PANEL DISCUSSION SUMMARY

Powering the "Energy Decade": From Policy to Execution

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Participants

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1. Energy is Not Just Electricity (Ashim)

Nepal's Ministry of Energy is focused almost entirely on electricity. However, electricity accounts for less than 10% of total energy consumption. Approximately 64% of Nepal's energy comes from traditional biomass — most of it operating in the informal economy. Petroleum and coal together make up another 25-26%.

Donor-funded policies are not inherently problematic, but the implementation tools accompanying them are weak. Good policies exist on paper; what is missing is execution. Energy security and energy justice perspectives are largely absent from current frameworks.

2. Grid Readiness for 4,000+ MW (Sadam)

As Nepal continues to add generation capacity rapidly, a fundamental question remains: is the transmission and distribution grid ready to handle 4,000+ MW? The current grid remains fragmented, with transmission investment lagging behind generation growth.

3. Major Hydropower Challenges in Nepal (Kamal)

The fundamental challenge is not water availability but variation in river discharge across seasons, combined with high sediment loads — Kali Gandaki being a clear example. Run-of-river projects, which dominate Nepal's portfolio, are inherently constrained by these natural conditions.

Nepal must adapt its hydropower strategy to these natural barriers. Basin-level master plans exist for major river systems, but they have not been implemented in a coordinated way. Projects continue to be developed individually rather than as part of integrated basin strategies.

4. Unbundling and Private Sector Role (Sadam)

How is Nepal planning to capitalize on its growing generation capacity — through export, productive sectors, or both? Pressure from the private sector and Independent Power Producers (IPPs) for unbundling NEA has been growing, suggesting the private sector sees itself as ready.

However, several factors complicate the case for immediate unbundling:

- The Open Access Directive has been introduced, but the Karyabidhi (implementation procedure) is not yet ready.
- The grid is still fragmented.
- Private sector can already invest in transmission, but has not done so meaningfully — suggesting ROI is insufficient.
- Private players want to trade directly with India, but Nepal lacks the technical expertise to compete in that market.
- Subsidized lifeline customers have no clear place in a fully liberalized market. Government currently subsidizes electricity.

International experience suggests that systems below approximately 3,000-3,500 MW installed capacity rarely benefit from unbundling. Nepal's installed capacity (~3,400 MW) is right at this threshold.

Norway, which liberalized its own hydropower sector, recommended unbundling for Nepal — but NEA has not been able to implement it. From a development science perspective, organizational power dynamics may make NEA hesitant even if the private sector were ready. Technology and market readiness are not yet there. Unbundling now appears politically timed rather than technically justified.

Institutional, financial, and technical capacity must be strengthened first. We cannot freely open everything to the market without being ready for it.

5. Productive Use of Surplus: Bitcoin, Green Fertilizer, Data Centers, Green Hydrogen (Ashim)

What is the most economically, financially, and environmentally viable use of surplus electricity?

- **Bitcoin:** Limited financial hedging capacity makes Nepal vulnerable to extreme price volatility.
- **Green hydrogen and CCUS:** Promising technologies, but infrastructure is years away.
- **Green fertilizer:** A strong option, particularly for Koshi Province. Technically efficient. The challenge is financing.
- **Data centers:** Possible but require year-round reliability and connectivity Nepal does not yet have.

The deeper concern: industrial consumption is very low. Nepal must focus on growing industrial demand. The IEX (Indian Energy Exchange) prices may also mean domestic industries end up paying higher rates than what surplus is sold for abroad.

The path forward is to manage surplus by increasing demand domestically, not by chasing speculative export options.

6. Storage Projects and Water Diplomacy (Kamal)

How should Nepal prioritize storage projects? What about downstream benefits and water diplomacy?

Nepal is a cascade country: water flows from China through Nepal to India. Geopolitical tension varies by project:

- **Arun River:** Approximately 70% of catchment is in China. India is developing Arun III and Sapta Koshi projects.
- **Karnali Chisapani:** Predominantly Nepal's river. India is the principal downstream beneficiary.
- **Budhi Gandaki:** 263-meter dam. Risk borne entirely by Nepal. Designed primarily for hydropower. Approximately 650 cumecs of regulated flow goes downstream to India in the dry season — a substantial benefit India receives from Nepal's investment.

Volume-based water treaties (such as those modeled on the Nile) are increasingly inadequate. With climate change shifting flows, fixed-volume agreements become rigid and outdated. Benefit-sharing frameworks — allocating the actual benefits of regulated flow such as irrigation, flood control, navigation, and power — are more resilient and more equitable.

Government project portfolios should be evaluated using comprehensive metrics: geopolitical implications, downstream benefits, displacement, submergence, sediment, and energy value — not just installed capacity.

Pancheshwar carries the highest geopolitical tension of all Nepal-India water projects. Case studies from around the world on how transboundary water is managed should inform Nepal's approach. This is not only about energy — it is about water.

7. Pumped Storage and Battery Storage (Sadam)

How viable are pumped storage and battery storage technically? How urgently are they needed?

Storage projects are necessary, but pumped storage faces financial challenges. Begnas-Rupa as a proposed PSH site looks attractive on paper but may not be effective in practice. Energy sovereignty justifies building storage.

Battery Energy Storage Systems (BESS) are more feasible in the short term. They can support base energy in the dry season and manage peak hours. Industries could participate by sharing battery capacity with NEA. BESS is more practical for immediate deployment than PSH.

8. Energy Diplomacy: Bilateral, Multilateral, Middle East (Ashim)

How should Nepal plan for energy security in the face of geopolitical risks?

Nepal currently has no formal energy diplomacy framework. As a net energy importer, Nepal is heavily dependent on India's geopolitical posture. The G2G model — government-to-government — that Bhutan uses with India offers a useful reference: Bhutan exports only its surplus, under predictable long-term arrangements.

Nepal currently has multiple cross-border interconnectors with India, with several more under construction or agreement. Business model questions remain — for example, transmission lines built initially in Indian territory and transferred to Nepali ownership over time.

Energy security is national security. The geopolitical sensitivity of interconnectors comes more from the water dimension than from electricity itself. A regional South Asian energy market remains aspirational — countries are too different in their structures and interests for near-term integration. The dominant role of India in any such market is also a constraint.

The practical conclusion returns to a familiar point: increase domestic demand.

9. Hydropower Planning: Climate Risk, Seismology, Geology

What should be non-negotiable criteria in project planning?

- Multipurpose basin projects — combining hydropower with irrigation and electrified transportation.
- Many planning documents and transboundary impact studies already exist; they need to be acted upon.
- Develop a national benefit-sharing framework for transboundary projects, instead of negotiating each project separately.
- Frame projects in terms of measurable benefits, not national pride.
- Climate adaptation must be built into infrastructure for risk management. Big risks require technical solutions.

On the positive side, Kathmandu University's Turbine Testing Laboratory is a strong example of solving problems with in-house technical expertise.

10. LDC Graduation, the 28,500 MW Target, and Policy Basis (Sadam)

How will donor funding change as Nepal graduates from Least Developed Country status? Nepal's official target is 28,500 MW of installed capacity by 2035.

- Approximately 11,500 MW are already under PPA.
- Approximately 21,500 MW have survey licenses issued.
- But what will be the impact on rivers? Coordination among DoED, ERC, and NEA needs strengthening.
- Run-of-river PPAs should not be issued haphazardly.
- There is no umbrella act covering the entire energy sector — the NEA Act, Electricity Act, and others operate in parallel without coherence.
- Policies must be streamlined and loopholes addressed.
- Energy and climate policies should be integrated, not competitive — for example, hydropower projects continue to be approved in forest buffer zones.

On data and policy basis: are we doing research based on policy, or making policies based on research? The current approach is too ad-hoc. Long-term plans exist on paper but lack implementation pathways.

Why 28,500 MW? Per capita energy consumption — and how it contributes to GDP — is the right framing. Nepal is increasing energy consumption, but not productively. Energy sovereignty, energy security, and energy efficiency must all be considered. Do we really need 28,500 MW if consumption is not productive or efficient?

The field needs to be redesigned around economic logic — not around politically glamorous numbers, but around real benefits. Think broadly. Fix small things.

Private sector investment is, in the end, also the country's money. The government should plan first; the private sector will follow. Storage hydropower has high upfront costs — will the private sector invest? Will there be payback? Contract structures such as "take and pay" versus "take or pay" significantly affect investment decisions.

Fragmentation exists everywhere in Nepal's energy sector. Institutions, policies, and investments should complement each other, not compete.

Closing Reflections

The discussion returned repeatedly to a few core themes: implementation matters more than policy declarations, productive domestic demand must grow, water diplomacy is inseparable from energy planning, and Nepal must define energy targets based on benefits rather than ambition. Storage is essential but requires both pumped hydro for seasonal balancing and batteries for short-term peaks. And ultimately, fragmentation across institutions, policies, and investments must give way to coordination.

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