



Workshop Proceedings Report

Driving Clean Energy Innovation: Strategic Policy Pathways and Market Integration in Thailand and Beyond

21-22 July 2026

Hosted by the Institute for
Environment and Sustainability (IES)
at the Lee Kuan Yew School of Public
Policy (LKYSPP), National University
of Singapore (NUS) and Energy
Research Institute (ERI),
Chulalongkorn University.

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INTRODUCTION

The imperative to accelerate the clean energy transition across Southeast Asia has reached a critical juncture. As a pivotal economic hub in the region, Thailand has established ambitious climate targets, aiming for Carbon Neutrality and Net-Zero Greenhouse Gas Emissions by 2050. Achieving these milestones requires a profound transformation of the regional energy landscape – demanding rapid scale-up of renewable energy deployment, modernization of grid infrastructure, and the widespread adoption of clean technology innovations, including Solar photovoltaic (PV) and electric vehicles (EVs).

However, the transition is faced with complex challenges. Navigating the shift away from fossil-fuel dependencies requires balancing energy security, economic competitiveness, and regulatory adaptation. Current market structures, grid gridlocks, and established policy mechanisms across the region often create unintended bottlenecks that slow down the scaling of transformative low-carbon alternatives. Recent regional dialogues underscore that addressing these barriers requires more than just technological solutions; it demands proactive policy innovation, cross-sectoral alignment, and a deep understanding of institutional drivers.

Building on these insights, this collaborative regional capacity-building workshop brings together senior government officials, leading academic experts, industry pioneers, and international organizations. By using a comprehensive and broad-based policy analysis lens, the workshop aims to co-generate systemic solutions, identify market-ready pathways, and overcome institutional barriers to accelerate the clean energy and infrastructure trajectories in Thailand and the broader Southeast Asian region.

Workshop Objectives

Enhance Policy Analytics & Capacity: Build more advanced capacity among regional policymakers, regulators, utilities, and practitioners to analyse complex energy systems, diagnose institutional bottlenecks, and design robust, adaptive decarbonization policies and energy market policies.

Identify Broad Energy Transition Pathways: Co-generate practical, systemic pathways that address long-term decarbonization, including renewable energy (RE) integration, grid modernization, clean technology scaling, and financial mechanisms for renewable energy infrastructure and emerging business models.

Foster Cross-Sectoral and Regional Coalitions: Strengthen collaborative networks by bridging the gap between reform-minded public officials, private sector innovators, utilities, and academic knowledge partners through structured policy learning.

Produce Actionable Policy Deliverables: Synthesize the workshop's key insights, leverage points, and strategic recommendations into high-level briefing notes and policy briefs, providing a roadmap for subsequent regional collaborations over the next several years.

KEYNOTE SPEAKERS



Professor Dr Rungsun Rerknimitr

Vice President for Research Affairs at Chulalongkorn University. A distinguished gastroenterologist and medical innovator, he has advanced AI-assisted endoscopy and translational research. In his university leadership role, he promotes interdisciplinary research, innovation partnerships and the application of academic knowledge to societal and economic challenges.

Ms Charuwan Phipatana-Phuttapanta

Senior Professional Scientist and Head of the Monitoring and Evaluation Group in Department of Alternative Energy Development and Efficiency (DEDE)'s Solar Energy Development Division. Her work focuses on solar deployment, policy monitoring and renewable-energy planning, including standards, investment, storage integration and Thailand's transition towards a cleaner and more resilient power system.



Professor Viboon Sricharoenchaikul

Director of the Energy Research Institute at Chulalongkorn University. Trained in chemical engineering, his research covers renewable energy, waste-to-energy conversion, gasification and catalytic fuel processing. He leads ERI's work in connecting technical research with Thailand's energy-policy, industrial-development and sustainability priorities.

Assistant Professor Tan-Soo Jie-Sheng

Director of the Institute for Environment and Sustainability at the Lee Kuan Yew School of Public Policy, National University of Singapore. An environmental economist, he studies climate-policy design, energy transitions, carbon markets, water governance and evidence-based approaches to sustainable development.



SUMMARY OF SESSION DISCUSSION

Day 1 Morning Session – Solar PV Innovation and Market Integration

The Day 1 morning presentations examined how Thailand can move from project-based solar deployment towards a reliable, distributed and flexible solar ecosystem. The keynote situated solar PV within national energy planning, market reform and grid readiness. Subsequent presentations addressed rooftop buyback, green tariffs, direct power purchase agreements (PPAs) and regulatory sandboxes; anticipatory distribution-grid investment and clearer connection processes; data sharing, forecasting and digital platforms for system operation; and PV end-of-life governance. The central message was that capacity targets alone are insufficient. Durable expansion requires coordinated regulation, modernised grids, interoperable data, equipment standards, consumer protection, and early arrangements for module reuse, recycling and responsibility.



INTRODUCTION OF SPEAKERS

Dr. Chanchai Amornvipas Director of Regulatory Development, Office of the Energy Regulatory Commission (ERC)

Dr. Arne van Stiphout Project Manager, SEA Power System Transformation, Agora Energiewende

Dr. Naebboon Hoonchareon Associate Professor Smart Grid Research Unit/Department of Electrical Engineering, Faculty of Engineering, Chulalongkorn University

Dr. Amornrat Limmanee Solar PV Research Team Leader, National Energy Technology Center (ENTEC), NSTDA

Day 1 Morning Session – Panel Discussion

The panel discussion examined the structural bottlenecks affecting the development of a reliable and durable solar ecosystem in Thailand. Participants agreed that no single constraint could explain the challenge; instead, the transition requires coordinated progress across regulation, grid investment, data governance, finance, public participation and PV lifecycle management.

Accelerating deployment without complementary rules could create new problems, including grid congestion, unfair cost allocation, limited operational visibility and unmanaged waste. Policy certainty was therefore identified as essential, with participants supporting announced review cycles, transparent adjustment triggers and broader performance monitoring. Data sharing also emerged as an urgent institutional priority, requiring common definitions, access arrangements and shared governance among regulators, utilities, asset owners, researchers and technology providers.

Finally, the panel stressed that public participation should extend beyond promoting solar adoption to meaningful engagement on affordability, environmental impacts, privacy, service quality and the distribution of costs and benefits.



INTRODUCTION OF DISCUSSANT

Dr. Phimsupha Kokchang

Researcher at the Energy Research Institute (ERI), Chulalongkorn University

Day 1 Afternoon Session – Experience of Other Countries

The Day 1 afternoon presentations compared solar-transition experience across China, Vietnam and Singapore. Yunfei Xing traced China's renewable-energy policy evolution and highlighted the supporting role of philanthropy and knowledge organisations in policy learning and just-transition initiatives. Dr Wei Ye examined how the Chinese state successively acted as market creator, coordinator and innovation facilitator, while also confronting subsidy dependence, overcapacity and grid constraints. Dr Le Viet Phu showed how Vietnam's rapid feed-in-tariff boom outpaced transmission and institutional capacity, leading to congestion, curtailment and contract uncertainty. Dr Sita Rahmani presented Singapore's land-constrained approach, including aggregated procurement, floating solar, market-linked rebates, battery storage and demand-side flexibility. Together, the presentations stressed institutional coordination, adaptive policy design and context-sensitive learning.



INTRODUCTION OF SPEAKERS

Dr. Yunfei Xing Officer, International Cooperation at the Energy Foundation

Dr. Kristy Wei Ye Proactive Researcher, Chiang Mai University

Dr. Le Viet Phu Senior Lecturer, Fulbright University Vietnam

Dr. Sita Rahmani Research Fellow, Energy Studies Institute (ESI), National University of Singapore

Day 1 Afternoon Session – Panel Discussion

The afternoon panel discussion considered which international solar-policy lessons Thailand should adopt and which risks it should avoid. Participants identified long-term policy stability as a major strength of China's experience, while cautioning that abrupt subsidy reductions, quota changes and unclear transition arrangements can disrupt investment and market confidence. Stable direction should therefore be combined with predictable phase-out schedules, advance notice and transparent review mechanisms. The panel also prioritised demand-side flexibility, beginning with manageable industrial and commercial loads before expanding towards batteries, smart EV charging, virtual power plants and residential participation. Just-transition concerns were central, particularly the distribution of costs and benefits associated with subsidies, grid investment, backup capacity and market reform. Participants stressed that top-down coordination should be complemented by local knowledge and meaningful participation from communities, universities, industry associations and civil society. Regional electricity trade offers opportunities but requires credible rules for network charges, contracts, environmental safeguards and renewable-energy certification. For Thailand, the preferred pathway combines policy credibility, stronger grids, flexibility, effective monitoring and domestic operational capability.



INTRODUCTION OF DISCUSSANT

Chakorn Loetnithat

Senior Researcher, Thailand Development Research Institute (TDRI)

1. Setting the Stage: Thailand's Solar PV Transition

Thailand's solar transition is moving beyond a policy model centred primarily on utility-scale procurement and installed-capacity targets. Solar PV is increasingly embedded within a more diverse electricity ecosystem that includes household and commercial rooftops, self-consumption, electricity exports, solar-plus-storage, Utility Green Tariffs, peer-to-peer trading, energy communities and direct power-purchase agreements. These developments create new roles for consumers, private providers, aggregators and technology companies within a power sector historically organised around an enhanced single-buyer structure. The central policy challenge is therefore no longer simply how many additional megawatts Thailand should install. It is how distributed resources should connect to the grid, how electricity and environmental attributes should be valued, how network costs should be recovered, and how reliability and consumer confidence can be maintained. The discussion also highlighted the importance of equipment standards, streamlined approval processes and clear participation rules. Rapid deployment without adequate quality control may create safety and performance problems, while fragmented procedures can discourage investment and reduce system visibility. Thailand consequently needs to treat solar PV as part of a broader transition linking national energy planning, market reform, grid readiness, equipment quality and meaningful consumer participation.

2. Policy Pathways and System Integration: Markets, Grids, Data and Flexibility

Day 1 examined an emerging package of policy instruments intended to expand solar participation and create new electricity-market arrangements. These included household rooftop buyback and tax incentives, regulatory sandboxes, Utility Green Tariffs, a Direct PPA pilot, peer-to-peer trading and prospective rules for battery storage and flexibility services. However, participants stressed that these mechanisms cannot operate effectively as isolated programmes. Direct PPAs require transparent network charges, balancing responsibilities and backup arrangements; peer-to-peer trading needs common metering, settlement and consumer-protection rules; and storage requires clear licensing, grid-code treatment and access to multiple revenue streams. Distribution-grid modernisation was therefore presented as a strategic prerequisite. Planning should become anticipatory and scenario based, connection procedures should be digital and proportionate, and storage, demand response and managed charging should complement conventional network reinforcement. Data governance was treated as equally fundamental. Asset registration, advanced metering, forecasting, shared identifiers, application programming interfaces (APIs), cybersecurity and authorised access are required to give utilities and regulators sufficient operational visibility. The overall objective is to develop a coherent system in which distributed solar, storage, flexible demand and electricity markets reinforce one another rather than creating congestion, administrative delays or inefficient investment.

3. Comparative Experience and Context-Sensitive Regional Learning

The international presentations used the experiences of China, Vietnam and Singapore to identify both transferable policy functions and risks that Thailand should avoid. China demonstrated how the state can successively act as market creator, infrastructure coordinator and innovation facilitator. Long-term targets, financing and subsidies helped establish manufacturing and deployment, while later reforms addressed overcapacity, subsidy dependence, curtailment and the transition towards market participation, storage and flexibility. Vietnam provided a cautionary example of rapid feed-in-tariff deployment outpacing transmission and institutional capacity. Although solar capacity expanded quickly, congestion, curtailment, contract uncertainty, speculative project development and weak domestic operational capability undermined the durability of the transition. Singapore illustrated a more measured pathway shaped by land constraints and strong institutional coordination. Public-sector aggregation, floating solar, market-linked rebates, battery storage and demand-side flexibility helped expand solar while supporting system reliability. The discussion emphasised that Thailand should not replicate any national model in full. Instead, it should adapt specific mechanisms – such as stable policy direction, anticipatory grid investment, aggregated procurement, flexible demand and stronger monitoring – to its own market structure, political economy, utility arrangements and implementation capacity.

4. From Policy Reflection to Co-creation: Circularity, Participation and Emerging Leverage Points

The panel discussions translated the presentations into a set of practical policy leverage points for a more reliable, inclusive and durable solar transition. Participants supported the preparation of a shared solar-ecosystem roadmap linking deployment targets to anticipatory transmission and distribution investment. Regulatory sandboxes should have transparent evaluation criteria and a clear route into formal rules, while storage, third-party access and network-use charges require greater regulatory clarity. A national distributed-energy data framework should establish common definitions, registration requirements, access arrangements and priority operational uses. Circularity must also be incorporated before large waste volumes emerge. Lifecycle governance should include module traceability, performance testing, second-life certification, collection systems, recycling capacity and clearly allocated producer or owner responsibility. Public participation and distributional fairness were treated as integral rather than secondary concerns. Communities and consumers need accessible information about affordability, reliability, environmental impacts, privacy and the allocation of costs and benefits. Policy support should not disproportionately benefit property owners and large firms while distributing network or fiscal costs across all consumers. Finally, policy credibility requires announced review cycles, transparent adjustment triggers and monitoring that extends beyond installed capacity to connection times, curtailment, consumer outcomes, system costs and waste flows.

Day 1: Priority messages

- **Shift from capacity expansion to integrated solar-ecosystem governance.**

Thailand's next phase of solar policy should move beyond procurement targets and installed megawatts. Rooftop solar, self-consumption, storage, green tariffs, peer-to-peer trading and Direct PPAs introduce new actors and transactions that require coherent rules for connection, settlement, network use, consumer protection and system reliability.

- **Modernise grids, data systems and flexibility before congestion becomes binding.**

Distribution networks should be planned anticipatorily rather than reinforced only after connection queues and voltage problems emerge. Digital connection processes, asset registries, advanced metering, forecasting, interoperable data, cybersecurity and transmission-distribution coordination are essential. Storage, demand response, smart charging and aggregation should be treated as system resources with clear participation and payment arrangements.

- **Combine policy certainty with transparent and adaptive adjustment.**

Investors and consumers need stable long-term direction, but stability does not mean permanent subsidies or fixed rules. Thailand should announce review cycles, adjustment triggers and phase-out pathways in advance. Monitoring should extend beyond capacity to connection times, congestion, curtailment, consumer outcomes, system costs and unintended effects such as speculative registration or weak domestic capability.

- **Embed circularity, participation and fairness from the outset.**

PV lifecycle governance should establish traceability, testing, second-life certification, collection and recycling responsibilities before waste volumes become unmanageable. Public participation should address affordability, land and environmental impacts, privacy and service quality. Distributional assessment is also necessary so that rooftop incentives do not concentrate benefits among wealthier property owners while network and fiscal costs are shared more widely.

Day 2 Morning Session – EV Ecosystem and Infrastructure

The morning session examined Thailand's EV transition from industrial, economic, market and technological perspectives. The presentations showed that Thailand has successfully stimulated EV adoption and attracted new manufacturers, but the next stage must move beyond vehicle sales and final assembly. Key priorities include strengthening domestic suppliers, addressing excess capacity and intense price competition, developing high-value engineering and software capabilities, improving testing and certification infrastructure, and preparing the workforce for shorter and more technology-intensive production cycles. The session also highlighted the importance of charging infrastructure, after-sales services, battery diagnostics, reuse and recycling, and credible local-content requirements.



INTRODUCTION OF SPEAKERS

Dr. Kriengsak Wongpromrat President of the Thailand Automotive Institute (TAI).

Dr. Archanun Kohpaiboon Centre of International Competitiveness and Development Studies (ICDC), Faculty of Economics, Thammasat University

Dr. Nuwong Chollacoop Committee & Secretary General of Thailand Charging Consortium, Electric Vehicle Association of Thailand (EVAT)

Dr. Nuksit Noomwongs Secretary General, Society of Automotive Engineers Thailand (TSAE) Smart Mobility Research Centre, Faculty of Engineering, Chulalongkorn University

Day 2 Morning Session – Panel Discussion

The panel discussion examined how Thailand can move from rapid EV adoption towards a durable and competitive domestic mobility ecosystem. Participants agreed that future policy should extend beyond vehicle sales and final assembly to strengthen local suppliers, engineering, software, testing, standards, workforce skills and after-sales services. Battery diagnostics, reuse, recycling and lifecycle management were identified as urgent priorities, alongside reliable charging infrastructure and consumer protection.

The panel also distinguished nominal local-content targets from genuine domestic value creation. Investment incentives should progressively encourage technology transfer, supplier qualification, local sourcing and participation in higher-value functions. Shared platforms, common components and accessible testing facilities could help Thai suppliers overcome fragmented production volumes and enter new manufacturers' supply chains.

Participants expected further market consolidation as weaker EV firms exit or restructure. Policy should therefore protect consumers, workers and suppliers without preserving uncompetitive companies. Overall, Thailand's long-term success will depend not only on attracting EV investment, but also on building the domestic capabilities needed to absorb technology, innovate and compete internationally.



INTRODUCTION OF DISCUSSANT

Dr. Jakapong Pongthanaisawan

Researcher at the Energy Research Institute (ERI), Chulalongkorn University

Day 2 Afternoon Session – Experience of Other Countries

The afternoon session, “Lessons from China and Association of Southeast Asian Nations (ASEAN)-wide EV Transitions,” expanded the discussion from Thailand’s domestic automotive transformation to comparative regional and international experience. It examined how governments, firms, consumers and infrastructure providers jointly shape EV market development and industrial change. The presentations covered China’s evolving use of purchase incentives, market competition and charging infrastructure; the implications of Chinese automotive investment for localisation, employment and technology transfer in ASEAN; Singapore’s integrated approach to vehicle regulation, charging governance and workforce preparation; and the contrasting EV coordination models adopted by Thailand, Indonesia and Vietnam. Together, these perspectives highlighted that successful electrification depends not on a single policy instrument, but on the careful sequencing of incentives, infrastructure, industrial upgrading and institutional coordination according to each country’s market structure and development priorities.



INTRODUCTION OF SPEAKERS

Dr. Yunyi Hu Associate Professor at the Industrial Economics Research Centre, Institute of Western China Economic Research, Southwestern University of Finance and Economics (SWUFE).

Dr. Martin Schröder Associate Professor at the College of Policy Science, Ritsumeikan University, Japan.

Dr. Alvin Ee Wei Liang Research Fellow and Programme Lead at the Energy Studies Institute (ESI), National University of Singapore (NUS).

Dr. Chunhua Ye Research Fellow at the Institute for Environment and Sustainability (IES), Lee Kuan Yew School of Public Policy, National University of Singapore (NUS).

Day 2 Afternoon Session – Panel Discussion

The afternoon panel discussion considered how lessons from China, Singapore and wider ASEAN experience could inform Thailand's next phase of EV development. Participants stressed that attracting foreign investment should not come at the expense of labour standards, workforce protection or meaningful domestic value creation. Investment incentives should therefore be linked to supplier participation, skills development, technology transfer and responsible employment practices.

The panel also highlighted the importance of predictable subsidy phase-out. Gradual and credible reductions can support market confidence, while smoother performance-based criteria can avoid firms designing products merely to meet policy thresholds. Singapore's experience showed the value of integrating EV incentives with public transport planning, charging regulation, building readiness, operator licensing and workforce training, although participants cautioned that these measures must be adapted to Thailand's different market and institutional context.

Overall, the discussion concluded that Thailand should combine industrial competitiveness with social protection, infrastructure governance and adaptive policy design, rather than treating vehicle adoption, manufacturing, charging and workforce transition as separate policy areas.



INTRODUCTION OF DISCUSSANT

Dr. Chunhua Ye

Research Fellow at the Institute for Environment and Sustainability (IES), Lee Kuan Yew School of Public Policy, National University of Singapore (NUS).

1. Grounding Thailand's EV Transition in Its Transport, Industrial and Institutional Context

Thailand's EV transition is shaped by its long-established position as a major automotive production and export hub. Decades of internal-combustion-engine manufacturing have created extensive supplier networks, skilled labour, testing facilities and close relationships between government agencies, domestic firms and international manufacturers. These assets give Thailand a strong foundation for electrification, but they also create path dependence because many suppliers, workers and institutions remain tied to conventional vehicle technologies. Policies such as the 30@30 target and the EV 3.0 and EV 3.5 packages have accelerated battery-electric-vehicle (BEV) adoption and attracted new investment through purchase subsidies, tax incentives, temporary import privileges and subsequent production obligations. However, rapid expansion has also produced excess capacity, inventory pressures, intense price competition and shorter model cycles. Institutionally, Thailand relies on committee-based and consensus-oriented coordination, particularly through the National Electric Vehicle Policy Committee. This approach supports predictability, stakeholder participation and investor confidence, but may slow adaptation when disruptive technologies threaten incumbent firms. The central challenge is therefore to preserve the strengths of Thailand's industrial base and collaborative governance model while accelerating the transition towards cleaner powertrains, software-defined vehicles and new domestic capabilities.

2. Market Formation, Charging Infrastructure and User Confidence

Thailand's EV market has expanded rapidly through a combination of consumer incentives, vehicle imports, local-production requirements and supporting infrastructure policies. The next phase must ensure that adoption is sustained by a reliable and commercially viable ecosystem rather than by subsidies alone. Charging infrastructure is central because it connects transport demand, electricity-system operations and consumer confidence. Participants emphasised that the number of chargers is only one indicator of readiness. Drivers also require dependable uptime, transparent prices, accurate availability information, interoperable connectors and payment systems, and sufficient geographical coverage. Operators need adequate utilisation, predictable electricity tariffs and viable business models, while utilities require smart metering, remote communication and load-management arrangements that protect grid reliability. Charging data can support investment planning and managed charging, but clear rules are needed for privacy, commercial confidentiality and authorised access. International experience showed that purchase subsidies and infrastructure support serve different user groups and should evolve with market maturity and remaining network gaps. Singapore also illustrated the value of operator licensing, building-readiness requirements, charger maintenance standards and data-driven deployment. For Thailand, the policy objective should be to treat charging, electricity networks, user behaviour and market development as one integrated system.

3. Supply-Chain Transformation and Industrial Upgrading: Regional Competition and Comparative Learning

Attracting vehicle assembly does not automatically generate meaningful domestic value. Thailand's long-term competitiveness will depend on whether local firms can participate in higher-value activities such as electric motors, power electronics, batteries, battery-management systems, software, systems integration, testing, certification, repair and recycling. Many Thai Tier 1–3 suppliers currently face difficulties entering the supply chains of new Chinese manufacturers because of gaps in technology, quality systems, software capability, skilled personnel and business practices. Localisation policy should therefore assess the depth and quality of domestic activity rather than relying only on assembly volumes or formal local-content percentages. Incentives should be progressive, firm-specific and auditable, while shared laboratories, testing facilities and supplier-development programmes can reduce entry barriers for domestic firms. Regional experience also shows that countries follow different EV strategies. Thailand relies on its mature automotive base, Indonesia uses nickel and battery resources to attract upstream investment, and Vietnam has pursued a national-champion model centred on VinFast. China offers lessons in market creation, competition and industrial scale, while Singapore demonstrates infrastructure and regulatory coordination without a large manufacturing sector. Thailand should adapt useful mechanisms from these cases without attempting to copy entire national models.

4. From Adoption Support to a Durable Transition: Policy Design, Workforce and Lifecycle Governance

Thailand now needs to shift from policies focused primarily on market adoption towards a broader capability-building and lifecycle-governance framework. Purchase incentives should be reduced through predictable and credible schedules so that firms and consumers can adjust without sudden disruption. Performance-based incentives should avoid sharp thresholds that encourage manufacturers to meet only the minimum technical requirement, while a broader any EV (xEV) strategy may support shared component volumes if it remains aligned with long-term emissions objectives. Workforce development is equally important. EVs require interdisciplinary capabilities in electrical engineering, software, data, battery systems, functional safety, cybersecurity, testing, certification and high-voltage servicing. Training should therefore be competency based, modular, industry embedded and supported by shared learning and testing infrastructure. Lifecycle governance must also be established before large numbers of vehicles and batteries reach end of life. Battery passports, diagnostics, repair, reuse, second-life applications, recycling and traceability can reduce environmental risk while creating new service and industrial opportunities. Policy should also protect consumers, workers and suppliers during market consolidation or firm exit. Focused cross-agency teams, clear milestones, evidence-based review and accessible public

infrastructure can help Thailand combine the stability of consensus-based governance with greater policy agility.

Day 2: Priority messages

- **Move from EV adoption to domestic capability building.**

Thailand's next policy phase should go beyond vehicle sales and assembly. Long-term competitiveness will depend on domestic engineering, software, testing, certification, repair and higher-value component production. Local-content measures should assess genuine value creation, technology transfer and supplier participation rather than factory capacity or assembly volumes alone.

- **Treat charging as an integrated infrastructure and user-confidence system.**

Charging policy should address reliability, interoperability, transparent pricing, payment access, geographic coverage and commercially viable utilisation, alongside grid management and data governance. Charger numbers alone are insufficient. Operators, utilities, regulators and property owners need coordinated rules that support dependable service, building readiness, managed charging and responsive infrastructure expansion.

- **Invest in workforce, testing and lifecycle capabilities.**

Thailand needs interdisciplinary skills spanning batteries, power electronics, software, systems integration, functional safety, cybersecurity and high-voltage servicing. Shared laboratories, testing facilities and competency-based training can support both workers and local suppliers. Battery diagnostics, reuse, second-life applications, recycling and traceability should be developed before end-of-life volumes become a major challenge.

- **Use adaptive, coordinated and socially responsible policy design.**

Subsidies should be phased out predictably, while performance criteria should avoid threshold gaming. Focused cross-agency teams can complement Thailand's consensus-based governance with clearer authority, milestones and evidence-based review. Policy must also protect consumers, workers and suppliers during market consolidation, firm exit and technological restructuring.

CROSS-CUTTING INSIGHTS

1. Clean-energy transitions require ecosystem transformation, not isolated technology deployment.

Solar PV and electric vehicles should not be treated simply as additional generation capacity or new consumer products. Their expansion changes electricity markets, distribution networks, industrial supply chains, business models, user behaviour and public responsibilities. Rooftop solar introduces prosumers, aggregators and new contractual arrangements, while EV adoption links transport policy to charging infrastructure, grid operation, automotive restructuring and battery management. Policy success therefore depends on whether regulation, infrastructure, standards, finance, skills and institutional coordination develop together. Rapid technology adoption without a functioning ecosystem may produce congestion, weak consumer confidence, stranded assets or limited long-term economic value.

2. Infrastructure, data and operational capability must be developed anticipatorily.

Both transitions require supporting systems before demand becomes large enough to expose their weaknesses. Distribution grids need scenario-based investment, digital connection procedures, active network management and stronger transmission–distribution coordination before distributed solar and charging loads create queues or reliability problems. Data should similarly be treated as infrastructure rather than an administrative by-product. Registries, common identifiers, metering, forecasting, interoperability, cybersecurity and authorised access are necessary for planning and real-time operation. Anticipatory investment may initially appear expensive, but delayed action can generate higher costs through curtailment, emergency reinforcement, underused charging assets and declining user confidence.

3. Policy credibility depends on both stability and adaptive sequencing.

Investors, consumers, utilities and manufacturers require a clear long-term direction, but durable policy does not mean maintaining the same subsidies or rules indefinitely. Support mechanisms should evolve as technology costs, market maturity, infrastructure availability and domestic capabilities change. Review cycles, phase-out schedules and adjustment triggers should be announced in advance to reduce policy shocks and strategic behaviour around deadlines or eligibility thresholds. Pilot programmes and regulatory sandboxes also need a visible pathway towards formal rules. Effective sequencing allows early incentives to create markets while later policies strengthen competition, system integration, localisation and lifecycle responsibility.

4. Deployment indicators should be distinguished from domestic value creation.

Installed solar capacity, EV registrations and factory announcements provide only partial measures of transition success. Durable economic value also depends on engineering, software, operation and maintenance, testing, certification, repair, supplier qualification and innovation. Local assembly or ownership does not automatically create domestic capability if core technology, data and operational knowledge remain controlled elsewhere. Policy evaluation should therefore track the quality and depth of local participation, not merely physical output or nominal local-content percentages. Shared laboratories, testing facilities, workforce pathways and industry-university collaboration can help domestic firms enter higher-value activities and respond to rapidly changing technological requirements.

5. Lifecycle governance and social legitimacy must be designed from the outset.

PV modules and EV batteries create environmental and institutional responsibilities that begin well before they reach end of life. Traceability, diagnostics, reuse standards, second-life certification, collection systems, recycling capacity and clear allocation of producer or owner responsibility should be established before waste volumes become unmanageable. Social legitimacy is equally important. Consumer protection, labour standards, privacy, affordability and fair cost allocation should form part of policy design rather than later corrective measures. Benefits from rooftop solar, EV incentives or infrastructure investment may initially favour households and firms with greater capital, while wider network and fiscal costs may be distributed across society.

6. International learning should focus on functions and institutional fit.

China, Vietnam, Singapore and neighbouring ASEAN economies offer valuable lessons, but their policy instruments reflect different market structures, administrative capacities, industrial legacies and political economies. Thailand should therefore avoid mechanical replication. The relevant question is which functions a policy performs – such as market creation, demand aggregation, supplier upgrading, flexibility procurement or policy coordination – and how those functions can be adapted locally. Comparative learning should also include negative lessons, including overcapacity, curtailment, abrupt subsidy changes, weak contracts and limited local knowledge transfer. Effective adaptation combines regional evidence with Thailand's own institutional strengths, constraints and implementation capacity.

FUTURE DIRECTIONS AND NEXT STEPS

Future direction	Possible follow-up action
Strengthen cross-agency coordination around clearly defined transition missions	Convene focused cross-agency dialogues involving regulators, utilities, industrial-policy bodies, research institutions and industry associations. Establish dedicated workstreams on distributed-energy and grid-data governance, and on EV suppliers, charging, workforce development and lifecycle capability.
Move successful pilots and incentives towards durable, adaptive regulation	Translate successful pilots and temporary incentives into durable, adaptive regulation. Define transparent evaluation criteria, review cycles and adjustment triggers for regulatory sandboxes, Direct PPAs, storage, EV subsidies, charging standards and localisation requirements.
Invest anticipatorily in infrastructure, data and domestic capabilities	Develop anticipatory infrastructure, data systems and domestic technical capabilities. Advance grid planning, digital connection processes, distributed-energy registration, charger-performance monitoring, shared testing facilities and competency-based training pathways.
Embed lifecycle governance, consumer protection and social inclusion	Embed lifecycle responsibility, consumer protection and social inclusion into solar and EV policy design. Establish frameworks for traceability, testing, reuse, recycling, warranties, repair access, labour standards and fair distribution of transition costs and benefits.
Convert workshop learning into policy products, shared evidence and sustained regional engagement	Produce targeted policy outputs and maintain sustained regional policy learning. Finalise the proceedings report and two policy briefs, compile a shared evidence inventory, and convene technical consultations followed by a Thailand-ASEAN dissemination roundtable.

Note: The insights summarized here are not prescriptive recommendations but highlight priority areas identified during the workshop for further assessment and collaboration.

WORKSHOP REPORT CONTRIBUTORS

Report prepared jointly by the ERI and IES workshop teams

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- Phimsupha Kokchang, Researcher, ERI, Chulalongkorn University
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- IES workshop research and reporting team, National University of Singapore

Acknowledgements

The organisers thank all keynote speakers, presenters, moderators, panellists, participants and rapporteurs for their contributions. Special appreciation is extended to the organising and technical teams of ERI, Chulalongkorn University, and IES, National University of Singapore, for convening the workshop and supporting the preparation of this report.

APPENDIX A

WORKSHOP AGENDA

Day 1: 21 July 2026, 08:30–17:00 (GMT+7)

Location: Social Innovation Hub (Building B95), Chulalongkorn University, Visid Prachuabmoh Building, 254 Phaya Thai Rd, Pathum Wan, Bangkok 10330, Thailand

Theme: Solar PV Transition

Time	Programme
08:30 - 09:00 [30']	Registration
09:00 - 09:15 [15']	Welcoming Remarks • Assoc. Prof. Manoj Lohatepanont, Vice President of Chulalongkorn University • Prof. Viboon Sricharoenchaikul, Energy Research Institute, Chulalongkorn University • Prof. Tan-Soo Jie-Sheng, Institute for Environment and Sustainability, Lee Kuan Yew School of Public Policy
09:15 - 09:45 [30']	Keynote Speech • Solar PV policy development in Thailand (Charuwan Phipatana-Phuttapanta, Department of Alternative Energy Development and Efficiency (DEDE))
09:45 - 10:00 [15']	Group Photo and Tea Break
10:00 - 11:30 [90']	Session 1: Building a Reliable and Durable Solar Ecosystem in Thailand • New Business Models and Regulatory Innovation for Thailand's Energy Transition Industry (Energy Regulatory Commission) • Policy Priorities for Distribution Grid Modernisation (Dr. Arne van Stiphout, Project Manager in the Power System Transformation team, Agora Energiewende) • Data and Forecasting Requirements for Renewable Energy Integration in Thailand (Dr. Naebboon Hoonchareon, Associate Professor, Department of Electrical Engineering, Faculty of Engineering, Chulalongkorn University) • Solar PV Waste Management in Thailand: Challenges and Policy Directions (Dr. Amornrat Limmanee, Solar Photovoltaic Research Team Leader, National Energy Technology Centre (ENTEC))
11:30 - 12:10 [40']	Panel Discussion and Policy Reflections

12:10 - 14:00	Networking Lunch
14:00 - 15:30 [90']	Session 2: Leveraging and Learning from Overseas Experience - Development of China's Renewable Energy and Policy Implications from International Philanthropy's Perspective (Yunfei Xing, Officer of International Cooperation, The Energy Foundation) - Solar Power Deployment in China: The Role of State in Energy Transition (Wei Ye, Proactive Researcher, School of Public Policy, Chiang Mai University) - From feed-in tariffs (FiTs) to Frictions: Institutional and Policy Constraints in Vietnam's Clean Energy Transition (Le Viet Phu, Senior Lecturer, Fulbright School of Public Policy and Management, Fulbright University Vietnam) - Singapore's Solar Transition and Policy Takeaways (Sita Rahmani, Research Fellow, Energy Studies Institute (ESI), National University of Singapore)
15:30 – 16:00 [30']	Tea Break
16:00 – 16:40 [40']	Panel Discussion and Policy Reflections

Day 2: 22 July 2026, 08:30–17:00 (GMT+7)

Location: Social Innovation Hub (Building B95), Chulalongkorn University, Visid Prachuabmoh Building, 254 Phaya Thai Rd, Pathum Wan, Bangkok 10330, Thailand

Theme: Sustainable Mobility and Cross-Sector Policy Coordination

Time	Description
Day 2	Sustainable Mobility and Cross-Sector Policy Coordination
08:30 - 09:00 [30']	Registration
09:00 - 09:15 [15']	Welcoming Remarks Prof. Viboon Sricharoenchaikul, Energy Research Institute, Chulalongkorn University Prof. Tan-Soo Jie-Sheng, Institute for Environment and Sustainability, Lee Kuan Yew School of Public Policy
09:15 - 09:30 [15']	Group Photo and Tea Break
09:30 - 11:00 [90']	Session 1: Policy Dialogue: Next generation automotive industry transformation How Automotive Manufacturers are Responding to the EV Transition (Dr. Kriengsak Wongpromrat, Director of Thailand Automotive Institute)

Time	Description
	- Industrial Upgrading and Competitiveness in Thailand's EV Transition (Dr. Archanun Kohpaiboon, Professor, Faculty of Economics, Thammasat University) - The Evolution of Thailand's EV Market: Opportunities and Challenges for Scaling Adoption (Dr. Nuwong Chollacoop, Committee & Secretary General of Thailand Charging Consortium, Electric Vehicle Association of Thailand (EVAT)) - Building an Enabling Ecosystem for Thailand's EV Transition (Dr. Nuksit Noomwongs, Secretary, Society of Automotive Engineers Thailand (TSAE))
11:00 - 12:00 [60']	Panel Discussion and Policy Reflections
12:00 - 13:30	Networking Lunch
13:30 - 15:00 [90']	Session 2: Lessons from China and ASEAN-wide EV Transition - Chinese Carmaker Globalisation: Consequences for the Thai Automotive Industry (Martin Shroder, Associate Professor, Ritsumeikan University) - How China's EV subsidy phase-out influenced consumer demand and supported the continued growth of the battery electric vehicle market (Yunyi Hu, Associate Professor, Southwestern University of Finance and Economics) - Electric Vehicle Adoption in Singapore: Policies, Progress and Challenges (Alvin Ee Wei Liang, Research Fellow, Energy Studies Institute, National University of Singapore) - How different state institutions and policy instruments shape national pathways for electric mobility transitions (Indonesia, Thailand and Vietnam) (Chunhua Ye, Research Fellow, Institute for Environment and Sustainability, Lee Kuan Yew School of Public Policy)
15:00 – 15:30 [30']	Panel Discussion and Policy Reflections

APPENDIX B

LIST OF PARTICIPATING ORGANIZATIONS

Session	Category	Organization
Day 1 – Solar PV Transition	Government / Public Sector	Department of Alternative Energy Development and Efficiency (DEDE), Ministry of Energy Energy Policy and Planning Office (EPPO), Ministry of Energy Energy Regulatory Commission (ERC), Thailand Electricity Generating Authority of Thailand (EGAT) Provincial Electricity Authority (PEA) Thailand Board of Investment (BOI) National Institute of Metrology (Thailand)
	Academia / Research	ERI, Chulalongkorn University; IES, NUS; Thammasat University; CES Solar Cells Testing Center (CSSC) King Mongkut's University of Technology Thonburi (KMUTT); Department of Electrical Engineering, Chulalongkorn University; ENTEC; Chiang Mai University; Fulbright University Vietnam; ESI, NUS; Srinakharinwirot University; Transportation Institute, Chulalongkorn University; Environment, Development and Sustainability (EDS) Programme, Chulalongkorn University; KMUTT
	Private Sector	Nuovo Plus Yokogawa Modern Energy Management/Kairos Renewables B.I. Ag. Development Co., Ltd.
	International / Non-profit	Agora Energiewende Energy Foundation
Day 2 – EV Ecosystem and Infrastructure	Government / Public Sector	Thailand Automotive Institute (TAI) Energy Policy and Planning Office (EPPO), Ministry of Energy Electricity Generating Authority of Thailand (EGAT) Provincial Electricity Authority (PEA)
	Academia / Research	ERI, Chulalongkorn University; other Chulalongkorn University units; IES, NUS; Transportation Institute/CUTI, Chulalongkorn University; Thammasat University; ESI, NUS; Thailand Automotive Institute; ENTEC; Ritsumeikan University; Southwest University; Srinakharinwirot University; KMUTT
	Private Sector	B.I. Ag. Development Co., Ltd.

	International / Non-profit	Agora Energiewende Energy Foundation
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