DATA SHARING FRAMEWORK AND GUIDELINES TO ACCELERATING THE EXPANSION OF MULTILATERAL POWER TRADING IN ASEAN

Input for a proposal for an ASEAN Data-Sharing Framework and Guidelines

2024

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Acknowledgements

Given the divergence in data-sharing practices among the ASEAN Member States, this report serves as important reference for ASEAN Stakeholders to set a framework and guidelines for data sharing in the pursuit of accelerating the expansion of electricity trading through either bilateral or multilateral arrangements.

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ACE would also like to thank for Kristian Bjørklund' services in arranging and delivering the 1st, 2nd, and 3rd of Data Sharing Workshops and synthesising the results of the discussions with APG Stakeholders during the workshops into this report.

The last but not the least, ACE would like to express the gratitude to the APG Stakeholders (namely, HAPUA, AERN, and APGCC) who involved during the discussions of the report development.

1 Summary

This document outlines a proposal for the ASEAN Data-Sharing Framework and Guidelines, which is part of the strategy to accelerate the ASEAN Power Grid (APG) and expand multilateral electricity trading. It includes a detailed plan for data exchange, covering objectives, purpose, a step-by-step approach and necessary considerations.

The proposal is based on:

- Prior discussion papers and workshops conducted to advance data exchange related to the APG.
- Group discussions among policy makers, regulators and utilities during the 3rd Data-Sharing workshop conducted on 24 June 2024, during the 42nd Senior Officials Meeting on Energy (SOME).

Key recommendations:

- **Step-by-Step Approach to Data Exchange**: A roadmap is proposed for a step-by-step approach to data exchange, starting with the sharing of historical data and gradually moving towards more detailed and planning-oriented data.
- **Shared Data**: Data for the first steps of the roadmap should be classified as general and public. Only for the third and last step of the roadmap should confidential data be considered.
- **Central Platform and Governance**: The ASEAN Energy Database System (AEDS) is proposed as the central platform for data exchange, which should be further developed to support standards and automation.
- **First Step: Pathfinder Data-Sharing Project**: The first step involves a Pathfinder Data Sharing Project, which will share annual, historical data at the grid level first and later increase the level of detail to monthly data and substation level.
- **Regulatory and Governance Considerations**: Regulatory and governance considerations include the need for high-level regulation to support both the Roadmap and the Pathfinder project so as to ensure long-term success and the engagement of the ASEAN member states (AMS).

2 Introduction

2.1 Background

As one part of the ASEAN strategy to accelerate the ASEAN Power Grid (APG) and initiate the expansion of multilateral electricity trading, the ASEAN member states (AMS) need to address the topic of data sharing. The ASEAN Plan of Action for Energy Cooperation (APEAC) Phase II (2021-2025) directly mentions the need to develop data sharing guidelines and best practices as Action Plan 3.4 under the 3rd Outcome-Based Strategy "*Work on harmonising the minimum technical requirements to advance multilateral electricity trading*" [12]

Numerous initiatives have been undertaken to facilitate the progression of data sharing:

- ASEAN Energy Regulators Network (AERN)'s discussion paper on Data Sharing in 2021 [1]
- The 1st Data-Sharing Workshop in 2022 (Virtual): Transparency and Data Sharing [2]: *Focusing on key aspects of data sharing, practical views and potential ways to get started.*
- The 2nd Data-Sharing Workshop in 2023: Technical and Practical Aspects [3]: *Detailed discussion of tasks ahead and key insights from other regions.*
- ASEAN Centre for Energy (ACE)'s Policy Brief: *The Value of Data Sharing and Transparency in Driving Multilateral Power Trading under the ASEAN Power Grid* in 2024 [4]
- The 3rd Data-Sharing Workshop in 2024: Data-Sharing Framework and Guidelines [13]: *Distilling the knowledge and dialogues from the previous years' efforts into a framework and guidelines to enable the data sharing that is essential for multilateral power trading.*

The overall objectives of the subsequent training sessions and workshops were to discuss the requirements in the next stage of data sharing and how to manage them. The main output has been a consensus on the importance of data sharing as a means to build trust and ensure transparency in relation to the ASEAN Power Grid initiative.

Following the milestones designed in the APAEC for data sharing, the next goal is to obtain agreement on proposed data sharing guidelines and standards.

2.2 Objective

The objective of this report is to support the Heads of ASEAN Power Utilities/Authorities (HAPUA) in fulfilling Action Plan 3.4 by developing draft guidelines and standards for data sharing. To achieve this, this document aims to deliver the proposed data-sharing framework and guidelines and to summarise and distil the discussions from the 3rd workshop on Data Sharing on 24 June2024 in Vientiane in conjunction with the 42nd Senior Officials Meeting on Energy (SOME).

2.3 Assumptions

The summaries of the 1st, 2nd and 3rd workshops on data sharing provided in the Annex to this document will help readers understand all the arguments and discussion that lead to the proposals in this report.

This report includes references to general technical definitions and concepts that may require technical knowledge to follow completely. However, it should be possible to understand the conclusions without this knowledge.

The report also assumes that the reader has a general understanding of the ASEAN Power Grid (APG) context, including the principles of power transmission and trading.

2.4 Stages in Multilateral Power Trading

This proposal builds upon the agreed definition of the stages of Multilateral Power Trading (MPT) in ASEAN. These definitions are based on the stages defined by the IEA in 2019 [14] and refined in the 2nd Data-Sharing Workshop [3]:

1. Cross-border Power Trading
2. Multilateral Power Trading (MPT)
3. Subregional / Regional Market.

Countries currently using APG interconnectors for cross-border electricity trade are considered to be at stage number 1. Stage number 2 is the emerging stage including the current LTMS (Lao PDR, Thailand, Malaysia, Singapore) stage where more than two countries are involved in the trading. Stage number 3 is the future stage, in which more MPT will take place and lead to either a sub-regional or a regional market as a secondary market apart from the national electricity markets. For other regions, a fourth stage is considered. This is a stage in which the regional market is the primary market. For the APG, this is not currently seen as a common goal.

Hence our focus is on the two future stages:

- **Multilateral Power Trading (MPT)**
  Power trade between member states is facilitated through multilateral agreements involving several states.
  Trading primarily operates on a contractual basis.
  Methods and procedures in the region are harmonised
- **Sub-regional / Regional Market**
  Regional power market accessible to use in addition to the domestic market.
  Mainly trading excess production to fill gaps in supply.
  Short-term trade is available. For simplicity in the rest of the document, this stage will be referred to as just “Regional Market”.

3 Reasons for Data Sharing

- **Summary**
  - Data sharing is identified as a strategy in the APG Program Area 1 under APAEC 2021-2025
  - Discussions about the rationale for data sharing assist in determining what to share and how to share

  Outcomes
  - Whichever reason (discussed below) for data sharing is deemed the most significant, historical data will be needed
  - It is important to define the recipients of the shared data at the outset.

Data Sharing is a part of the APAEC Program Area No. 1: ASEAN Power Grid, specifically for the Outcome-Based Strategy (OBS) 3, Action Plan 3.5 [12] and is agreed as a tool to accelerate the APG and expand towards Multilateral Power Trading (MPT). This alone is sufficient reason to initiate data sharing, but it does not tell which data to share or how. Agreeing on the fundamental reasons for data sharing will help gain consensus on the subsequent related questions.

The current level of engagement in power trade is different across the 10 ASEAN Member States (AMS). Table 1 shows the current level of power trade in ASEAN.

Country	Involved in BPT	Involved in MPT	Liberalised market
Brunei Darussalam			
Cambodia	√		
Indonesia	√		
Lao PDR	√	√	
Malaysia	√	√	
Myanmar	√		
Philippines			√
Singapore	√	√	√
Thailand	√	√	
Vietnam	√		√

Table 1 – Level of engagement in power trade in each of the ten AMS regarding Bilateral Power Trade (BPT), Multilateral Power Trading (MPT) and liberalisation of the internal market.

3.1 Recognised Reasons for Data Sharing in the APG

The discussions in the 2nd Data-Sharing Workshop included three main reasons for data sharing, and while each reason calls for distinct types of data, historical data is common to all.

3.1.1 Power Trade Requires Data Sharing

Any power trade intra-grid or inter-grid requires the sharing of data. Accepting unilateral, bilateral, or multilateral power trading as a goal means accepting data sharing as a necessity.

As it is the region's aspiration to advance Multilateral Power Trading (MPT) is the next stage of the APG, a harmonised practice for data sharing is required.

Sharing data related to the power trade encompasses historical, planning, and, on some occasions, operational data. Both operational and short-term planning data are often classified as confidential and require additional security measures to share and manage.

3.1.2 Transparency Encourages Collaboration

Making information available and transparent optimises planning and shows the potential for collaborations between the AMS.

The potential for optimisation increases with the quality of data and the timeliness of delivery. The optimal data to share include historical data and long-term planning such as grid planning, outage planning and available capacity in production and transmission.

3.1.3 Transparency Builds Trust

The development of the APG has received attention from several external actors, but it is now difficult to obtain updated and precise information about the grid, including production, capacity and load. This lack of transparency can be a hindrance to investments and international collaborations.

The quicker and more detailed the AMS deliver data, the higher is the gain in trust and transparency. Any data type can assist in building trust, but historical data on interconnectors, production and load are obvious types to start with.

3.2 Considerations

It is important to acknowledge that the framework for data sharing is the main achievement regardless of the actual data shared. Hence, consensus on the priority of reasons is not a necessity in the current stage.

However, the rationale for data sharing indicates the potential recipients of the shared data, and this selection forms an important input guiding the regulatory work needed.

4 Framework for Data Sharing

- **Summary**
  - The definition of data to share can be divided into three dimensions: temporal, granularity, and data type.
  - Each dimension impacts the classification, purpose and value, and requirements of data sharing.

  Outcome
  - A stepwise approach to data sharing for the next stage of APG Development is identified in a 3-stepwise roadmap.

In the expansion of the APG and the path towards MPT, the participants of the 2nd Data-Sharing workshop in 2023 confirmed three principles[1]:

1. **Path of Least Resistance**
   Whereas politics, projects, economic or supply purposes can create a demand for the sharing of power data, conversely, this sharing will reveal project potential and thereby facilitate not only the projects themselves but also the resolution of related political considerations that may arise. Hence, starting with data sharing emerges as a the most viable, accessible path to accelerate the development of the APG.
2. **Start Small, Envision Big**
   Begin with modest steps while keeping an eye on the broader picture.
3. **Next Step: Building a Data Sharing Platform**
   Establish a robust foundation for future endeavours.

These principles lead us to the conclusion that to reach the desired level of APG development (Regional Market, see also Section 0) a stepwise approach is needed. This requires a defined and agreed roadmap that defines what to share at what step. At each step the roadmap should also define the purpose, requirements, participants and challenges.

4.1 Understanding the Dimensions of Data Sharing

When defining what to share, three dimensions are relevant to consider:

1. Temporal dimension: Historical data, operational, short- or long-term planning.
2. Granularity: The level of detail in relation to the grid and time.
3. Nature of data: The business type of data (production, load, capacity etc.).

[1] Summary of the 2nd Data-Sharing Workshop, Jakarta 29 November 2023.

4.1.1 Temporal dimension

At the most granular level, data is classified into three distinct temporal types:

- **Planning data** is the data needed to discover potential and plan optimally for both the long- and short-term,
- **Operational data** is the immediate input to or output from our operation; this is often data that flows automatically between systems and is used immediately,
- **Historical data is** the output from the actual operation that allows us to handle contingencies, settle the business, validate our predictions and deliver transparency and insights.

Operational data is rarely shared for the purposes discussed in Chapter 2 above. Only in specific and highly integrated trading scenarios, is sharing operational data needed. It is required mainly in the last stage of MPT, the Primary Trading Model (PTM). The AMS have acknowledged that the PTM is not commonly seen as an achievable or even desired goal within the current horizon. Hence, operational data can be omitted from the roadmap discussion for the next period.

Planning data should be considered as a broad term containing very long-term planning, up to five years ahead (Y-5), short- and medium-term planning (a month or week ahead, M-1 or W-1) and planning day-ahead or same-day operations (ID, or intra-day).

The purpose of sharing planning data is different based on the respective temporal perspective:

- **Long-term planning** (1-5 years ahead) optimises grid and production planning, outage planning as well as political prioritisations. It can also encourage investments and collaboration projects with external bodies.
- **Short- and medium-term planning** (1 week to 1 year ahead) optimises operation, grid usage, supply security and price reduction. Short-term planning also optimises the usage of renewable energy sources.
- **Day-ahead and intraday** (DA, ID) planning optimises operation, security and allows for balancing out differences in the projected and actual production, especially of renewable energy sources.

4.1.2 Granularity

The two main aspects of granularity are time interval and level of network details. The time interval is the length of the period to which the planning or historical data pertains, from annual to hour or even minute intervals. The level of network details is the level of the grid to which the data pertains, from grid to grid (the entire grid for a state) to substations or even circuits.

Moving from a rough to a finer granularity is an obvious part of the roadmap for data sharing. However, it must be anticipated that not all of the AMS are at the same level and –even more

importantly – not able to move forward at the same pace. This suggests that the roadmap should state a minimum level of granularity while allowing for finer granularity for more advanced states.

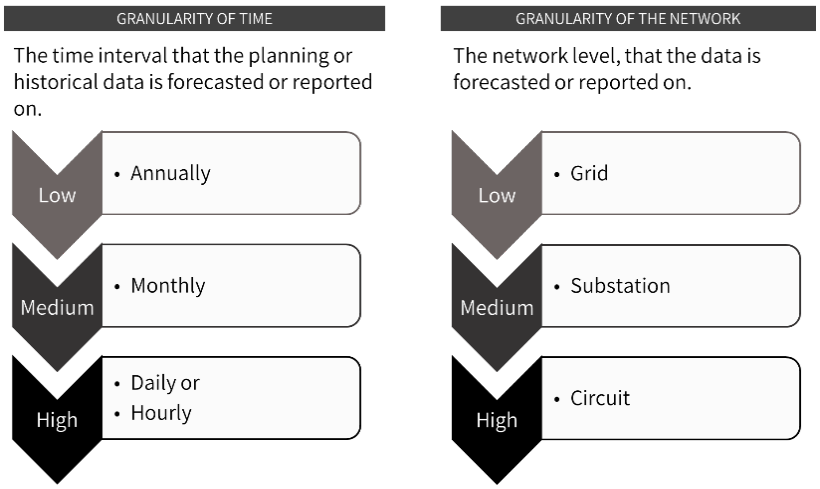

Figure 1 – Illustration of granularity in power data: Time interval and level of network details, from low (simple) to high (more complex and more detailed).

4.1.3 Nature of Data

The third dimension to consider is the actual type of data, often called the business type. In Chapter 2, production capacity, production mix, load, transferred energy, etc. were mentioned. These are all different business types that serve different purposes. Pricing information and planning remedial grid actions are other types of data that could be shared.

The combination of the three dimensions is important to determine the purpose, accuracy and classification of the data shared. Figure 2 illustrates the different business types from a temporal perspective. The funnel indicates how the accuracy of the data increases up to the time of operation. To some extent the granularity also increases with the accuracy.

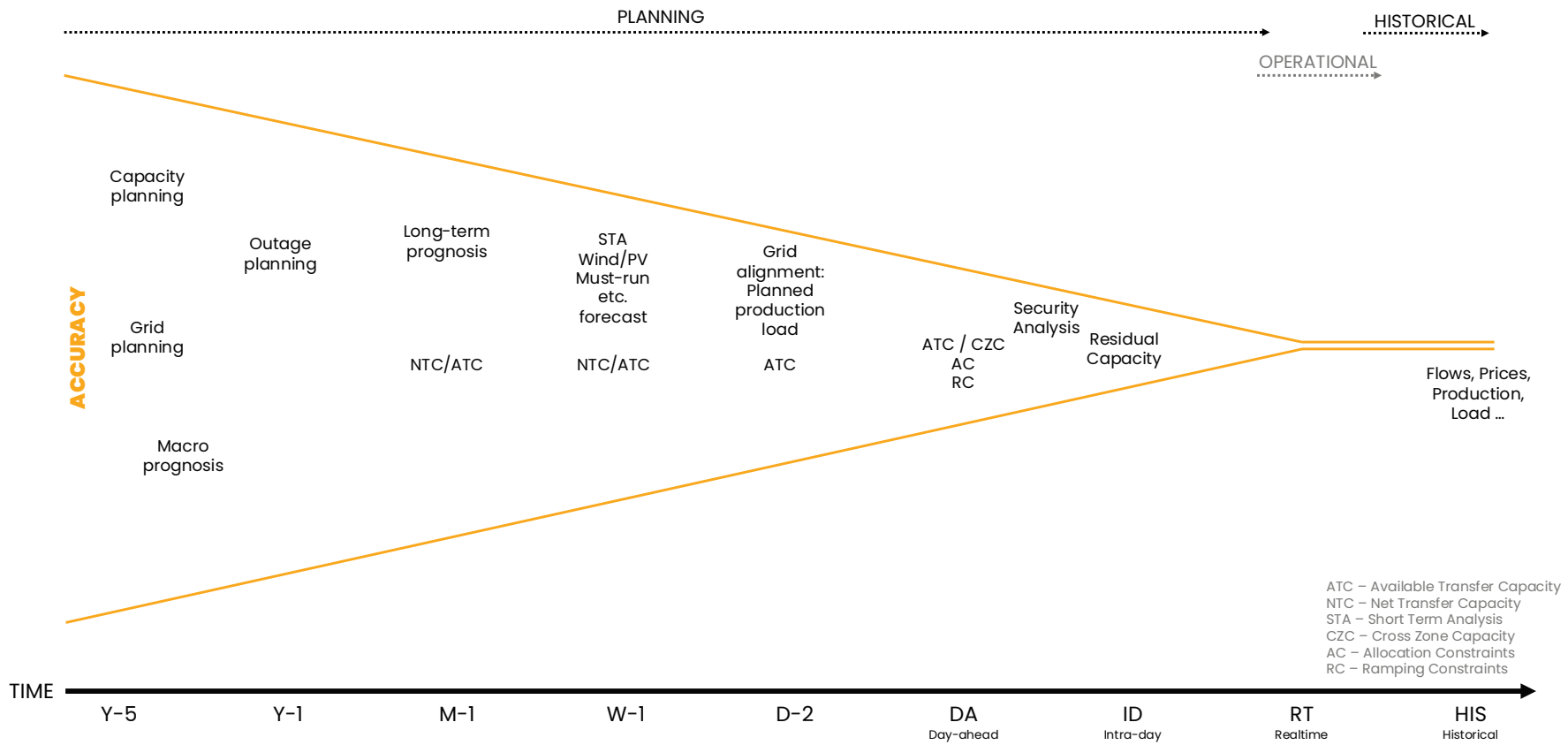

Figure 2 – An illustration of the three dimensions of data to share: temporal dimension, granularity and accuracy, and business types.

4.1.4 Impacts on Data Sharing Requirements

All three dimensions impact the requirements of data sharing. The temporal dimension not only determines the purpose of the data sharing but also its accessibility and speed. The granularity and business type also impact data sharing requirements:

- Historical data are more likely to be available, whereas planning data reflect strategic differences between operators.
- Short-term planning data require fast, timely delivery, within the timespan covered by the data (e.g. week-ahead data should be made available according to that timeframe). Historical data can be delivered later and still provide value.
- High granularity requires more automation in terms of validation, approval and publication. Low granularity is easier to verify manually and easier to generate.
- High granularity on the grid causes higher complexity, and thus requires more detailed identification and more frequent updates to the data structure. For example, the number of member states and hence national grids are unlikely to change within the foreseeable future, whereas updates on the circuit level are more frequent.
- The accessibility and work needed to collect data are impacted by the business type. For example, installed capacity and outage planning would be easier to collect and share than available transfer capacity on interconnectors.

While the ambitions are high, the roadmap should aim for manageable challenges first, leaving more advanced data for the next stage.

4.2 Classification of Data

Typically, the practice of categorising data based on its level of secrecy is referred to as *data classification*. In the previous Data-Sharing Workshops, the AERN's discussion paper on Data Sharing [1] was discussed and the following categories were proposed [2]:

- **General data**: information that it is public and not specifically related to the business process.
  Examples of this information are the historical data available on the Asian Development Bank (ADB) website and part of the current ASEAN Energy Database System (AEDS).
- **Public data**: information that is available for everyone, possibly authenticated and subject to an approval process.
  Examples are the historical data available on the gated part of the current AEDS.
- **Confidential data**: data that is not for everyone, and security measures must be in place.
  Examples could include outage planning and available transfer capacity on interconnectors.

- **Secret data**: a high level of confidentiality, aligning with the normal terms of most national intelligence services.
  Secret data – or top-secret data if segregated into more categories – often include the detailed grid model, planned remedial actions and certain operational data.

	General Data	Public Data	Confidential Data	Secret Data
MPT Relevance in ASEAN market	Not directly relevant to MPT	Directly relevant to MPT	Directly relevant to trading and system operation	Relevant to MPT in the Primary Trading Model
Sharing purpose	Assessing business in ASEAN	Assessing market participation in ASEAN	Running the market in HBT and STM	Running the market PTM
Security level	Public data No security	Public data Low security, no specific measures needed	Private data Medium security, specific measures must be met	Very sensitive data High security, significant measures must be met
Examples of data	Yearly historical data on production, load, production mix	Historical data on flows Long-term planning data	Schedules, detailed short-term planning as ATC, adequacy, load etc.	Grid elements, real-time operation, remedial actions etc.

Figure 3 – Proposed data classifications based on the AERN discussion paper on Data Sharing (2021) and further refined in the Data-Sharing Workshops in 2022 [2] and 2023 [3]. HBT is Harmonised Bilateral Trading, STM is Secondary Trade Model, PTM is Primary Trade Model.

The three dimensions of data correspond to the data classification. Figure 4 shows how specifically the temporal dimension and granularity could influence the data classification.

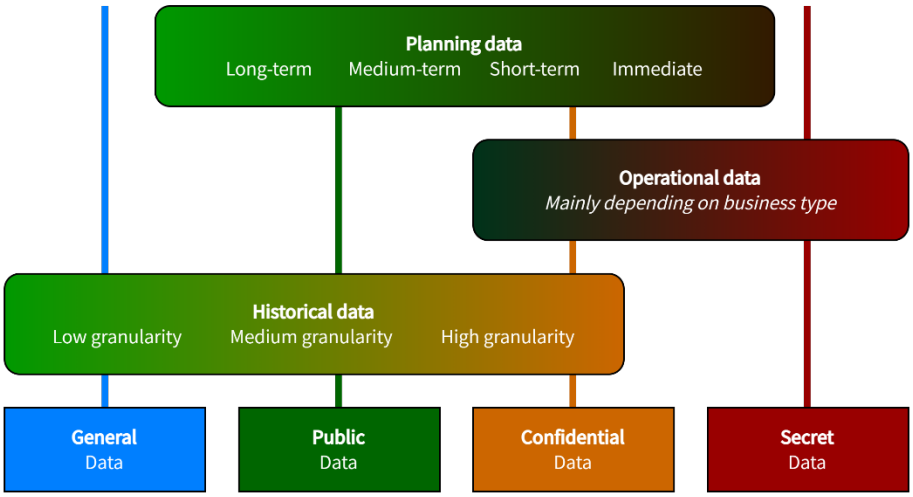

Figure 4 – Illustration of the potential relation between the temporal and granularity dimensions of the shared data, and the data classification.

4.1.5 Classification Levels: Significance for Sharing Data

Low classified data, as "general" or "public", is obviously easier to share. This is true both in terms of regulation and approvals as well as in terms of the technical measures needed to manage the transport, access and storage of data. As the requirements of sharing confidential data are difficult to meet as a first step, it is natural that confidential data belongs to the second or third step on the roadmap.

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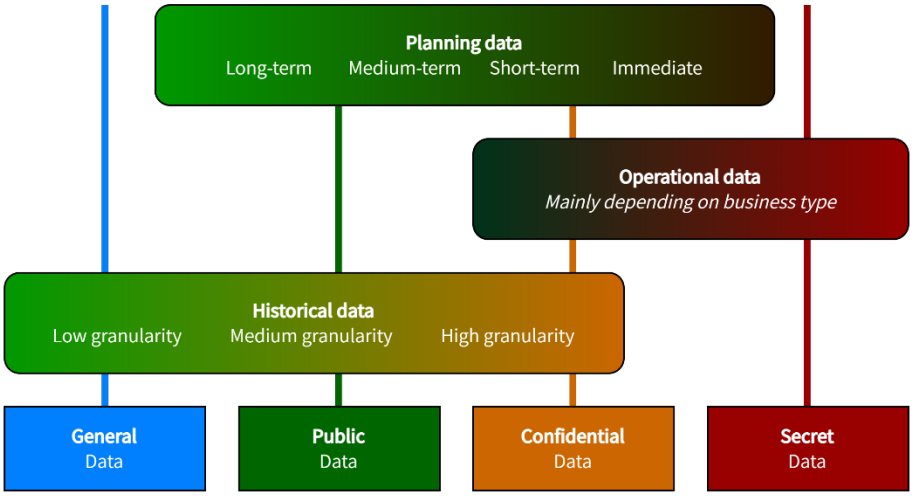

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4.3 Relevant Data for Multilateral Power Trading

The process of data sharing in MPT is split into three phases:

1. Discovery: Finding potential by getting insights into specifics of the power grid
2. Delivery: Plan the actual trade on an operational basis
3. Settlement: Post-operational information to conclude the financial transactions

There is a developmental, evolving aspect to the phases, in that data for phase 1 must be available before data for phase 2 are to be provided, or for phase 2 before phase 3, etc.

AERN's discussion paper on Data Sharing in 2021 [1] illustrated these phases with corresponding suggestions for data sharing in each phase. The paper discussed the temporal dimension and the business type of data but did not consider the granularity of the data.

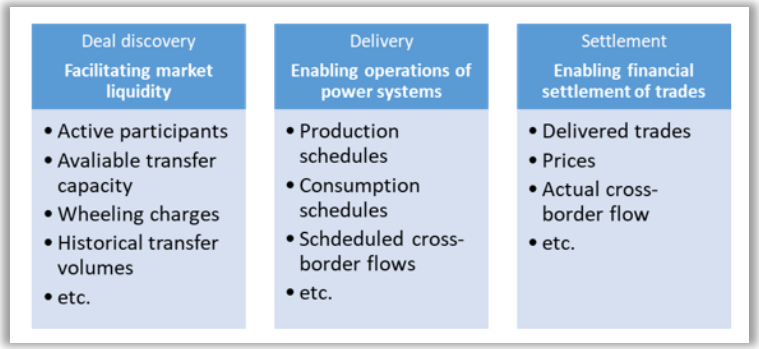

Figure 5 – Initial discussion of relevant data in different trading phases.

Source: AERN's discussion paper on Data Sharing 2021. [1]

Figure 5 presents the initial thinking about data sharing in each phase. These ideas were further discussed during the data-sharing workshops in 2022 [2] and 2023 [3].

Specifically, the 2nd Data-Sharing Workshop [3] and further analysis by the ASEAN Centre for Energy (ACE) [4] led to the conclusion that *long- or medium-term planning data for production and load forecast* are also needed to provide a sufficient decision-making basis in each phase. These efforts result in an updated illustration of the relevant data for the phases in an ASEAN context.

Sharing wheeling charges and capacity is recognised as important for the development of the APG, especially at the Regional Market stage (also called the Secondary Trading Model [STM]) [3]. The rows in Figure 6 show the two stages of MPT.

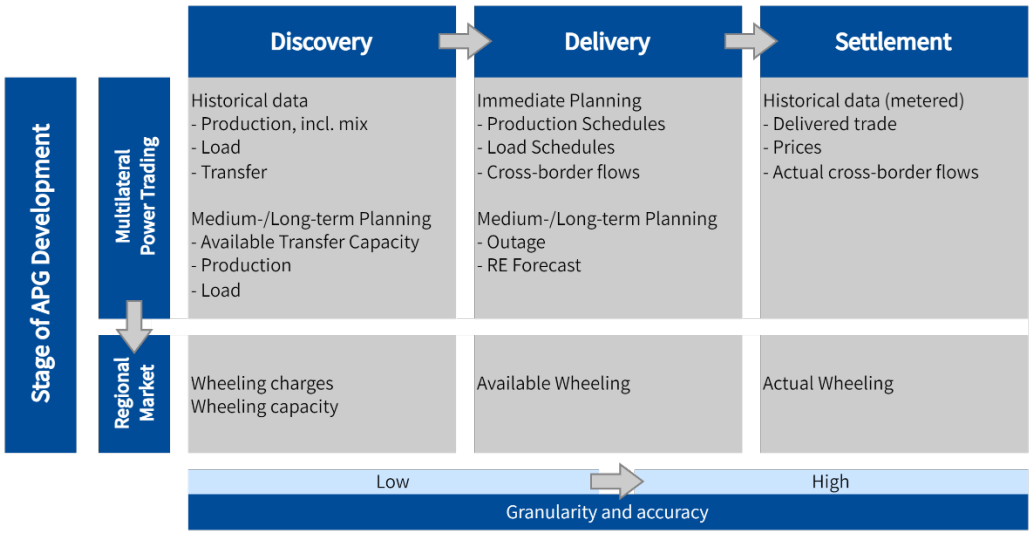

Figure 6 – Relevant data in different trading phases in an ASEAN context.
Note: The figure illustrates the increased need for higher granularity as the trading moves from discovery to settlement.

4.4 Stepwise Approach to Data Sharing

A logical order for data sharing is to share data related to discovery before data for delivery. However, data sharing also depends on the feasibility of accessing, classifying and ensuring the accuracy of the data. It makes sense to start sharing the data that has the easiest access, the lowest classification and the lowest accuracy requirement.

The 2nd Data-Sharing Workshop discussed a stepwise approach for data sharing as the foundation for the next stage in APG development: the MPT stage [3]. The discussion focused mainly on the first step, which would include only historical data and data at a low level of granularity. Planning data would come in subsequent steps.

To achieve a concrete framework for data sharing, the stepwise approach needs to contain enough steps to cover all the data required for the MPT stage. Furthermore, we should link the steps with the elements discussed above: data dimensions, classification, purposes and requirements. To connect the framework to the ASEAN situation, it is also important to associate each step with the relevant stakeholders in the region.

Figure 7 shows the high-level framework for data sharing containing three steps.

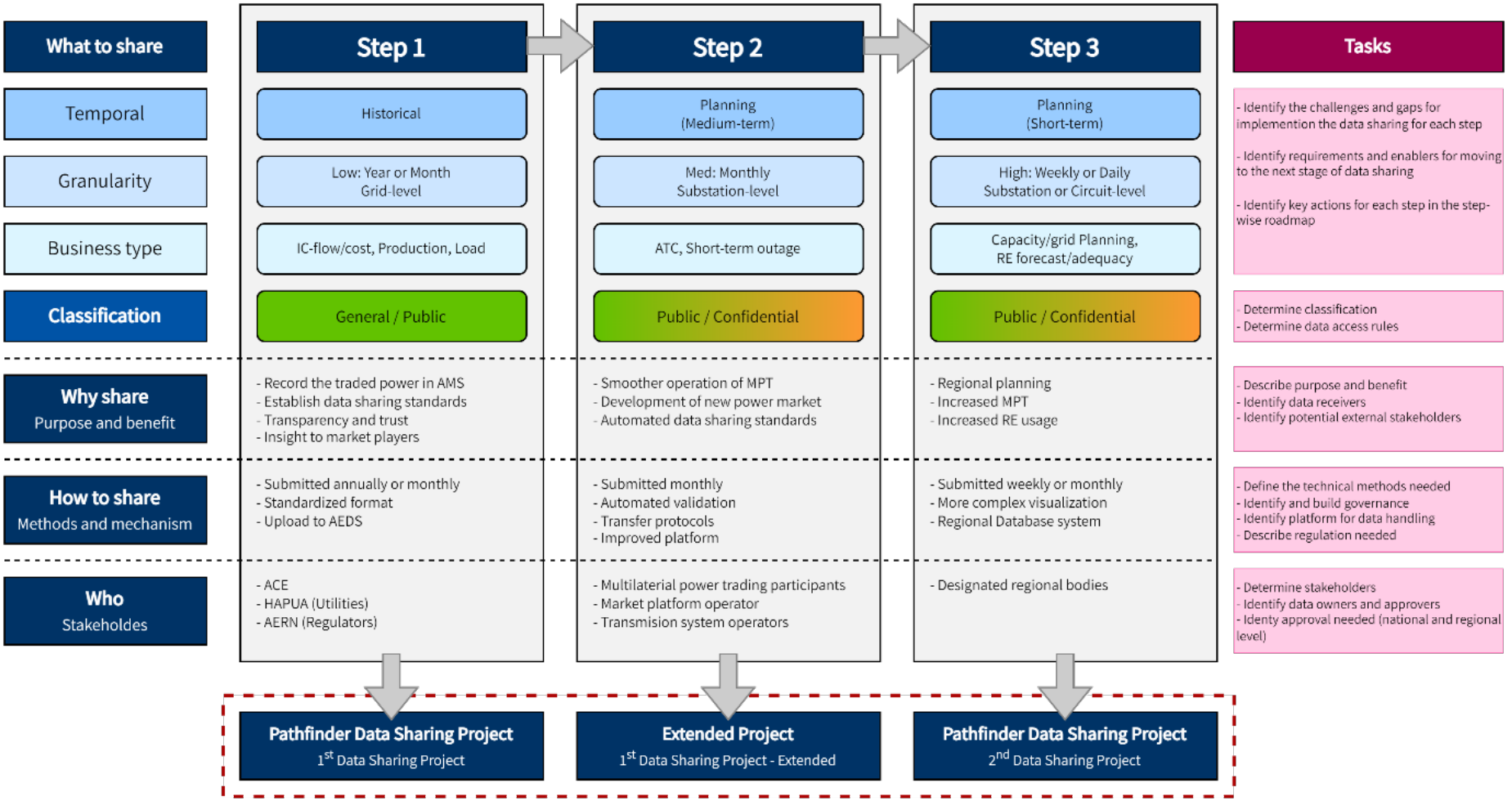

Figure 7 – Suggested framework for data sharing in ASEAN context: A three-step roadmap.

For each item, stakeholders can identify the main tasks needed to elaborate the framework. These tasks are shown in the far-right column. As the data sharing effort follows the roadmap, we anticipate that the tasks need to be repeated and further detailed at each step.

The roadmap suggests a practical approach in the form of pilot projects as the way forward. These are named the 1st and 2nd Pathfinder Data-Sharing Projects because of the relatively large difference between the first two steps and the third in terms of the required efforts and higher complexity. Hence it is proposed that the first Pathfinder project covers the first two steps, while a second Pathfinder project covers the third step.

The next chapter (Chapter 5) discusses these tasks.

5 Guidelines for Data Sharing

- **Summary**
  - The main issues of Data Sharing in Power Trading are identified and categorised to ease the conversation about and creation of guidelines.
  - The topics covered are: current data sharing experiences, providing data, accessing data and the central platform to enable the data sharing.

  Outcome
  - The results from all the Data-Sharing Workshop discussions (2022-2024) are collected and condensed to provide pragmatic considerations and recommendations from the workshop participants.

Defining the guidelines for data sharing starts with considering and answering questions that arise. The 1st and 2nd Data-Sharing workshops in 2022/2023 discussed some of the related questions; this was particularly the case in the second workshop, during which many questions were formulated in relation to regulatory, governance and technical aspects.

During the 3rd Data-Sharing workshop in 2024 high-level questions were discussed. These questions were grouped into five areas:

1. Current Experiences in Data Sharing
2. Data to Share Initially
3. Providing Data
4. Receiving and Storing Data: The Central Platform
5. Accessing the Shared Data

Arising from the discussions, Figure 8 gives a conceptual illustration providing terminology and separation of the areas.

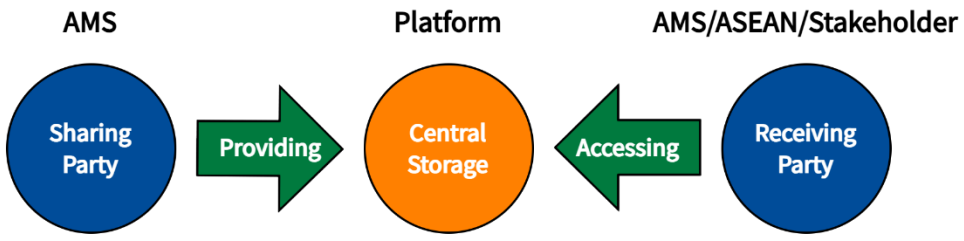

Figure 8 – Conceptual illustration.

Note: The AMS provides data to a central platform accessed by another AMS, ASEAN/regional institution, or external stakeholder (for selected data) e.g., Development Agency and International Organisation.

Sections 0 to 0 are dedicated to the high-level questions in the above five areas. The outcomes of the Group Discussion at the 3rd Data-Sharing Workshop are synthesised and added in Annex 1 and grouped to align with the five areas.

During the first two workshops several more detailed discussions took place, and these are summarised in the last section, "Detailed Guidelines", 0.

Together these sections serve to summarise the input for ASEAN guidelines on data sharing in the APG.

5.1 Current Experiences in Data Sharing

In the ASEAN region, several efforts in power data sharing exist. Some involve only a subset of the member states, while others cover the whole region or more.

1. National data sharing within a member state, where independent power producers (IPPs), utilities, market operators, etc. share power data on a national level. This is often data related to the delivery or settlement of power trade.
2. The ASEAN Energy Database System (AEDS) is the regional database focused on both data for deal discovery and relevant information on development in the APG. AEDS is governed by the ASEAN Centre for Energy (ACE) and is the only official regional data sharing effort covering the entire APG.
3. The LTMS Pathfinder project covering Laos, Thailand, Malaysia and Singapore. This project shares data on (short-term) delivery, operation and settlement, but only among the four members and some data only on a bilateral basis due to strict non-disclosure agreements (NDAs).
4. The Greater Mekong Subregion (GMS) which covers five of the AMS and China, has been practising power data sharing which includes general power trade data as well as socio-economic data related to energy. The collaboration has a focus on data for the deal discovery phase. The group, however, lacks standards and agreed methodologies for data collection [6].
5. General sharing of public power data as, for instance, through the ADB [9].

5.2 Data to Share Initially

During the first step, the roadmap suggests sharing historical data on power trade, production and load with annual or monthly time intervals, and on a grid level. Data at this stage should be considered general or public data.

5.3 Providing Data

Data is currently shared in various ways and with different levels of clarity. This makes receiving and interpreting the data not only challenging and time-consuming, but also prone to errors.

As discussed during the 1st and 2nd data workshops, common methodologies and standards are needed, along with plenty of inspiration from other regions. The challenge is to build upon the

existing experience and work without inheriting the mistakes or legacy issues that exist in the current standards.

5.4 Receiving and Storing Data: The Central Platform

The only currently available platform in the APG is the ASEAN Energy Database System (AEDS) which is hosted by ACE [13].

Due to the lack of common standards and methodologies, many tasks, including running AEDS are still carried out manually. This includes both receiving and inputting data as well as preparing data for sharing when requested.

The platform provides several online statistics and interactive graphs. Some are publicly available, while others are gated and provided only to authorised parties.

Other platforms exist in the region, but first and foremost, as mentioned in Section 5.2, they cover only a subset of the member states. Examples are the LTMS-PIP platform and the GMS-collaboration [6]. Both cover only a handful of states, and the GMS covers countries outside of ASEAN. The LTMS-PIP is designed to handle the operation of the LTMS project on a daily basis: short-term planning and settlement.

5.5 Assessing the Shared Data

In the conceptual illustration of data sharing (Figure 8), the receiving party is mentioned as either ASEAN (e.g. a regional institution), one or more AMS or an external stakeholder/development agency (such as, the UN, USAID, etc.).

Especially for the internal stakeholders (i.e., regional institutions within the AMS), timely and equal delivery of data can be important for certain data types or processes. This is to ensure fairness and equal opportunities for all. However, the data in the different steps of the roadmap might have different requirements in this regard. The regulators of the AMS need to discuss and agree on this matter.

In addition, it should be considered how timely data delivery in general can be encouraged. Due to obvious differences, the member states do not currently deliver data at the same pace. To ensure the value of data, obtain full transparency and maximise the potential of the data sharing, it will be important to encourage timely delivery of data to the central platform.

5.6 Detailed Guidelines

At the 2nd Data-Sharing Workshop, the participants discussed several requirements for data sharing and made suggestions. Combined with discussions about key insights learned from other regions, this information can be summarised in a list of detailed guidelines for the next steps for data sharing in the APG.

In general, the group discussions provide valuable input to the detailed guidelines in relation to the suggested roadmap and are summarised below in four categories: (i) details of data to share, (ii) regulatory considerations, (iii) governance practices, and (iv) technical aspects of data sharing.

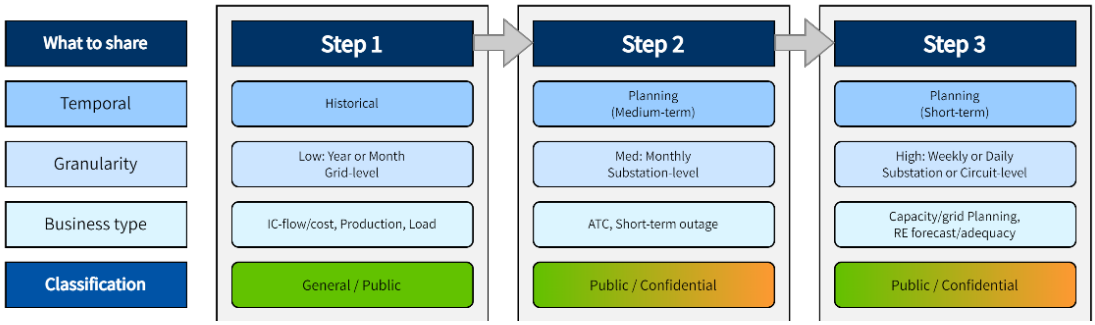

Figure 9 – Summary of the roadmap's three steps.

5.1.1 Details of Data to Share

This section lists the considerations and recommendations in relation to "what to share" discovered during the three workshops.

Roadmap steps 1-3: Definition of data dimensions	
Explanation	The data to share in the first step must be defined in accordance with the three dimensions of power data. See Section 0.
Considerations	During the workshops, existing historical data was foregrounded for several reasons: (i) It is the easiest, (ii) it can be considered public, (iii) it is needed for deal discovery and external involvement/sponsors. During the 3rd workshop, the group discussions confirmed the view that starting with easily available and sharable data was preferred.
Recommendation	Start sharing: - Temporal: historical data - Granularity: annual or monthly, grid-level - Type: production, load (consumption), and cross-border flow

Roadmap Steps 1-3: Cross-border flow details	
Explanation	The current methodologies for describing cross-border flow are different among the member states. A common approach is necessary.
Considerations	Cross-border flow is for some reported as a total, for some split between IPPs and for others considered production (import) or load (export). To sufficiently distinguish the flow and compare/validate the data between member states, a more detailed approach is preferred. For more on this issue, please refer to the presentation of the 2024 workshop.
Recommendation	For each period (year or month), power trade should be disaggregated and shared as: - Purchase vs. sales - Country by country - Source by source (hydro, wind, PV, other).

Granularity: Allow for difference	
Explanation	Both time intervals (year, month, day, hour) and network level (grid, sub-station or circuit) describe different degrees of granularity. A third is the level of business details – e.g., whether production is shared only as total, or using general descriptors such as RE, nuclear vs. fossil, or even more detailed as coal, gas, hydro, wind, PV, etc.
Considerations	Certainly not all member states will currently be able to deliver data at a high level of detail – such as monthly time interval, or substation level. For the first step, we should require only annual intervals and grid-level. However, some member states could deliver with more details.
Recommendation	It is recommended in the first step to require data only at the annual and grid levels, but to allow for more details from some member states. This requires developing both the standard and the platform to make this possible.

5.1.2 Regulatory Considerations

Most of the framework and guidelines will in the end require considerations or approval by regulatory authorities, but a few considerations are specifically relevant to mention here.

In the 2nd Data-Sharing Workshop, a section was dedicated to governance-related duties and considerations. These could be taken into account as well.

Defining Data Classification and Security	
Explanation	Classifying data is not trivial – a common taxonomy must be defined. Agreeing on security measures, including encryption and access, is also a part of this task.
Considerations	Defining the categories and assuring that the "secret" category is not used in the next stage, will make the national ratifications and regulatory tasks easier. Consider adding an extra category for data that are not to be shared.
Recommendation	Identify three categories to encompass the entire roadmap: - General, Public, Confidential Do not explain the "Secret" in depth, since it will be determined by exclusion – and will not apply to the current or next stage of the APG.

Support the Pathfinder Data-Sharing Projects with High-Level Regulation	
Explanation	To succeed, the Pathfinder Data-Sharing Projects are dependent on the AMS and regional commitment, resources and not least data sharing. One of the goals of the project is to deliver the foundation for later detailed regulation.
Considerations	The projects' dependencies call for support at all levels. Regulation at a high level could support the projects' needs in relation to commitment, implementation, delivery of data, etc.
Recommendation	Once the project is finally described and agreed upon, define a high-level regulation to support the Pathfinder Data-Sharing Projects.

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5.1.3 Governance

This section covers the governance-related discussions and recommendations relevant to the steps of the suggested roadmap and, hence, to the proposed Pathfinder Data-Sharing Projects.

Technical Board: Ensure Competences and Mandate	
Explanation	At the 1st workshop on Data Sharing in 2022, the need for a Technical Board to design and decide upon the technical aspects of data sharing in ASEAN was discussed. This body will design and describe the standards, methodologies and procedures to be used both in the 1st and 2nd Pathfinder Data-Sharing Projects as well as in the decades to come.
Considerations	It is key to ensure both the right competences and the right mandate for this group. The group cannot solely focus on the needs of the project, since the result of the initial design will live long after the project is completed. Also, the group must have sufficient mandate and commitment from the AMS.
Recommendation	It is recommended to create the Technical Board as a part of the 1st Pathfinder Data Sharing Project, but to include the AMS in the work and approvals. It is similarly important to ensure a long-term focus on the design choices made, since the work will be used for both steps 2 and 3 of the roadmap as well as the future development of data sharing within the APG.

Platform: Governance Outside Project Organization	
Explanation	The central platform for data sharing in Step 1 is suggested to be AEDS. The System receives the data provided by the sharing parties, aggregates and ensures access of data to regional institutions, AMS and – for selected data – external stakeholders.
Considerations	The current AEDS needs further development and support for the data sharing and the methodologies and standards that are yet to be defined. Both the AEDS platform and its operation will need to continue uninterrupted after the Pathfinder Data-Sharing Projects are completed.
Recommendation	The governance of both development and operation of the platform should be rooted outside of the project organisation. The Modelling and Policy Planning (MPP) Department of ACE has been discussed as a candidate for this governance and it is recommended to consider this. The group needs further resources and competences which could be delivered in collaboration with the Pathfinder Data-Sharing Projects.

Assisting the AMS	
Explanation	During the discussions in the 3rd workshop on Data Sharing, it was agreed that a regional task force that assists the AMS in implementing the standards and methodologies could be an effective way to ensure progress in the Data Sharing efforts.
Considerations	The task force could be seen a predecessor to the "User Group" that was discussed in both the 1st and 2nd Data-Sharing Workshops.
Recommendation	The 3rd workshop recommended that the task force is placed under the auspices of ACE.

5.1.4 Technical Aspects

The "Technical Board" discussed during the workshops and described in the section above will be tasked with deciding upon the technical aspects of sharing power data in ASEAN.

The considerations below are those primarily addressed to this body.

Defining a base format for data	
Explanation	The base format can be the same for all data.
Considerations	Having the same base format will greatly simplify future work and discussions. The format "XML" is an ISO standard and has been used by several regions for data exchange in the power business. It is considered the standard format for time series and complex data of a diverse nature. The format also has a validation methodology built in which is a part of the official standard.
Recommendation	Approve XML version 1.1 as the base format for data sharing in the APG.

Defining a base schema	
Explanation	The base schema defines the common elements of all data.
Considerations	The base schema should include classification details, sender, recipients, and description of the data dimensions (temporal, granularity, business types).
Recommendation	The European Common Information Model (CIM) standard has a base schema. However, this lacks classification information and data dimension information. Consider adding these missing features to the CIM base and use the result.

Deciding on technical transfer protocol	
Explanation	At least one technical transfer protocol is needed, but most likely allowing for more protocols will be necessary.
Considerations	It is likely that different protocols are needed, but the more protocols supported, the more development is needed in the central platform. Also consider that each protocol has its security measures and concerns to manage. Experience teaches us that older but more mature protocols are easier to implement and secure.
Recommendation	Select a simple and well-proven technical transfer protocol as Secure File Transfer Protocol (SFTP) or similar. This protocol has been used with success in other regions.

Build an identification code system	
Explanation	Data Sharing in the APG context obviously needs codes for the grid elements, but we also use codes for regions, institutions, data types, business types, granularities, etc. We need a system to hold and issue these identification codes.
Considerations	Issuing new codes can be a bottleneck and delegating some of this to each member state should be considered for the long term. The common identifications such as data types and business types should, however, only be issued regionally.
Recommendation	Start with a central approach and consider including this in AEDS.

6 Conclusions

This document has provided a comprehensive overview of the proposed data-sharing framework and guidelines for the ASEAN Power Grid (APG), highlighting the importance of data sharing as a strategic tool to accelerate the APG and expand towards Multilateral Power Trading (MPT). The discussions and trainings conducted over the past years have culminated in a consensus on the necessity of data sharing for building trust, ensuring transparency, and fostering collaboration among the ASEAN Member States (AMS).

The proposed framework outlined in this document is designed to facilitate the next stage of data sharing, with a focus on obtaining agreement on data-sharing guidelines and standards. It is imperative that we recognise the different reasons for data sharing—whether for power trade, transparency, or collaboration—and understand the types of data required for each purpose. Historical data emerges as a common need across all considerations, underscoring its significance in the data-sharing process.

As we move forward with a stepwise approach to data sharing, we focus on building trust and transparency in the first steps and gradually progressing towards data that is both more detailed and planning oriented. This approach will ensure a smooth transition towards data sharing for both deal discovery and power trade delivery while at the same time allowing for the necessary adjustments along the way.

The workshop discussions have delivered a rich number of considerations, recommendations and conclusions on several topics. The most important is to initiate a Pathfinder Data Sharing Project to support the two first steps of the suggested roadmap.

The next steps are to finalise the proposed Framework and Guidelines for Data Sharing and then define the 1st Pathfinder Data Sharing Project.

In conclusion, the path to a fully integrated and collaborative APG is paved with shared data.

7 References

[1] AERN (ASEAN Energy Regulatory Network). (2021). Discussion paper "First draft guidance on data to be shared" (Not for Release)

[2] UN ESCAP (Economic and Social Commission for Asia and the Pacific) (2022). Summary of the 1st Workshop on Transparency and Data Sharing. (Not for Release)

[3] UN ESCAP, ACE. (2023). Summary of the 2nd Workshop on Data Sharing. (Not for Release)

[4] ACE. (2024). Policy Brief for ASEAN Power Utilities and Stakeholders: The Value of Data Sharing and Transparency in Driving Multi-lateral Power Trading under the ASEAN Power Grid. https://aseanenergy.org/publications/policy-brief-for-asean-power-utilities-and-stakeholders-the-value-of-data-sharing-and-transparency-in-driving-multilateral-power-trading-under-the-asean-power-grid/

[5] AMEM. (2023). Joint Declaration of the 41st ASEAN Ministers On Energy Meeting on Sustainable Energy Security Through Interconnectivity.

[6] GMS. (2024). Statistics in the Greater Mekong Subregion. (https://greatermekong.org/stats/index-static.php)

[7] HAPUA. (2023). Development of the ASEAN Power Grid. Presentation at the 41st AMEM.

[8] Joint Statement. (2023). Joint Statement of Brunei Darussalam, Indonesia, Malaysia and the Philippines Power Integration Project (BIMP-PIP).

[9] ADB. (2024). Unlocking the ASEAN Power Grid (APG) Potential.

[10] ACE, USAID. (2024). Data Sharing. Guidelines & Framework. Presentation at 3rd Data-Sharing Workshop.

[11] ACE. (2020). ASEAN Plan of Action for Energy Cooperation (APAEC) 2016-2025 Phase II: 2021-2025

[12] ACE, USAID. (2024). 3rd Data-Sharing Workshop – Presentations.

[13] ACE. ASEAN Energy Database System (https://aeds.aseanenergy.org/)

[14] IEA. (2019). Establishing Multilateral Power Trade in ASEAN. (https://www.iea.org/reports/establishing-multilateral-power-trade-in-asean)

8 Annex: Results of the Discussions from the 1st, 2nd and 3rd Data-Sharing Workshops

The 1st Data-Sharing Workshop

The 1st Data-Sharing Workshop was conducted virtually 29 - 30 November 2022. During the workshop, two essential questions were foregrounded:

1. Why is data sharing important?
2. How can data sharing be implemented?

The first question was raised to increase the utilities' awareness of the importance of data sharing in boosting business outcomes by increasing the opportunities to link power markets across countries. Experience has shown that to create a successful power market (and a future power market), sharing of data is one of the key enabling factors.

In any market, access to data is vital. In a non-transparent power sector, data is often kept from the stakeholders in the sector. This will create an unequal sector in which typically vertically integrated power utilities can assume control. This will in turn make discussions between relevant stakeholders on the development of the power sector harder as discussions will be based on different data; moreover, information-making decisions can be more difficult, and misunderstandings can occur due to different starting points among the stakeholders.

a] Data-sharing best practices from international experiences such as those of Australia the EU and South Africa were discussed and focused on their applicability to the ASEAN context.

A second question raised involved the technical aspect or practicability of data sharing in ASEAN. In this module, data were grouped into types so that it could be split d into categories (Planning, Operational, and Historical) according to their characteristics. Defining how to share, choosing the transport protocol and data format, and storing the data were also discussed in this module with additional attention to data security.

The initial governance of data sharing was also proposed at the workshop to introduce the three (3) importance governance bodies in data sharing:

- **Technical Board** - a mandated technical body to discuss and answer current and future questions
- **Operational Group** - takes care of the central activities and duties in a timely, secure and efficient manner.
- **User Group** - ensures effective collaboration and knowledge sharing, by establishing a forum for everybody working within IT or information security.

The basic roles of each of the three suggested bodies were outlined in the workshop:

Duties	Best Practices
Technical Board	
• Ensure definition of base standards, such as time zone etc. This will of course require collaboration with businesses, but the technical group can prepare decision material for such questions. • Design identification code standard and its maintenance – to ensure unique identification of every element as well as codes for business types. • Define and describe the data types to be shared. • Define the standards for data format, schemas and transport protocols. • Define and mandate the Operational and User Group. • Define and initiate development of applications and tools if needed.	• Limit the number of participants; big groups create long discussions. • Consider defining the required characteristics (education and professional background, etc.) for observers if there is a request for more participants. • Encourage long term engagement. • The Board most likely can meet on a rotating basis; no fixed, designated office needed • Divide work into subgroups and ad hoc working groups but be aware of dependencies and avoid overlapping responsibilities.
Operational Group	
• Maintaining the identification code repository. • Governing and maintaining a central certificate authority. • Approving new participants • Maintaining central platform (can also be handled by dedicated group). • If required, handling central authentication, authorization and/or trust.	• Start with a small group, maybe even a subgroup of the Technical Board. • The group might not need an office and can both meet and work remotely – but ensure meeting regularly. • Consider rotating the members and keep the group small to ensure efficiency. • Ensure sufficient commitment from the members: the work can be time-consuming.
User Group	
• Maintaining a knowledge base for the technical participants. • Offer training in standards, applications and security concepts/policies. • Creating and sharing source code examples. • Creating reference implementations and test tools. • Invite architects for discussing and giving inputs to the standards and policies; feed this back to the Technical Board.	• Start by inviting the architects and relevant people to meet and join – technical people can be a bit shy and sometimes are reluctant to participate. • Ensure that everyone can join despite level of knowledge and maturity. • Encourage input and comment, share questions and answers, but consider anonymizing the person asking as default – not everybody appreciates the publicity.

The 2nd Data-Sharing Workshop

The 2nd Data-Sharing Workshop was held in person on 30 November 2023 in conjunction with the 1st ASEAN Power Grid Meeting Series in Jakarta, Indonesia. The workshop was attended by APG Stakeholders of HAPUA, AERN and APGCC from 8 ASEAN Member States (AMS) physically and 2 AMS virtually, with a total of 38 participants.

During this workshop, the data-sharing experiences from the LTMS project covering Laos, Thailand, Malaysia and Singapore were presented and discussed to further identify the requirements for data sharing in different stages of MPT.

The process of discussion involved breakout group discussions for which all participants were split into four different groups based on their roles and countries. The breakout group discussion was aimed at discussing the preparatory steps, needs and challenges in implementing data sharing.

1. The Session noted 1) the motive and importance of historical data in power trading to be shared, 2) the need for data transparency to acknowledge available transmission capacity resources, and 3) the need for a dedicated body and platform with sustainable operations for data sharing, as the priorities of the important elements to enable data sharing for successful power trading. The detailed remarks from each country regarding the priorities in realising successful power trading in the region are:
    a. Cambodia noted the need to acknowledge the diversity and different availability of data, as well as the divergent capacities of the countries to share the data among the AMS. Therefore, Cambodia suggested developing a standardised format and list of the data that should be shared including the justification for sharing chosen data to be proposed by each country's ministry issuing the mandate in the APG. Cambodia also noted the importance of data sharing in improving system reliability and demand projection for reserve power sharing.
    b. Lao PDR emphasised the importance of data trading in ASEAN. Lao PDR noted the importance of acknowledging the available resources of each country and of looking into the resource gaps which will later be filled through power trading.
    c. Malaysia highlighted the need to acknowledge and clarify the pricing mechanism between countries, and the data on electricity tariffs and its subsidies. Malaysia also highlighted the need to share dispatch and scheduling of energy data from each country, and also the need to have a controlling and monitoring body concerning the data sharing practices.
    d. Myanmar emphasised the need for more enhanced research on data sharing from the government-side, to acknowledge the needs of the utilities, to better align the government and utilities' priorities concerning data sharing, and to observe the concerns over data security. Myanmar also emphasised the need to clarify the minimum requirements for data sharing and the necessity to collect detailed electricity tariff data from each country.
    e. The Philippines emphasised the need to determine the data classification, while also addressing the issue of data security and privacy. The Philippines highlighted the necessity of a body on data protocols to specifically establish the rules and procedures in data sharing; the directives/rules from the body will later be implemented for data forecasting, data compliance and policy making. The Philippines suggested acknowledging the different governance structures within the country for regional data sharing as it has a liberalised power market in which power operation and trading data within the country is under the private sector.

f. Thailand highlighted the benefits of data sharing in improving transparency for internal market operation, grid management and planning, and national or even regional power market planning. Thailand also emphasised the need to highlight the urgency of data sharing to all stakeholders and the need to have a common platform and body to collect and store the data.

2. The main challenges in realising data sharing were also discussed in the breakout group. These challenges, first and foremost, involve identifying the dedicated entity to host the implementation of the data sharing and finding the needed funds for the entity to establish such a regional-sharing platform. Besides this, the discussion noted further challenges such as the lack of participation from IPPs and the private sector, data security, data quality and a clear classification of the shared data. The detailed remarks from the participating countries are as follows:
   a. Cambodia emphasised that the challenge in implementing data sharing is the difference in data requirements and outputs from different applications. Cambodia highlighted the need to develop a common software for grid planning and the training of human resources to use it.
   b. Lao PDR emphasised financing as a challenge to establishing the common ASEAN data platform. Lao PDR also pointed out that the different classifications or definitions of data, data quality, data integration and data inter-operability are important factors in realising data sharing.
   c. Malaysia highlighted the need for the establishment of a common data-sharing platform and the related challenges, including the compliance to the existing system, investment cost, nature of data involved and presentation of real-time data. Malaysia also drew attention to the high costs of data platform and weather-monitoring investments.
   d. Myanmar emphasised data availability as the major challenge. Myanmar emphasised that budgetary constraints posed a limitation on modernising the IT requirements of the data sharing platform, and on old plants and facilities.
   e. The Philippines emphasised that the challenge in implementing data sharing is data security and privacy, political-driven policies and targets, and lack of data sharing from IPPs, as the private sector has strategies to limit the quantity of shared data in a competitive environment. The Philippines also highlighted financial constraints for the implementation of data sharing as one of the key challenges.
   f. Thailand highlighted the complexity of gathering reliable, most recent and updated data from the sources, and that data entities that withhold/compile and store the data become quite a challenge for implementing data sharing.
3. The Session also suggested the next step for each AMS' ministry/utility to overcome the given challenges, as follows:

a. Cambodia highlighted the need to have a study to identify the types of data that the countries could provide. Cambodia suggested that ACE should host the ASEAN data collection process and upon completion of the study, then a software programme might be able to fill the data gaps.
b. Lao PDR suggested that the next step would be to advise the benefits of data sharing to the ministry/utility, starting by acknowledging the commonalities in the data from each AMS and identifying what types of data would benefit all ten AMS.
c. Malaysia offered several suggestions to overcome the challenges, such as to make the generation mix and simulation results public, seek advice from cyber security agencies concerning the data security and privacy, and be in compliance with legal frameworks.
d. Myanmar highlighted the need to consider privatisation of government-owned enterprises, partially to allow private sector budgetary expenses and investment to alleviate the government expenses.
e. The Philippines noted the need to produce the guidelines on data sharing (i.e. common confidential guidelines/laws).
f. Thailand suggested bringing the data-sharing topics to high-level meetings (SOME & AMEM) to obtain the endorsement from each AMS for further action on data sharing.

4. The second part of the breakout session touched upon current and future data-sharing governance in ASEAN, specifically discussing the existing institutions relevant for the governance of data sharing. The detailed discussion from the breakout session is summarised as follows:
   a. Cambodia stated that the ministry works only on policy, while the data are from the utility (EdC). Cambodia also mentioned that EdC controls most of the data but cannot provide all data, as permission from the Ministry is required.
   b. Lao PDR and Thailand stated that the relevant ministry should be responsible for the governance of data sharing, and the utility (EdL/EGAT) for holding and gathering the data which in turn should be submitted to the ministry.
   c. Malaysia suggested establishing a platform for data sharing, upon a direct mandate from ASEAN Secretariat.
   d. Myanmar suggested system operators as the main organisations that can provide the data.
   e. The Philippines stated that the market operators should hold the data, and that the regulator and government should provide the required data. The Philippines also noted that ASEAN needs a permanent dedicated entity which will be responsible for collecting, storing and providing data for the AMS.
5. Upon the conclusion of the discussion, each delegate was asked to propose the next step to support the building of the needed governance for data sharing. The detailed remarks from the delegates are as follows:

a. The APGCC Chair mentioned the need to communicate the objectives and urgency of having a data-sharing practice and platform. He stated that the regulators need to observe the market-based power system in order to acquire a full comprehension of the operationalisation and benefits resulting from the use of such data.
b. Cambodia recommended including the data-sharing topics in the new APG MoU. Cambodia suggested keeping the data requirements simple and creating an ASEAN-appropriate template for the required data.
c. Lao PDR agreed with the idea to establish a platform among utilities to facilitate the data sharing in ASEAN.
d. Malaysia agreed with including the data-sharing topic in the new APG MoU. Malaysia also stated that the new APG MoU should serve as a guide for all AMS to follow in the implementation of data sharing.
e. Myanmar stated that it is important to clarify the types of data shared among the AMS, to clarify the sensitivity of the data and the requirements of the data. Myanmar stated that the different types of data may require different levels of approval, from the technical to the political level.
f. The Philippines suggested appointing a one-person focal point for data sharing from the appointed governing bodies.
g. Thailand suggested accelerating the MoU drafting process and reporting the work process to the utilities and ministries. Thailand also suggested that the HAPUA Working Group 2 proliferate the idea in HAPUA and immediately arrange a workshop/meeting.

6. The meeting also discussed the realistic timeline for establishing the bodies for data-sharing governance. The detailed remarks from each delegate are as follows:
   a. Malaysia mentioned the need to focus on a central ASEAN regulatory body. Malaysia opined that ACE would be the best and most available option to govern the data sharing.
   b. Myanmar stated that the realistic timeline for the data-sharing governing body depends on approval at the AMEM level, as it is needed to be clear on the type of the required data and the necessary governance structure. Myanmar also suggested that ACE provide guidance on the required data and the types of data already available.
   c. Thailand stated that the timeline is heavily dependent on the APG MoU renewal process. In addition, Ms. Juthamard from EGAT provided a two-year realistic plan to get approvals from each governing body, with one year for the development of the data-sharing governance, to be shared at the next AMEM. After the development, she stated that the approvals should be gathered from all of the AMS and then shared, with the hopes of getting the endorsement from the next AMEM.
7. The meeting agreed on using existing bodies, such as ASEC, ACE, AERN and HAPUA, to govern the data sharing process. The meeting suggested raising the urgency of data-

sharing practices in the region, through the high-level meetings such as SOME and AMEM, for the purpose of receiving endorsement on the data sharing practices.

All the insights and discussions from the 1st and 2nd Data-Sharing Workshop have been highlighted as a Policy Brief entitled "The Value of Data Sharing and Transparency in Driving Multilateral Power Trading under the ASEAN Power Grid" [4].

The 3rd Data-Sharing Workshop Group Discussions

The 3rd Data-Sharing Workshop was held in person on 24 June 2024 in conjunction with the 42nd Senior Officials Meeting on Energy (SOME) in Vientiane, Lao PDR. This workshop was a follow-up from the previous 2nd Data-Sharing Workshop which raised the urgency of data sharing practices in the region in the high-level meetings such as SOME and/or AMEM. Hence, it was attended by APG Stakeholders of HAPUA, AERN and APGCC from six ASEAN AMS (physically) with a total of 15 participants.

The 3rd Data-Sharing Workshop, aimed at AMEM, discussed the proposed framework and guidelines of data sharing with relevant APG stakeholders and introduced the 1st Pathfinder Data Sharing Project.

During the 3rd workshop several high-level questions were discussed. The questions were grouped into the five areas below.

1. Current Experiences in Data Sharing
2. Data to Share Initially
3. Providing Data
4. Receiving and Storing Data: The Central Platform
5. Accessing the Shared Data

The workshop participants were grouped into four groups based on the main role as policy makers, regulators, utilities and current practitioners.

- Group 1: Current practitioners and stakeholders.
- Group 2: Utilities and regional parties.
- Group 3: Regulators focusing on measures for providing and accessing data.
- Group 4: Regulators and policy makers focusing on the next steps.

The questions were distributed among the four discussion groups and some overlap was intentionally planned, since some questions benefitted from discussion from different points of view.

The groups presented their results in plenum, and both the discussions from within the groups and the presentation-related discussions were recorded.

In the five sections below, the discussion outcomes have been synthesized and grouped to align with the five areas.

Area 1: Current Experiences in Data Sharing

Discussion topics:

- What current experiences in data sharing are relevant to consider?
- What data granularity levels are currently used or shared?

Groups involved:

- Group 1: Current practitioners and stakeholders.

Result of the discussion:

Group 1 was tasked with discussing the current experiences in sharing. The group discovered that some of the AMS have extensive experience in data sharing as it is essential to the everyday functioning of exchanges, markets and existing power trading.

For example, Malaysia's power trade operators shared data in three categories based on their market roles - wheeler, seller and buyer. They shared a large quantity of detailed data (network level and 30-minute trading interval) among these three market roles, but only enough for them to do their part in market and exchange operations.

The group agreed that data sharing at a finer level than monthly flows between substations is not needed. On the other hand, it would be easy to provide the levels suggested by the 1st Pathfinder Data Sharing Project – for example, monthly power flow data sharing at the level of connections between substations. However, they would need to develop permissions to share and ensure compliance with existing Non-Disclosure Agreements (NDAs) that the market administrators and the market actors have signed.

Area 2: Data to Share Initially

Discussion topics:

- Is the suggestion to start sharing historical data on power trade, production and load the optimal approach?
- What granularity of data is relevant for the next step in APG data sharing?

Groups involved:

- Group 1: Current practitioners and stakeholders.
- Group 4: Regulators and policy makers focusing on the next steps.

Result of the discussion:

Group 1 discussed the above suggestion (first bullet point under "Discussion topics") and found that historical data provide a reasonable starting point for the benefit of the general data-sharing objective which is to develop the APG and expand Multilateral Power Trading. The suggested data is focused on the Deal Discovery phase of data sharing, which is consistent at the current stage of development.

In relation to the granularity, some member states have already shared data on finer levels – as mentioned above, even down to 30-minute intervals and at detailed network levels. However, data at this level of granularity are currently not considered public and not necessary to achieve the goals in the Step 1 of the roadmap.

The group agreed that a monthly level was more desirable, but that an annual level could be accepted as a first step. However, the platform and Pathfinder Data Sharing project must receive and use data from those AMS that can provide this at monthly time intervals.

The main questions are:

i. How much power trade data sharing is enough to achieve the benefits of data sharing? (*Better awareness of APG trends; increased comprehension of power trade possibilities and challenges by policy makers, regulators, utilities and investors; better planning and improved coordination by grid operators and control centers; building blocks towards developing regional frameworks such as Renewable Energy Certificates (RECs)*); and

ii. How much power trade data should be kept confidential according to NDAs and market rules and requirements?

In this context, the opinion of Group 1 participants was again that monthly power flow data at the substation-to-substation (e.g., interconnector) level would be adequate to attain all the benefits while avoiding the disclosure of market-confidential power trade data (e.g., daily or hourly flows; transactional details between specific market sellers and specific market buyers).

Group 4 discussed the practical approach to the first step of the roadmap and concluded that it is beneficial to start with the data that are most easily available – such as production and load – since this would ensure faster initiation of actual data sharing, testing the methodologies and mechanisms. Also, this data is relevant for all AMS. Sharing easily accessible data is a fast track to success and further data sharing experiences.

Then cross-border trade data is very relevant, but group 4 recognised that it will be relevant for only a subset of the AMS. Starting with this data type would then leave the data-sharing project with less relevance for some of the AMS.

Area 3: Providing Data

Discussion topics:

- How can we facilitate the adoption of the future methodologies and mechanisms?
- If the next steps are facilitated by projects, how do we then ensure that knowledge is both shared and preserved over time?

Groups involved:

- Group 4: Regulators and policy makers focusing on the next steps.

Result of the discussion:

Group 4 recognised that the standards and methodologies will require different approaches and actions from each member state to their understanding and application, but many of the practical aspects and issues will be common or comparable across the AMS.

With this in mind, the group suggested that a dedicated task force should be established to help the member states with the implementation of the standards and methodologies, after they are determined.

The group discussed two possible solutions for this task force: (i) to let a Pathfinder Data Sharing Project contain this "task force" function, or (ii) to have an existing and permanent regional body, such as ACE, form and lead the function.

The group concluded that to ensure preservation of knowledge and a long-term perspective, the task force should be led by ACE. However, it could be supported by the Pathfinder Data Sharing Project, and it should join forces with the project to ensure progress.

Area 4: Receiving and Storing Data: The Central Platform

Discussion topics:

- What are the main and high-level requirements for a data-sharing platform?
- What considerations are relevant to consider for development, maintenance and governance of the central data sharing platform?

Groups involved:

- Group 2: Utilities and regional parties.

Result of the discussion:

Group 2 discussed the need for a central platform and related options: to use an existing platform or to develop a new one.

The group concluded that a central regional platform dedicated to the maintenance of power data sharing is needed. The platform should collect and aggregate information from each

member state and build the agreed and relevant statistics. The data should be directly available to the AMS both with a user interface and by Application of Programming Interface (API) endpoints.

The database should be secure, and the data quality should be validated.

The group agreed that AEDS is the most obvious platform available, but also that this platform requires some development to be ready for step 1 of the roadmap:

i. The platform should implement and support the standards and methodologies that are yet to be defined.

ii. The platform should be automated sufficiently to ensure a smooth and efficient operation.

iii. The platform should be improved with interfaces, APIs and sufficient security.

The group discussed the option for AEDS to support Step 2 and Step 3 as well but concluded that this decision would be premature. Specifically, the group agreed that the main goals of the central platform would be to support the "Deal Discovery Phase" of power trading. This means that AEDS should:

i. Be enhanced for AMS power data sharing in the ASEAN context. This includes comparing tables on power trade and a specific standard identification code system.

ii. Support reporting and options for validating the data.

iii. Be standardised and automated in the process of providing data to ensure frequent and regular updates from the member states.

iv. Make certain agreed datasets are publicly available to improve the content and system value.

v. Focus on the benefit of transparency and integration of the data from all member states.

vi. Ensure a focus on regularly providing data for monitoring APG progress and power trade development in the region.

vii. Frequently update and provide focus on tracking progress in the APG.

Regarding governance of AEDS, the group concluded that additional resources and competences are needed. This could be delivered as a part of – or in collaboration with – the 1st Pathfinder Data Sharing Project.

Area 5: Accessing the Shared Data

Discussion topics:

- For what types of data would it be relevant to consider regulations to ensure timeliness and equal delivery?
- What are the practical approaches to initiate the regulatory work on timeliness and equal delivery?

Groups involved:

- Group 3: Regulators focusing on measures for providing and accessing data.
- Group 4: Regulators and policy makers focusing on the next steps.

Result of the discussion:

Group 3 concluded that the following data types, in particular, are potential candidates for timely and equal delivery regulations:

- Data on the countries' potential resources
- Data on the demand and supply capacity of each country
- Data used for settlement of trades (e.g. data of available transfer capacity, wheeling charges, etc.)

The group also discussed how, prior to developing the supporting regulation, data governance needs to be settled to manage the data in an effective and secure way. The establishment of a regional regulatory body which is ideally tasked to regulate the data sharing practices is also needed.

To assist in encouraging an equal and timely delivery of data, the group agreed that a near-term APG Memorandum of Understanding (MOU) could potentially support encouraging this. A clause on data sharing in the MOU or in the protocols could assist the member states in ensuring the security of sharing the required data for MPT.

Group 4 explored the issue of data delivery timeliness in relation to the Pathfinder Data Sharing Project and concluded that high-level regulation could help the project. This suggests that the regulatory work should be seen as an evolving and gradual process that begins at a high level and becomes more and more specific as the regional data sharing advances.

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