Implementation of the Data Sharing Framework for ASEAN Power Utilities in Advancing MPT

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About ASEAN Centre for Energy (ACE)

Established in January 1999, ASEAN Centre for Energy (ACE) is an intergovernmental organization within ASEAN structure that represents the 10 ASEAN Member States' interests in the energy sector.

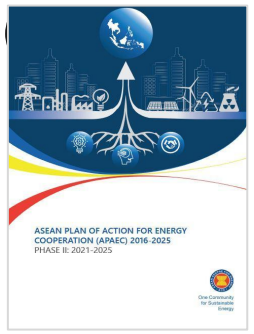
What We Do

Think Tank
Assist AMS in research and identifying practical and specific solutions on policies, legal, and regulatory frameworks, technologies, and innovative solutions.

Energy Data and Knowledge Hub
Provide a knowledge repository for ASEAN Member States (AMS) and services through data management, publication, and dissemination.

Catalyst
Unify and strengthen ASEAN energy cooperation by providing a platform for sharing, policy advisory, best practices, capacity building, and secretariat.

ASEAN Plan of Action for Energy Cooperation



A series of guiding policy documents to support the implementation of ASEAN multilateral energy cooperation to advance regional integration and connectivity goals. Serves as a blueprint for better energy cooperation under seven (7) programme areas in achieving the goals of the ASEAN Economic Community (AEC) pillar of the ASEAN Community.

APAEC Programme Areas

- **ASEAN Power Grid (APG)**
- Trans-ASEAN Gas Pipeline
- Coal and Clean Coal Technology
- Energy Efficiency and Conservation
- Renewable Energy
- Regional Energy Policy and Planning
- Civilian Nuclear Energy

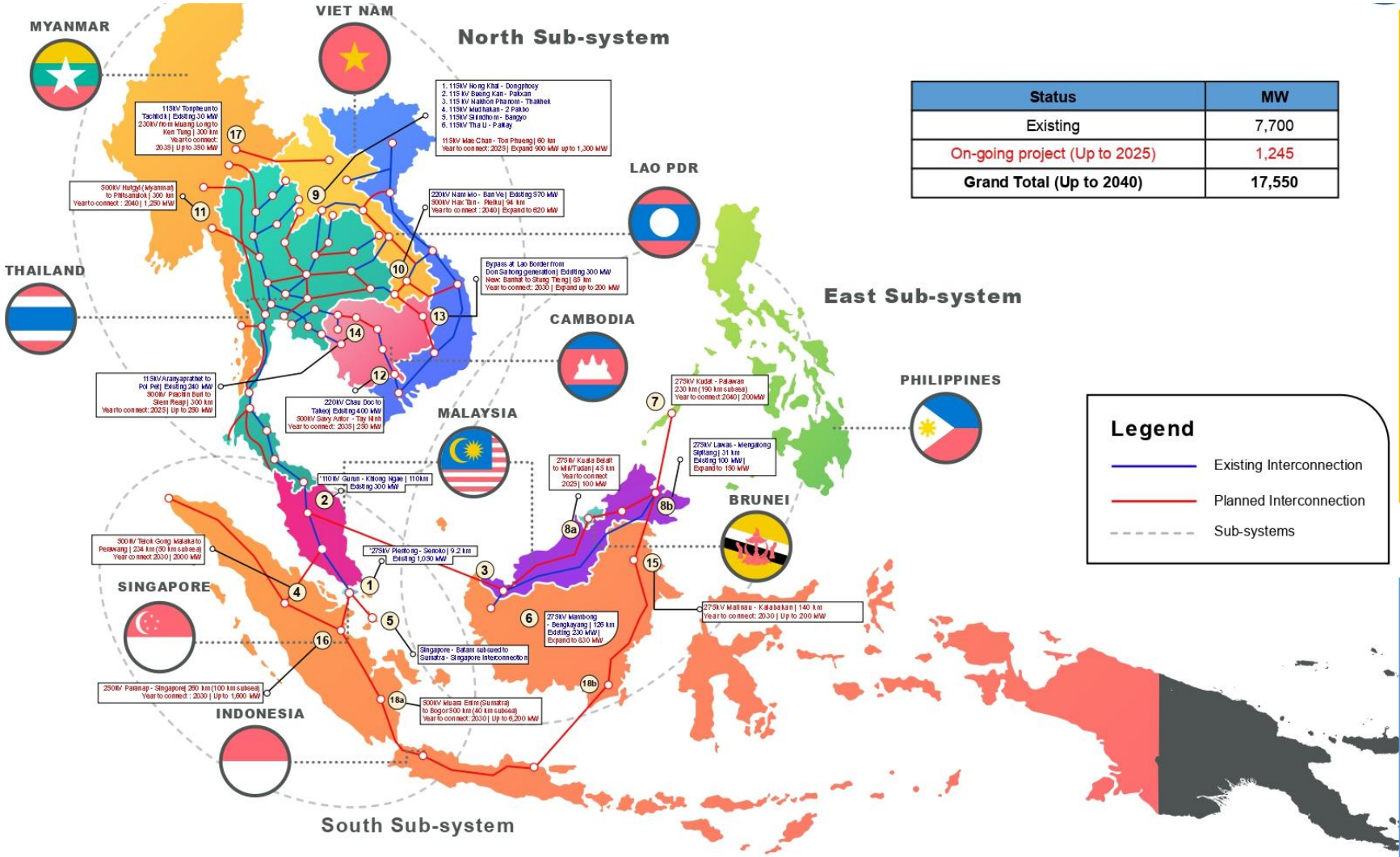
ASEAN Power Grid (APG)

Programme area under the APAEC to expand regional **multilateral electricity trading**, strengthen **grid resilience** and modernisation, and promote **clean and renewable energy integration**.

Specialized Energy Body: HAPUA

HAPUA objective is to promote cooperation among its members to strengthen regional energy security through interconnection development, enhancing private sector participation, promoting joint project development, enhance quality & reliability of electricity supply system

ASEAN Power Grid – Work Priorities and Regional Collaboration



Status	MW
Existing	7,700
On-going project (Up to 2025)	1,245
Grand Total (Up to 2040)	**17,550**

Source based: Updated Power Development Plan (PDP) scenario under AIMS III, 2022

Infrastructure Development

- 18 priority interconnection has been identified
- 9 out 18 has been operated
- Several are currently on-going FS: Sumatra –P. Malaysia (new) & Kalimantan – Sabah (new), Thailand – Malaysia (upgrade existing)

ASEAN Interconnection Master Plan Study (AIMS) III

Phase 1:
Capacity Expansion Planning
(2020, updated in 2022)

Phase 2:
Grid Performance Analysis
(2020, updated in 2022)

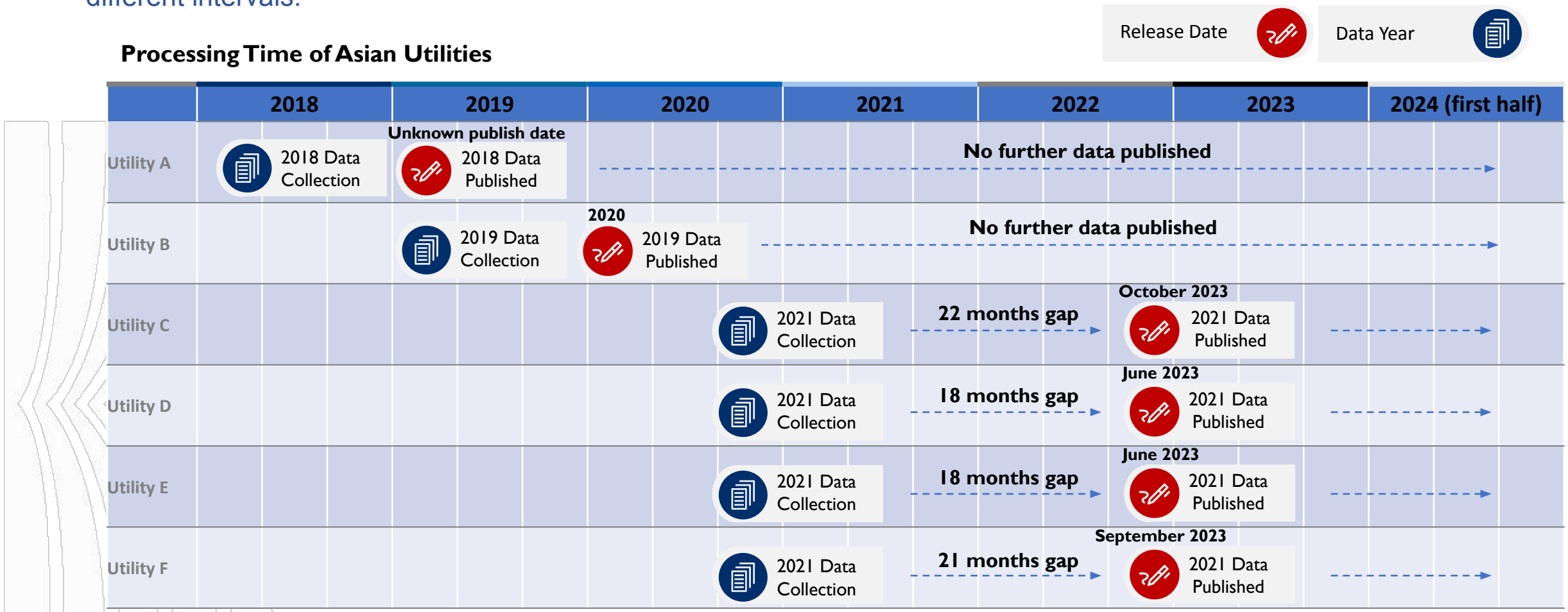
Market Development

- Lao PDR – Thailand – Malaysia PIP (2019)
- Lao PDR – Thailand – Malaysia – Singapore PIP (2022)
- Expansion to other subregion

Phase 3:
Multilateral Market Analysis
(2024)

How is Power Exchange Data Currently Reported?

At present there is no common mechanism for sharing of Power Exchange Data. The only publicly available source is Annual Reports from individual utilities. Each utility reports Power Exchange Data in different ways, at different intervals.



Source: ACE and USAID SPP (2024)

Problem with Current Practice for Data Sharing

- Current practice reflects the reporting requirements of individual ASEAN utilities rather than a focus on data sharing with power trading partners.
- Developing a Power Exchange Data Sharing approach can be implemented if there is a commitment to sharing by governments and cooperation between utilities and regional entities such as ACE.

1 Long **delays in availability** of power exchange data

2 **Lack of granularity** (time and interconnection differentiation) in the power exchange data provided

3 Data **Availability and Accuracy depending on Annual Report** issuance

4 Presentation in **Annual Reports is scattered** across multiple statistical categories

5 **Inconsistencies and potential double-counting** in the data provided by different sources

6 **Existing regional data sharing platforms** such as ASEAN Energy Data System (AEDS) **are not being utilized**

Suggested Standardized Data Reporting

Standardizing annual reporting of power exchange data could be a quick win in the development of ASEAN-wide Data Sharing Protocols.

Data Published by Utility A

Energy Generation from Power Plant and Import

Year / Location	2013	2014	2015	2016	2017	2018
National Grid	3,660	4,477	5,658	6,566	7,603	9,373
Thai	417	350	139	147	87	212
VN	1,329	879	804	737	710	728
PP Sugar	1	10	23	23	38	48
SRP	4	5	4	8	2	6
SHV	25	9	3	11	-	6
KGC	32	8	0.2	2	-	4
TKO	0.03	0.02	0.02	0.01	0.01	0.02
BTB	0.01	0.01	0.01	0.01	0.01	0.02
KPT	12	15	12	23	0.08	19
BTC	0.16	0.04	0.04	0.1	0.08	0.12
PKK	39	30	22	23	26	27
MMT	16	16	19	22	25	23
KGT	17	13	7	14	17	17
PRV	15	13	9	5	2	0.01
STR	11	14	18	35	54	66
SVR	33	137	155	164	110	0.02
BVT	87	-	-	-	-	129
Kratie	10	15	15	20	14	0.39
Snuol	9	10	11	12	7	11
Off Grid	28	35	42	47	62	53
MDKR	3	4	5	6	7	13
KSM	2	3	4	4	4	4
RTK	23	28	33	37	51	36
Total	3,688	4,512	5,700	6,613	7,665	9,427

Data Published by Utility B

Power Exchange Purchases

Customer	2022		2021		Increase / (Decrease)
	Million kWh	Percentage	Million kWh	Percentage	Percentage
Neighboring Countries					
- Lao PDR ★	35,383.04	17.60	33,229.51	17.05	6.48
- Malaysia	88.71	0.04	126.78	0.07	(30.03)
Subtotal	**35,471.75**	**17.64**	**33,356.29**	**17.12**	**6.34**
Total Energy Purchase	**139,132.75**	**69.20**	**133,913.92**	**68.72**	**3.90**
Grand Total	**201,071.15**	**100.00**	**194,868.69**	**100.00**	**3.18**

Power Exchange Sales

Customer	2022		2021		Increase / (Decrease)
	Million kWh	Percentage	Million kWh	Percentage	Percentage
Lao PDR	841.24	0.43	1,266.24	0.64	(33.56)
Tenaga Nasional Berhad (TNB) - Malaysia	2.92	-	32.92	0.02	(91.12)
Electricité du Cambodge (EDC)	566.53	0.29	77.34	0.04	632.52
Other minor customers	97.03	0.05	142.32	0.07	(31.83)
Total	**196,795.37**	**100.00**	**190,348.49**	**100.00**	**3.39**

Suggested Standardized Reporting

Standardizing annual reporting of power exchange data

Harmonizing reporting scheme (GWh)			
		2022	2021
Power Exchange Purchases			
Laos	IPPs		
	Hydro	*	*
	Coal	*	*
	Grid-to-grid	*	*
Malaysia	Grid-to-grid	89	127
Power Exchange Sales			
	Laos	841	1,266
	Malaysia (TNB)	2.92	32.92
	Cambodia (EDC)	566.53	77.34

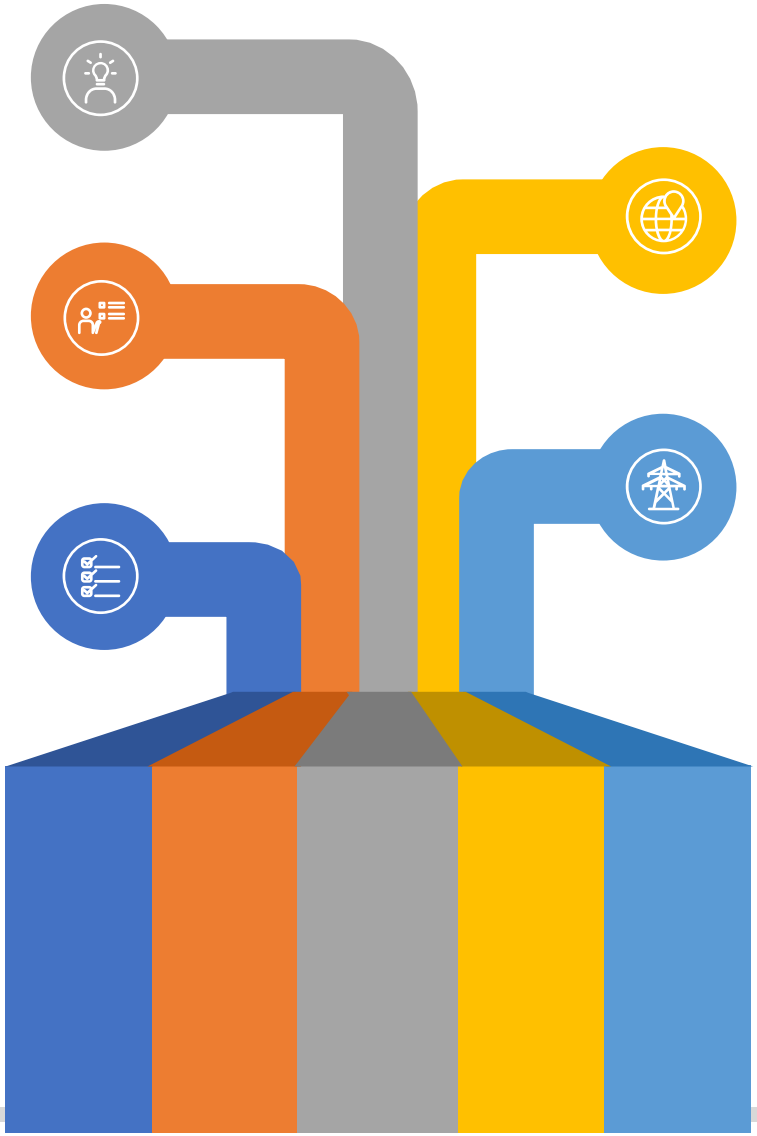
Note: * = Unknown

Benefits of Sharing Historical Power Exchange Data

1. Improved awareness of APG trends and developments for all stakeholders

2. Increased confidence of policy makers, regulators, utilities, and investors to understand the power trade opportunities and issues

3. Better planning, identification of investment needs, and improved coordination by grid operators and Control Centers.



4. Steppingstone towards development of regional frameworks for coordinated grid and market operations

5. Essential to other functional requirements of multi-lateral power trading (MPT), such as tracking and tagging of RE power flow and delivery

Regional Recent Effort on Data Sharing for MPT

- Under ASEAN Plan of Action for Energy Cooperation (APAEC) Phase II: 2021-2025 on Action Plan 3.4, as part of a strategy in accelerate the APG and initiate the expansion of multilateral electricity trading, data sharing is one of the topic AMS needs to address.
- The annual milestones designed in APAEC for data sharing is shown below:

Action Plan	Annual Priorities				
	2021	2022	2023	2024	2025
Action Plan 3.4 Develop data sharing guidelines and best practices	Conduct consultative meeting and/or workshop on data sharing guidelines and standards	Develop the draft guidelines and standards for data sharing	Obtain agreement on the proposed data sharing guideline and standards		Develop data sharing guidelines and standards

Conducted & Planned Activities

AERN develop a Discussion Paper on Data Sharing (draft) → **1st WS on Data Sharing** (Nov 2022) → **2nd WS on Data Sharing** (Nov '23) → **3rd WS on Data Sharing**, ACE to proposed mechanism for Data Sharing → Guidelines & Protocols for Data sharing for AMS to adopt

Outcomes

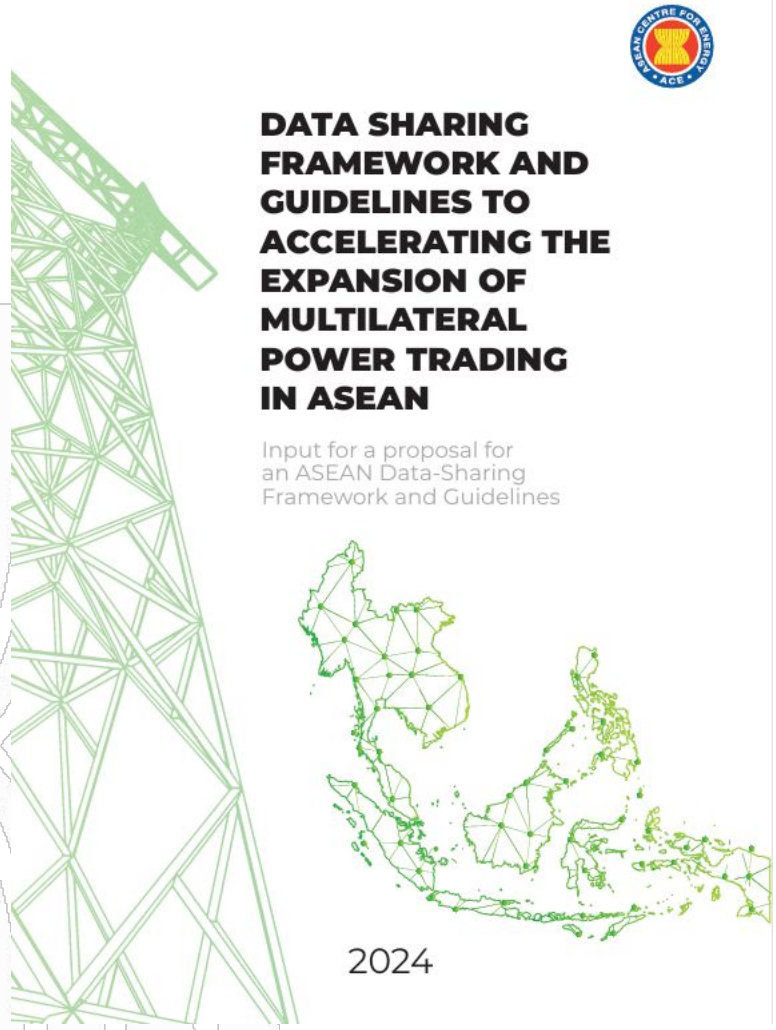
- AERN Discussion paper on Data Sharing
- Policy Brief on Data sharing (2024)
- Platform for AERN & HAPUA to discuss Data Sharing Guideline Draft
- Proposal of Data Sharing Framework & Guidelines
- Approved Framework and Guidelines for Data Sharing
- **Next: Pilot project on Data Sharing Practice**

Proposed Stepwise Framework and Guidelines for Data Sharing

What to share	Step 1	Step 2	Step 3	Tasks
Temporal	Historical	Planning (Medium-term)	Planning (Short-term)	- Identify the challenges and gaps for implemention the data sharing for each step - Identify requirements and enablers for moving to the next stage of data sharing - Identify key actions for each step in the step-wise roadmap
Granularity	Low: Year or Month Grid-level	Med: Monthly Substation-level	High: Weekly or Daily Substation or Circuit-level	
Business type	IC-flow/cost, Production, Load	ATC, Short-term outage	Capacity/grid Planning, RE forecast/adequacy	
Classification	General / Public	Public / Confidential	Public / Confidential	- Determine classification - Determine data access rules
Why share Purpose and benefit	- Record the traded power in AMS - Establish data sharing standards - Transparency and trust - Insight to market players	- Smoother operation of MPT - Development of new power market - Automated data sharing standards	- Regional planning - Increased MPT - Increased RE usage	- Describe purpose and benefit - Identify data receivers - Identify potential external stakeholders
How to share Methods and mechanism	- Submitted annually or monthly - Standardized format - Upload to AEDS	- Submitted monthly - Automated validation - Transfer protocols - Improved platform	- Submitted weekly or monthly - More complex visualization - Regional Database system	- Define the technical methods needed - Identify and build governance - Identify platform for data handling - Describe regulation needed
Who Stakeholdes	- ACE - HAPUA (Utilities) - AERN (Regulators)	- Multilaterial power trading participants - Market platform operator - Transmision system operators	- Designated regional bodies	- Determine stakeholders - Identify data owners and approvers - Identy approval needed (national and regional level)
	Pathfinder Data Sharing Project 1st Data Sharing Project	**Extended Project** 1st Data Sharing Project - Extended	**Pathfinder Data Sharing Project** 2nd Data Sharing Project	

Source: Data Sharing Framework and Guidelines to accelerating the expansion of MPT in ASEAN (ACE, 2024)

Framework and Guidelines for Data Sharing



Key recommendations:

- Step-by-Step Approach: 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.
- 1st Pathfinder Data-Sharing Project: share annual, historical data at the grid level first and later increase the level of detail to monthly data and substation level.
- 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.
- Regulatory and Governance Considerations: the need for high-level regulation to support both the Roadmap and the Pathfinder project to ensure long-term success and the engagement of the AMS

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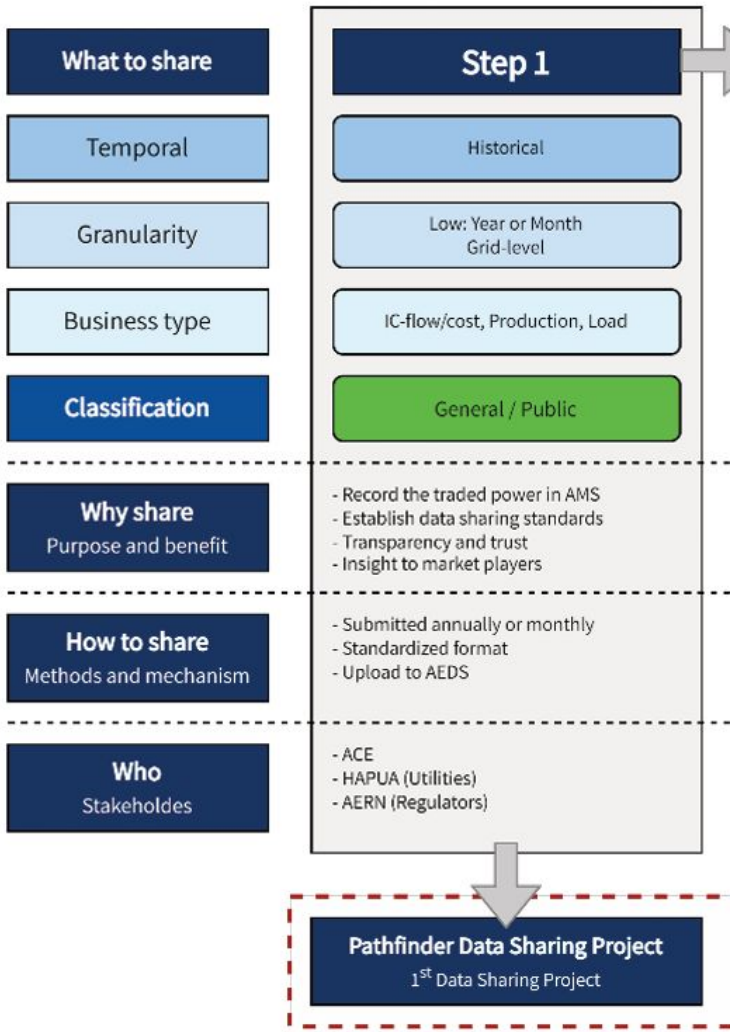
Step 1 - the 1st Pathfinder Data Sharing Project for Power Trading

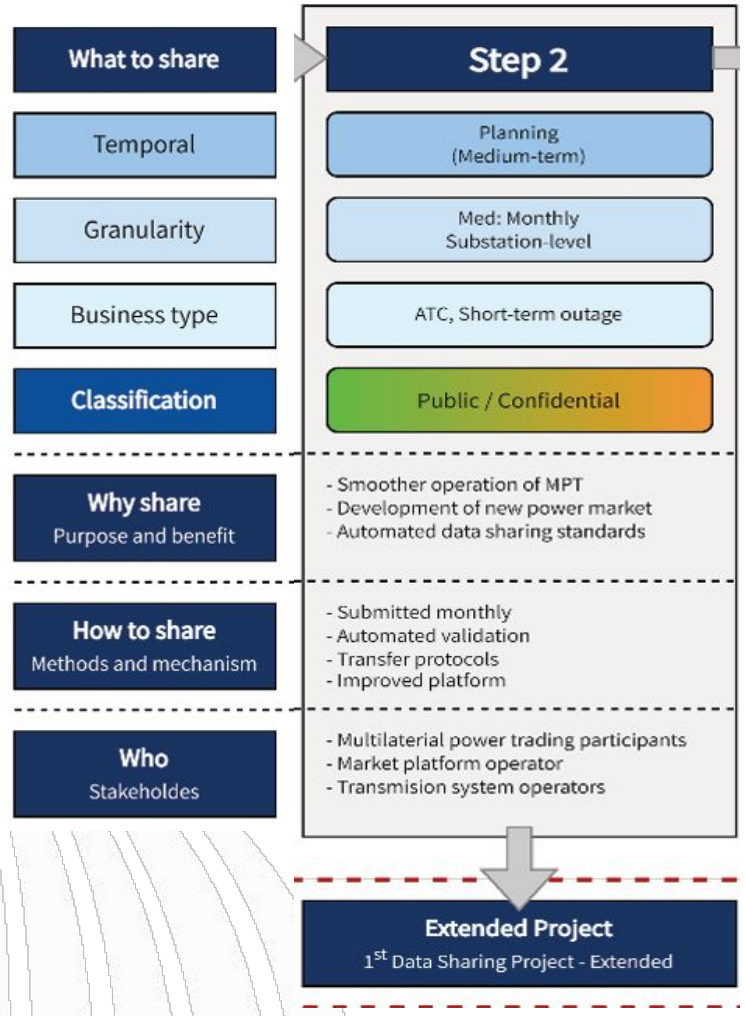


- **Backgrounds:**
  Data availability and accuracy depending on annual report issuance (sometimes delay) and it is scattered in multiple statistical categories. Meanwhile, the existing regional data sharing platform such as ASEAN Energy Database System (AEDS) is not being utilized.

- **Propose Method** under 1st Pathfinder Data Sharing Project:
  Improve grid-to-grid historical power exchange data through **standardizing the data reporting format and configuring the data sharing platform.**

- **Objective:**
  to improve awareness of APG trends and development for all stakeholders which leads to an increase of confidence of policy makers, regulators, utilities, and investors to understand the power trade opportunities and challenges in ASEAN

Step 2 – Data Sharing in MPT Arrangement



- **Why to share:**
  To ensure the smoothness operation of MPT and to initiate the development of new power market
- **Propose Method** under the extension of 1st Pathfinder Data Sharing Project.
- **Two different set of focus:**
  1. Data sharing for existing MPT
  2. Data sharing for development of new MPT

Example of Data Sharing in MPT Arrangement

The data sharing platform allows the power system operators from LTMS countries to **exchange real-time or near real-time operational data**, confirming their daily selling/wheeling/purchasing declarations.

PIP Existing Data Sharing Platform by EGAT of Thailand

Tasks required:

- To define the types, granularity of the data, transfer protocol (submitted near real-time and/or ahead of time) based on the minimum requirement of the MPT
- To define the platform to be utilized for new MPT

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