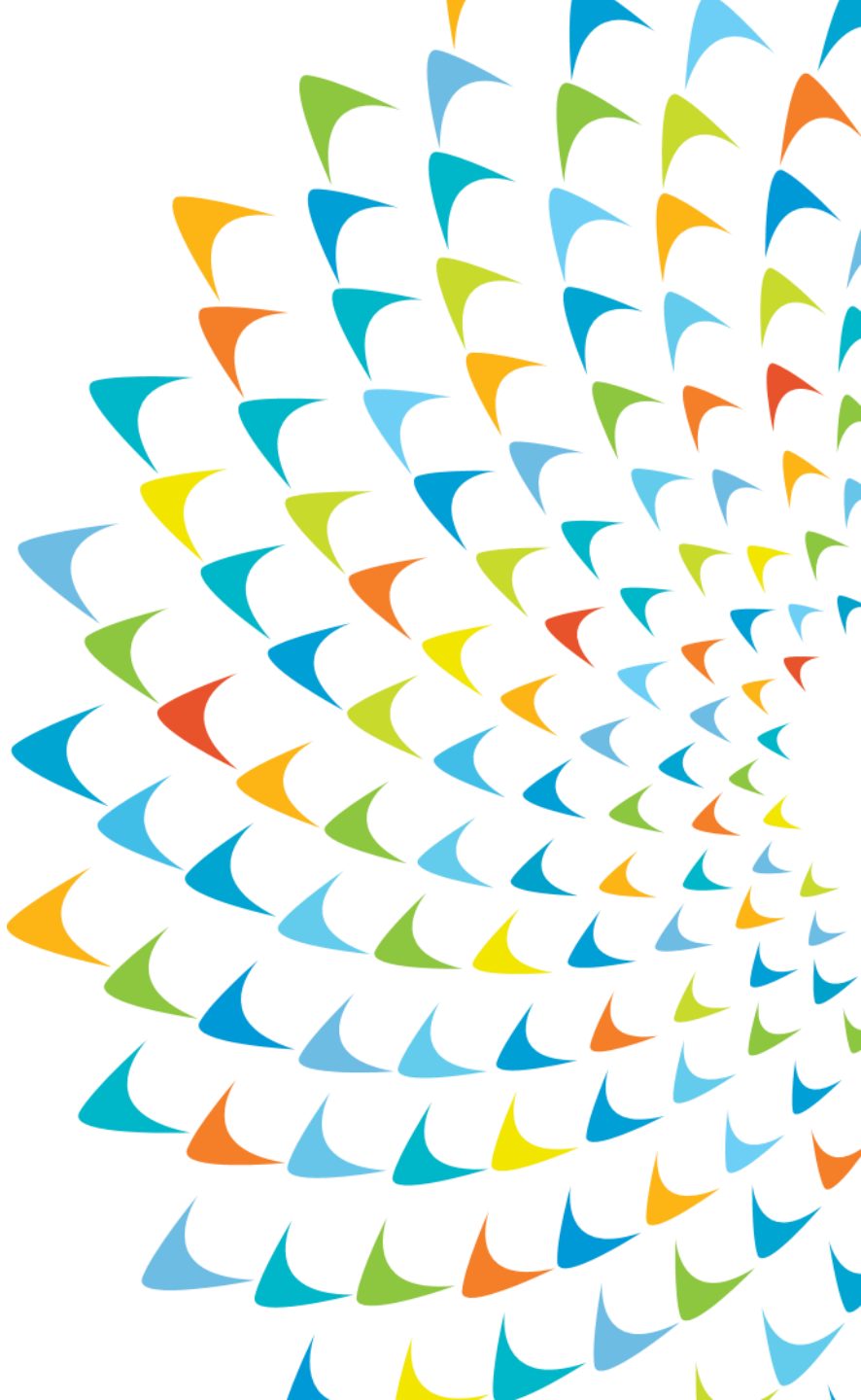
Upstream Support for Critical Minerals Value Chains:
Driving Clean Technologies through PPP Infrastructure

2025 Asia PPP Practitioners' Network (APN) Conference

Seoul, Republic of Korea | 23–25 September 2025



Mobilizing Private Capital and Expertise for Critical Minerals

Public–Private Partnership (PPP) is a modality that mobilizes private expertise and financing to support the entire critical minerals (CM) value chain.

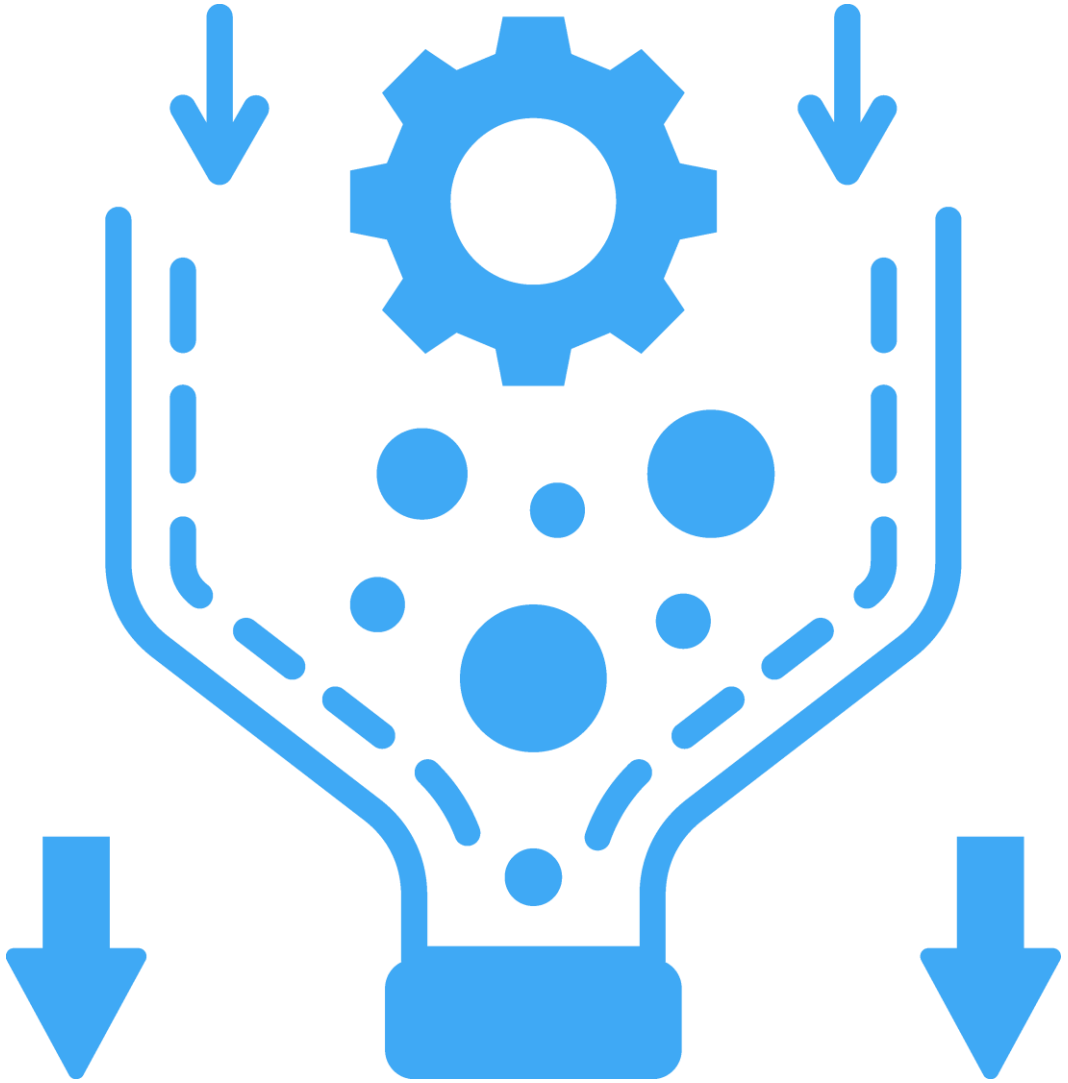
Global clean energy transition driving exponential demand: **lithium ×7,nickel/cobalt × 4–6 by 2030 (IEA, 2021)**

Supply chain concentration: **China controls >70% of lithium processing, >65% of cobalt (2022).**

- **Risk factors:** geopolitics, price volatility, resource nationalism.
- **Resource-rich DMCs:** infrastructure & regulatory gaps → limited investor confidence (ADB/OECD 2022).

Geopolitics, Market Dynamics & Upstream Support

- **Geopolitics:** Indonesia nickel export ban (2020), US Inflation Reduction Act (2022), EU Critical Raw Materials Act (2023), friend-shoring (since 2022).
- **Markets:** Lithium price spike $6,000 → $80,000 → $25,000 (2020–2023).
- **Upstream challenges:** power, water, ports/logistics, and permitting delays (5–10 years).



- **Upstream PPP support:** establish clear regulatory & governance conditions; enable private participation; ensure gender equality, community engagement, and environmental safeguards.
- **PPP implication:** beyond de-risking, PPP enable timely delivery of power, water, logistics, and other critical infrastructure essential to the CM value chain.

PPP Infrastructure for Critical Minerals

Power: RE plants, transmission, hybrid microgrids (700 MW coal + RE hybrid plant in Morowali, Indonesia, operational since 2020).

Water: industrial supply, desalination, reuse systems (Onslow Water PPP in Western Australia, 2018, securing processing hubs).

Housing: accommodation for mining workers (during fly-in fly-out (FIFO) shifts at remote mining site)

Logistics: ports, rail, roads linking mine–processing–export (Pilbara rail and port PPPs, Australia,expanded 2019–2021).

Industrial clusters: processing & manufacturing hubs (Pilbara Minerals lithium hub, Australia, scaled up 2022).

Permitting, Governance & Private Sector Engagement

Permitting reform: one-stop shop, parallel processing → 30–50% faster (Canada's Critical Minerals Infrastructure Fund streamlined permitting process, 2023).

ESG safeguards: indigenous rights, EIAs, international standards.

Private participation: long-term offtake agreements, blended finance (Tesla–Ganfeng Lithium 5-year offtake contract, 2018; ADB blended finance facility in Mongolia, 2021).

SOEs: absorb initial risk, leverage private investment.

HOW TO: Designing PPP Models for Critical Minerals

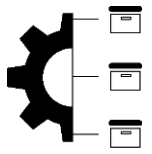
Step 1: Establish legal and regulatory frameworks including PPP law, ESG, and contracts.

Step 2: Scope infrastructure needs in power, water, logistics, and clusters.

Step 3: Structure financing through guarantees, FX hedging, blended finance, and offtake.

Step 4: Achieve financial close and monitor performance via KPIs and ESG reports.

Policy Highlight: Australia (Exporter Case Study)



Strategy: Australia's Critical Minerals Strategy and the AUD 2 billion Critical Minerals Infrastructure Fund (CMIF), launched in 2021 and updated in 2023, provide a framework for sector growth.

Finance: The Northern Australia Infrastructure Facility (NAIF) and Export Finance Australia (EFA) finance major projects such as rail, ports, and transmission, including the Pilbara transmission upgrade (2021) and port expansion (2022).

PPP Opportunities: The Pilbara Corridor and Onslow Water PPP (2018), along with Pilbara expansion projects (2019–2021), demonstrate scalable partnership models.

Lesson Learned: Public first-loss capital, as seen through CMIF grants since 2021, has been effective in catalyzing private investment.

Policy Highlight: Korea (Importer Case Study)

Strategy: Korea's K-Strategy, covering 33 minerals, was announced in 2022 with a target of achieving supply chain diversification by 2035.

Finance: The Export–Import Bank of Korea, Korea Trade Insurance Corporation, and Korea Overseas Infrastructure & Urban Development Corporation provide financing for overseas PPPs, including lithium and cobalt projects.

PPP Opportunities: Since 2021, initiatives in smart logistics, renewable-linked transmission, and storage have created new PPP opportunities.

Linkages: These efforts are closely tied to the EV and battery industry, with strong connections to LG, SK, and Samsung.

Lesson Learned: Integrating demand with financing creates a pull-based PPP pipeline, enabling demand-driven partnerships.

Policy Anchor: Comparative Matrix (10 Countries)

Group	Country	Strategy/Policy	Finance	PPP Opportunity	Lesson Learned
Exporters	Australia	CMIF, Strategy	NAIF, EFA	Pilbara, Onslow Water	Public first-loss leverages private capital
	Indonesia	Export ban, downstreaming	SOEs, SMI, PINA	Morowali Cluster	Industrial policy + PPP = hub
	India	Nat'l Mineral Policy, VGF	IIFCL, SBI	Mine + smelter PPP	VGF crowds in private
	Philippines	Mining Act reform	PPP Center, GFIs	Port, road PPP	LGU engagement key
	Vietnam	Mining Law reform (2023)	SOEs, FDI	Mine–port–RE PPP	Clear rules build trust
	Lao PDR	GMS Corridor strategy	AIF, BOL	Rail + hydro + mining	Corridors as hubs
	Uzbekistan	New strategy (2025)	State Mining Bank	Mine–cluster PPP	SOE-led → gradual private entry
Importers	Korea	K-Strategy (33 minerals)	KEXIM, K-Sure, KORES	Overseas JV + logistics PPP	Demand + finance integration
	Japan	JOGMEC, diplomacy	JBIC, NEXI	Overseas mines + domestic use	Rule-based approach
	Singapore	Hub strategy, green finance	Temasek, GIC	Logistics + finance PPP	Hub + finance specialization

Linking Finance, ESG, and Corridors for Bankable PPPs

Financing Gaps: Key challenges include exploration risk, commodity price volatility, and foreign exchange exposure, as seen in lithium exploration in Argentina (2020) and nickel price swings (2021–2022).

Solutions: Tools such as guarantees, blended finance, offtake agreements, and hedging have proven effective, including ADB blended finance (2021) and Tesla's offtake contract (2018).

Private Needs: Investors require long-term contracts, consistent policies, and transparency, highlighted in Korea's K-Strategy (2022) and the EU Critical Raw Materials Act (2023).

ESG: Water management, community engagement, and circular economy practices are critical, drawing on examples like the Onslow Water PPP (2018) and IFC ESG standards (2012).

Corridors: Strengthening resilience depends on rail, ports, and digital infrastructure, with models such as the Pilbara Corridor (2019–2021) and GMS rail in Lao PDR (2021).

Key Questions for Debate

- How can upstream PPP support be designed for DMCs? *(readiness vs. appetite)*
- What is the optimal incentive mix for private participation? *(subsidies vs. market tools)*
- How can permitting reform be linked with PPP bankability? *(speed vs. compliance)*
- What models best support cross-border corridor cooperation? *(governance & financing)*
- How should MDBs cooperate across various areas? *(enabling environment, capacity building, market development, advisory, technical assistance, finance, policy)*

Thank You!

www.adb.org

/AsianDevBank

@ADB_HQ

/AsianDevelopmentBank

/AsianDevelopmentBank