMS to conduct long-term vulnerability assessments (e.g. through regional technical workshops and trainings of experts);
- Exchange on assessing and strengthening resilience of critical ecosystems and infrastructure (i.e. wastewater treatment facilities, water utilities, waste disposal facilities, landfills, air quality monitoring stations, hazardous waste storage facilities, etc.);
- Developing sectoral impact models for climate-sensitive sectors;
- Exchange on disaster risk reduction approaches (including the improvement of disaster risk assessment, and financing and insurance solutions such as the planned Southeast Asia Disaster Risk Insurance Facility).

Climate finance in the context of LTS

Climate finance is seen as a crucial instrument for LTS implementation by the vast majority of AMS. Regional cooperation on climate finance is already ongoing, e.g. with the dialogue on ASEAN Climate Finance Mobilization and Access Strategy). However, it could be complemented with the following aspects: 1) development of regional climate projects, which can be more attractive for international finance to come in; 2) bringing together Central Banking Institutions and Finance Ministers of AMS to have discussions on LTS across ASEAN – as climate finance institutions' involvement is highly important to formulate LTS as viable business proposals.

7.2. Recommendations on cooperation forms/formats

To address the various entry points identified, different formats of cooperation can be used:

- Approaches of softer collaboration (e.g. on adaptation issues) and/or technological collaboration are easier ways forward as compared to economic or financial collaboration in a competitive ASEAN region.
- Peer-to-peer exchange proves to be an appropriate entry point for cooperation.
- Energy and forestry are sectors that have the largest potential and are most important for LTS-related cooperation.
- Dialogues moving beyond the exclusive focus on UNFCCC negotiations towards more holistic climate policy and development cooperation within ASEAN.

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ANNEX

LTS Status Quo in AMS

LTS building blocks	Status quo in ASEAN
Vision	<ul style="list-style-type: none"> Seven AMS mentioned having issued high-level policies and strategies (largely, short- and mid-term) that will help establish long-term climate policy planning Long-term policies and analyses have been developed in some AMS (“Thailand Climate Change Master Plan 2015-2050”; Low Carbon Development Initiative 2045 in Indonesia as scientific assistance for policy-makers, etc.) In some AMS, current policy planning/ visioning does not go beyond 2030
Target setting	<ul style="list-style-type: none"> Six AMS have either set long-term GHG reduction targets or are in the process to do so; however, some AMS mention technical constraints (e.g. the difficulty of determining the peaking year) Electricity and heat production ranked as 1st priority by six AMS and as 2nd priority by two other AMS. Forestry and other land use, ranked by three AMS as 1st priority and by three AMS as 2nd priority. Transportation is also a high priority of six AMS.
Scientific input (input data, modelling and MRV)	<ul style="list-style-type: none"> Seven AMS referred to having existing in-country analytical capacities for conducting LTS-related research and long-term scenario modelling Some AMS explicitly mentioned ongoing modelling and assessment exercises that will build the basis for LTS (e.g. sectoral mitigation analysis up to 2040 in the Philippines; sectoral modelling and assessment of mitigation potential in Malaysia) However, not in all AMS those capacities are sufficient to inform the LTS process. As barriers, countries indicated “familiarity with modelling tools”, “limited information to develop long-term projection models”, “very limited capacity for the AFOLU sector”, a need for continuous capacity building and sharing of knowledge Four AMS indicate the insufficient level of technical capacities of relevant agencies at the national and local levels and the need for capacity building for local experts/institutions One AMS specifically referred to insufficient technical capacity to implement mitigation modelling, NDC tracking, enhancing national level MRV, developing facility level MRV for mitigation actions, vulnerability assessments, GHG inventory, and preparation of climate reports One AMS highlighted the need to conduct a technology needs assessment to determine the type of technology needed to decarbonize the economy Seven AMS have experience with the establishment of MRV procedures; however, some AMS indicate that local and sectoral MRV procedures and their application on the ground need to be improved Countries refer to the lack or limited availability of accurate sectoral data and credible methodologies to measure the outcomes of policies and actions
Policies and measures	<ul style="list-style-type: none"> Seven AMS have adopted some mitigation and adaptation policies and measures that will be relevant for LTS development During NDC preparation and reporting under UNFCCC, countries have identified some particular sectoral priority areas that need to be addressed to decarbonize the economy as well as adaptation priorities Some AMS are already at the advanced stage of creating a legal and regulatory basis for low-carbon development

LTS building blocks	Status quo in ASEAN
Market mechanisms	<ul style="list-style-type: none"> • Eight AMS have introduced, plan to introduce or are interested in introducing a domestic carbon pricing mechanism (Singapore already has a carbon tax in place; Malaysia mentioned potential interest in a mechanism in a specific sector such as forestry) • Five AMS referred to experience with and / or interest in international markets
Climate finance	<ul style="list-style-type: none"> • Seven AMS stressed the importance of climate finance for LTS implementation • One AMS stressed the need to translate identified climate policy measures and the LTS as a whole into a viable business proposal • While some AMS have set or are in the process of establishing national mechanisms to mobilise and channel climate finance, the ASEAN Climate Finance Mobilization and Access Strategy is expected to provide an important guiding role
LTS process	<ul style="list-style-type: none"> • Only one AMS has not initiated the LTS process so far • Some AMS are interested to learn how LTS process is organised in other AMS
Governance	<ul style="list-style-type: none"> • Seven AMS mentioned already existing institutional and coordination arrangements that will be used for or built upon for LTS development • Some AMS highlight that cross-sectoral coordination mechanisms are insufficient at the moment; another challenge is vertical coordination and the involvement of subnational and local levels
Science and policy interplay	<ul style="list-style-type: none"> • One AMS mentioned a lack of an institution that can provide scientific background for LTS development; in some AMS, technical expertise of relevant institutions needs to be enhanced in order to provide LTS modelling • Some AMS highlighted that the interaction and coordination between the science and policy-makers is insufficient
Stakeholder engagement	<ul style="list-style-type: none"> • All AMS have put in place some kind of process to involve stakeholders in climate policy development; five AMS explicitly mention experience in sectoral engagement mechanisms • Formats include technical forums for information sharing and discussing policy benefits and the interests of stakeholders, public consultations, workshops, focus group discussions at technical/ scientific level, coordination and bilateral meetings.
Societal and private sector buy-in	<ul style="list-style-type: none"> • Along with the existence of societal and private sector engagement platforms and initiatives, some AMS mentioned concerns that the acceptance by the public and the private sector might be a challenge
Identified capacity gaps / challenges	<ul style="list-style-type: none"> • The following main challenges have been identified by AMS so far: <ul style="list-style-type: none"> • Data availability and accuracy for long-term modelling and target setting • Modelling tools and technical (analytical) capacities to formulate the LTS • Technical and financial constraints to implement policies and measures • Insufficient linkages between scientific modelling and policy-making • Potential challenges regarding societal and private sector buy-in
Monitoring & review	<ul style="list-style-type: none"> • Some AMS mentioned limited experience in monitoring the impacts of climate actions and the progress on the achievement of climate policy goals • Some AMS mentioned the necessity to institutionalize an efficient reporting system and a robust carbon inventory that is accurate and reliable in order to monitor, report and verify GHG emissions and removals

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