



Financial and Operational Performance of Grid-Connected Micro Hydro Plants in Nepal: Findings from Six MHPs Cases

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This case study is part of the series “Sustainability Solutions for Mountain People and Landscapes,” developed within the WISONS Innovation Lab Nepal. The aim is to promote an integrated approach to strengthening the livelihoods of people living in mountain communities. Each factsheet provides information on specific sustainability solutions in the fields of energy and landscape management that have shown promising potential or improving the livelihoods of mountain people but have a low level of adoption in Nepal and other mountain regions. The information is tailored to the specific context of Nepal’s mountain landscapes and offers practical insights and guidance for scaling up the application of these solutions. Additionally, it presents an integrated approach that begins with an understanding of the opportunities and challenges faced by mountain communities, enabling the systematic deployment of synergies between solutions from the energy and landscape sectors.

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Authors:

Subodh Ghimire, Nisha Jaishwal, Badri Nath Baral

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EXECUTIVE SUMMARY

Mini/Micro Hydropower Plants (MHPs) have played a significant role in expanding electricity access in rural Nepal. The development of MHPs accelerated during the early 1990s when access to the national electricity grid was limited to only about 20 percent of the population, leaving most remote and rural communities without reliable electricity services. In this context, MHPs served as a vital source of energy, contributing to rural development, improved livelihoods, and enhanced access to social services.

However, the energy landscape in Nepal has changed considerably over the past decade. With the rapid expansion of the national grid, electricity access has now reached more than 90 percent of households. As a result, many MHP consumers prefer to switch to grid electricity due to its higher reliability and capacity. This transition has created significant survival challenges for MHPs, including declining electricity demand, underutilization of installed capacity, reduced revenue generation, and concerns over long-term financial sustainability.

In this context, grid interconnection has emerged as a promising strategy for enhancing the viability of MHPs. Nepal has already initiated several grid interconnection efforts, with 16 MHPs currently connected to the national grid. Among these, three MHPs in Baglung District were supported through the integrated ecosystem-based approach of the WISIONS Innovation Lab Project, implemented by Winrock International and its consortium partners. These experiences demonstrate that grid interconnection can provide a viable pathway for sustaining MHP operations by enabling surplus electricity export to the national grid while improving governance and operational performance.

This study assesses the operational and financial impacts of grid interconnection in six cooperative-managed MHPs located in Baglung, Palpa, and Nuwakot districts of Nepal. The study is based on field visits, operational records, financial analysis, and stakeholder consultations conducted between July 2025 and February 2026.

Key Highlights of the study are:

- System utilization improved significantly after grid interconnection
- Service reliability increased due to grid backup
- Maintenance shifted from reactive to preventive
- Record keeping and monitoring improved
- Governance became more structured under cooperative management

Overall, the cases analyzed in this study demonstrate that grid interconnection is a viable pathway for revitalizing MHPs, but its success depends on combining technical solutions with strong governance, financing, and operational capacity.

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LIST OF ABBREVIATIONS

AEPC	Alternative Energy Promotion Centre
AVR	Automatic Voltage Regulator
DLC	Dump Load Controller
ELC	Electronic Load Controller
GoN	Government of Nepal
IL	Innovation Lab
KIIs	Key Informant Interviews
kW	Kilowatt
MHP	Micro Hydropower Plant
MWh	Megawatt-hour
NEA	Nepal Electricity Authority
NPR	Nepalese Rupees
PPA	Power Purchase Agreement
ROI	Return on Investment
SECF	Sustainable Energy Challenge Fund
SME	Small and Medium Enterprise

1. BACKGROUND

Spread across six provinces of Nepal, over 1,800 micro hydropower plants (MHPs) with a combined installed capacity of 40 MW (AEPC, 2024) have played a pivotal role in expanding rural electrification since 1980s. These systems have been particularly important in remote and underserved communities where access to the national grid was limited or unavailable during the period.

These small-scale hydropower systems provide clean, renewable and locally managed electricity, enabling socio economic development, improving living standards and supporting local enterprises. MHPs have become an essential part of Nepal's rural energy landscape by delivering decentralized power solutions tailored to the country's unique geographic and demographic challenges.

Despite these contributions, many MHPs face significant challenges related to financial sustainability, managerial capacity, and low utilization of installed capacity. In some cases, these constraints increase the risk of abandonment of MHP assets, undermining the past investments in rural electrification. These challenges are further intensified by the rapid expansion of the national grid into previously off-grid areas.

In this context, grid interconnection has emerged as a strategic pathway to enhance the long-term viability of MHPs. 16 MHPs are already connected to the grid till date. By connecting to the national grid, these systems can export surplus electricity, access more stable revenue streams, improve operational efficiency, and strengthen financial and institutional performance.

The WISIONS Innovation Lab Project, implemented by Winrock International and its partners, has played a pivotal role capacitating the staff of 18 MHPs in Baglung and Jumla to explore options for improving the sustainability of their systems. Three of the MHP committees in Baglung decided to pursue grid interconnection, and the WISIONS Innovation Lab project supported them throughout the transition process. By November 2025, they were all effectively feeding power into the Nepal national grid. This case study draws on insights from these newly connected MHPs, as well as from data and experiences from other three MHPs of different sizes and geographical locations that were connected to the grid earlier.

Objective

The main objective of this case study is to assess the operational and economic performance experienced by the MHPs after they were connected to the National Grid.

Specifically, its objectives are:

- To study the additional revenue generation and other financial benefit resulting from the grid interconnection
- To assess the governance and other operational related benefits due to grid interconnection

2. METHODOLOGY

This study employs a comparative case study approach to examine the operational and economic implications of grid interconnection for six community-managed MHPs in Nepal. The methodology ensures systematic collection, verification and analysis of relevant information.

2.1 CASE SELECTION

The six micro-hydropower projects Jhumsakhola, Tarakhola, Syaurebhum, Nisikhola II, Chachalghat and Girindi were selected as case studies based on differences in capacity, interconnection timeframe, geographical context, diverse funding mechanism and grid model.

- **Capacity:** The selected projects range from 23 kW to 380 kW.
- **Interconnection timeframe:** The set includes cases with a broad range of operational experience, spanning from 2018 to late 2025.
- **Model of connection:** Two types of models are present in the selection
 - › Power Purchase Agreement (PPA): All electricity generated is sold to NEA.
 - › Net Metering Model: Ensure Local Supply first and only sell surplus electricity to NEA.
- **Funding Mechanism:** The funding mechanism ranges from fully own capital to full grants vs up to fifty percent viability gap funding through GoN's Sustainable Energy Challenge Fund.
- **Geographical context:** Projects are located across Palpa, Baglung, and Nuwakot districts, representing diverse geographic, socio-economic, and institutional settings.

Together, these projects span a spectrum of capacities and site conditions, providing valuable insights into the operational realities of MHPs in Nepal and the implications of grid interconnection. Table 1 presents a concise overview of the key features of each of the six MHPs.

Table 1: Key Features of selected MHPs

Category	Tarakhola	Jhumsakhola	Syaurebhum	Nisikhola II	Chachalghat	Girindi
District	Baglung	Palpa	Nuwakot	Baglung	Baglung	Baglung
Rural Municipality	Tarakhola	Mathagadhi	Shivapuri	Nisikhola	Badigad	Badigad
Capacity	380 KW	68 KW	28 KW	100 KW	100 KW	75 KW
GPS Location	28°19'42"N, 83°22'56"E	27°43'05"N, 83°36'43"E	27°51'41"N, 85°21'55"E	28°22'44.2"N, 83°03'14.7"E	28°16'02.3"N, 83°15'22.9"E	28°11'31.5"N, 83°16'56.52"E
Start of Operation (Year)	2019	2009	2013	2011	2013	2009

Category	Tarakhola	Jhumsakhola	Svaurebhum	Nisikhola II	Chachalghat	Girindi
Year of Grid Inter-connection	2021	2024	2018	2025	2025	2025
Mode of Connection	Net Metering	Net Metering	PPA Model	Net Metering	Net Metering	Net Metering
Households Electrified	1400	380	350	1350	723	1000
Turbine Type	Pelton	Crossflow	Crossflow	Crossflow	Crossflow	Crossflow
Design Flow (L/s)	430	367	370	530	350	365
Available Head (Meter)	111	31.5	10.91	32	49	43
Generator Type	Synchronous, 3-phase	Synchronous, 3-phase	Synchronous, 3-phase	Synchronous, 3-phase	Synchronous, 3-phase	Synchronous, 3-phase
Frequency Regulation	Electronic Load Controller	Electronic Load Controller; 82 kW ballast tank	Electronic Load Controller	Electronic Load Controller	Electronic Load Controller	Electronic Load Controller

2.2 DATA COLLECTION

Data for this study were collected using a combination of secondary and primary sources, including desk-based research, field visits, key informant interviews, and group discussions, to ensure comprehensive, reliable, and validated information.

- **Desk based research:** Basic project data (location, capacity, commissioning dates) collected from academic articles, project reports and documentation from Alternative Energy Promotion Centre (AEPD) and Nepal Electricity Authority (NEA).
- **Field visits:** Direct collection of operational and financial data from plant offices and cooperative management (July 2025: Syaurebhum, Tarakhola, and Jhumsakhola MHPs; February 2026: Chachalghat, Nisikhola, and Girindi MHPs).
- **Consultations:** Interviews and discussions with plant operators and cooperative representatives provided insights on revenue collection, tariff structures, operational challenges, and community perspectives on grid interconnection. (July 2025: Syaurebhum, Tarakhola, and Jhumsakhola MHPs; February 2026: Chachalghat, Nisikhola, and Girindi MHPs).



Figure 1: Interviews with Syaurebhumu MHPs and Tarakhola MHPs Representatives

2.3 DATA ANALYSIS

The analysis was structured around two main dimensions:

- I. Financial Performance:** focusing on revenue generation before and after grid interconnection, capital costs, and financing structures.
- II. Operational Performance:** covering aspects such as system utilization, reliability, maintenance requirements, seasonal variation and integration of local supply with the national grid.

Quantitative records such as revenue breakdowns, and cost structures were organized into tables to identify trends and performance shifts. Qualitative insights from field interviews were used to interpret technical challenges and cooperative management practices, this combination of numerical and experiential data allowed the study to evaluate the feasibility of grid connected MHPs in diverse rural contexts and identify enabling conditions for long-term sustainability.

3 FINDINGS

3.1 FINANCIAL PERFORMANCE

The financial performance of grid-interconnected MHPs is driven by two primary factors:

I. Increased energy generation due to better utilization of the plant

Grid interconnection led to a significant increase in energy generation across all MHPs, as surplus electricity could be exported to the national grid rather than curtailed.

- Generation increased from 70.08–350.4 MWh/year to 166.74–2289.07 MWh/year
- Overall increase ranged from 97% to 553%, with Tarakhola MHP recording the highest growth (553.3%)

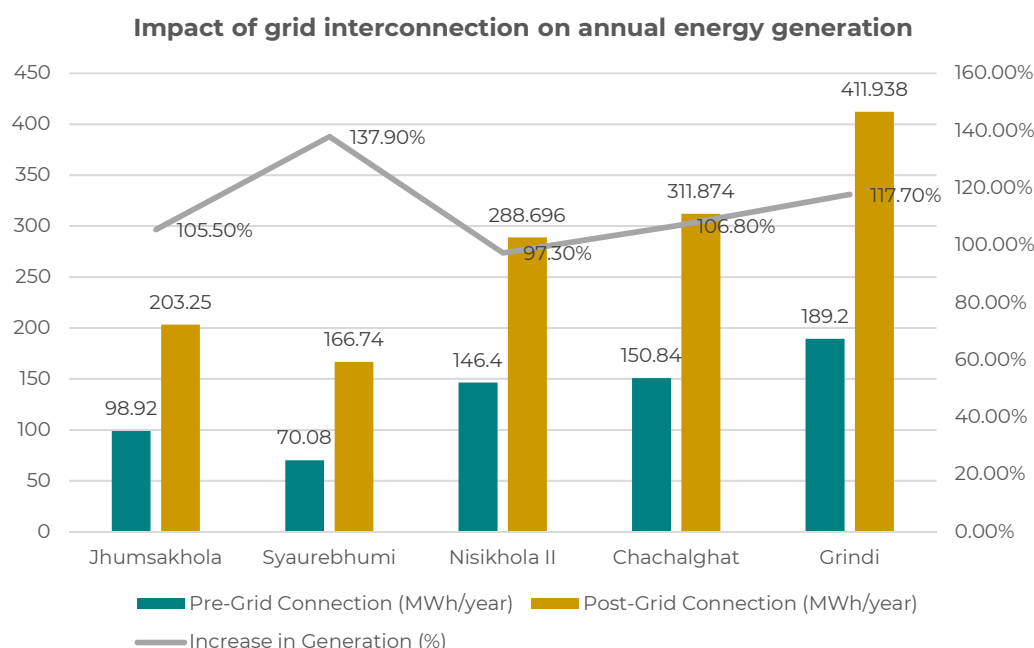


Figure 2: Impact of grid interconnection on annual energy generation¹

II. Increased revenue due to selling additionally generated electricity to NEA

Electricity sales to Nepal Electricity Authority (NEA) emerged as a primary source of income following interconnection. NEA revenue ranges from NPR 0.79 million to NPR 12.31 million annually. The contribution of Sales to NEA to total revenue ranges from 33.9% in Nisikhola and 78% in Tara Khola. This difference illustrates very well the strong effect of the size of the MHP (380 kW in the case of Tara Kohla) as well as the high level of surplus power that is very common in several MHPs in Nepal.

Within the set of analyzed MHPs, the case of Syaurebhum is of course exceptional, as it is PPA agreement also implies that all the generated power is sold to NEA. These two profound contributing factors are considered in a simple financial analysis of these MHPs, based on the following assumptions:

- The revenue of each MHP was obtained from plant records and financial statements. It is assumed that the observed revenue levels will continue in the future for the purpose of the analysis.
- Revenue for three MHPs (Nisikhola, Chachalghat and Girindi) were collected for six months and extrapolated for a year in the analysis.
- Operational costs are collected based on audit reports and records, when available, complemented with information the interviews. It is assumed that the current level of costs will remain same in future.
- Simplistic output indicators such as return on Investment (ROI) and payback period based on incremental investment for grid-connection are taken for brief analysis.

¹ Tarakhola MHP (increase in generation: 553.3%) was excluded from the graph as an outlier because its exceptionally high increase, resulting from low pre-grid utilization and high installed capacity, would distort the scale and reduce the visibility of variations among the other MHPs.

- A “without grant” scenario was also evaluated to assess the financial performance of grid-connected MHPs in the absence of grants or viability gap funding. The resulting ROI and payback period values are presented solely for comparative purposes against the grant-supported scenario.

Table 2 presents the financial performance of the studied MHPs under both grant-supported and non-grant scenarios. The comparison highlights the important role of grants and viability gap funding in improving the financial attractiveness of grid interconnection projects. Under the grant-supported scenario, Nisikhola II, Chachalghat, and Girindi demonstrate acceptable financial returns, with payback periods ranging from 5.47 to 8.46 years. However, under the non-grant scenario, returns decline significantly and payback periods increase substantially. Jhumsakhola records negative returns in both scenarios due to persistently high operating costs, although grid interconnection has still generated additional revenue and operational benefits. Syaurebhumu represents a special case where 100% grant support was provided and, therefore, ROI and payback indicators are not applicable. Tarakhola exhibits exceptionally high returns because of its large installed capacity (380 kW), previously underutilized generation potential, and relatively low incremental grid interconnection cost; consequently, its financial indicators should be interpreted as outliers. Detailed calculations of electricity generation and revenue for Nisikhola II, Chachalghat, and Girindi MHPs are provided in Annex II.

Table 2: Financial returns of the MHPs

MPH	Capital Invested by MHPs (NPR) ²	Annual Revenue Post Grid Connection (NEA+Consumer) (NPR)	Without Grants		Without Grants (Own Investment)	
			ROI (%)	Payback Period (Yrs)	ROI (%)	Payback Period (Yrs)
Tarakhola	2,121,177	15,781,549	539%	0.19	539%	0.186
Jhumsakhola	3,481,748	1,836,757	-4%	-25.34	-1%	-90.468
Syaurebhumu	0	1,099,771	N/A	N/A	32%	3.126
Nisikhola II	4,587,793	2,325,978	18%	5.47	9%	10.950
Chachalghat	5,428,573	2,210,580	17%	5.84	7%	15.074
Girindi	5,350,000	3,322,404	12%	8.46	6%	16.920

² Capital Invested by MHPs = MHPs capital Investment + Local Consumers Investment

Tarakhola (380 kW) exhibits exceptionally high ROI and unusually short payback periods compared to the other MHPs. Prior to grid interconnection, plant utilization was very low relative to its installed capacity. Grid interconnection enabled a substantial increase in energy sales and revenue, while the incremental investment required for interconnection remained relatively low in comparison. As a result, the calculated ROI and payback values are disproportionately high and should be interpreted as outliers when assessing the financial performance of grid-connected MHPs.

Jhumsakhola does not show encouraging financial performance overall. However, a closer analysis indicates that grid interconnection has brought significant operational and financial benefits. Revenue increased by approximately 27% following grid interconnection, and the incremental investment for grid interconnection can be recovered within 3.65 years through the additional revenue earned from electricity sales to NEA. The negative ROI is primarily attributable to high operating costs that existed even before grid interconnection. This suggests that improving operational efficiency and reducing operating costs are essential for enhancing the plant's long-term financial sustainability.

Syaurebhumi represents a unique case as the first grid-connected MHP in Nepal. Without grid interconnection, the plant was likely to be abandoned. Therefore, AEPC provided 100% grant support for the interconnection investment. Since the cooperative made no capital investment, ROI and payback period indicators are not applicable. Nevertheless, grid interconnection has enabled continued operation, positive cash flow, and sustained community benefits.

Nisikhola II, Chachalghat, and Girindi demonstrate the financial viability of grid interconnection. Under the grant-supported scenario, these MHPs achieved positive returns, with ROI ranging from 12% to 18% and payback periods between 5.47 and 8.46 years. Even under the non-grant scenario, the projects remained financially feasible, although returns declined considerably and payback periods increased to 10.95-16.92 years. The results indicate that grid interconnection can enhance the long-term sustainability of MHPs by creating an additional revenue stream through electricity sales to NEA. However, the comparison between the grant-supported and non-grant scenarios highlights the importance of grants or viability gap funding in improving project attractiveness and reducing investment recovery periods.

Overall, these findings indicate that successful grid interconnection of Nepali MHPs may require:

- a. grant support or viability gap funding for a portion of the investment cost; or
- a. reduction of grid interconnection costs through technological innovation, optimization of equipment and safety requirements, or other cost-reduction measures.

3.2 OPERATIONAL PERFORMANCE

Grid interconnection has influenced the operational performance of the six studied MHPs beyond its direct financial impact. Based on field observations, plant records, and stakeholder consultations, the most significant operational changes were observed in system utilization, service reliability, maintenance practices, record keeping, and governance arrangements. While the magnitude of these changes varied across sites, all six MHPs reported operational benefits associated with grid interconnection.

3.2.1 SYSTEM UTILIZATION

Grid interconnection substantially improved the utilization of installed generation capacity across all six MHPs by creating an outlet for surplus electricity that previously could not be consumed locally. However, the magnitude of improvement varied considerably among projects.

The most dramatic change was observed in **Tarakhola MHP** (380 kW). Prior to grid interconnection, the plant generated only 350.4 MWh annually despite its relatively large installed capacity. After interconnection, generation increased to 2,289 MWh per year, representing a more than six-fold increase. Discussions with the cooperative indicated that local demand alone was insufficient to absorb the plant's generation potential, and grid interconnection enabled the sale of surplus electricity to NEA. As a result, Tarakhola now exports approximately 1,939 MWh annually to the national grid.

A different pattern was observed in **Syaurebhum** MHP, before interconnection, the plant generated approximately 70 MWh annually for local consumers. Following grid interconnection, all electricity generated is sold directly to NEA, increasing annual generation to approximately 167 MWh. In this case, the operational transformation was not merely higher utilization but a complete shift in the business model from community supply to power generation for the national grid.

The recently interconnected **Nisikhola II**, **Chachalghat**, and **Girindi** MHPs demonstrated more moderate but still substantial improvements. Annual generation nearly doubled in Nisikhola II (146 MWh to 289 MWh), increased by 107% in Chachalghat (151 MWh to 312 MWh), and by 118% in Girindi (189 MWh to 412 MWh). These increases indicate that prior to interconnection the plants were already supplying substantial local demand, but significant generation potential still remained underutilized.

3.2.2 SERVICE RELIABILITY AND OPERATIONAL CONTINUITY

The operational benefits of grid interconnection extended beyond increased generation and revenue. One of the most important improvements reported by all cooperatives was enhanced service continuity for consumers.

For example, Jhumsakhola MHP experienced major infrastructure damage in July 2022 when a landslide damaged the penstock. In addition, the forebay had previously been damaged during the 2015 earthquake. Before grid interconnection, such failures would have interrupted electricity supply to all connected households.

After interconnection, however, consumers could continue receiving electricity from the national grid during outages and maintenance periods.

Similarly, Nisikhola II MHP experienced repeated turbine shaft failures, generator damage, canal damage, and other civil works issues prior to grid interconnection. During one major breakdown, the community remained without electricity for approximately three months while repairs were undertaken. Following grid interconnection, however, consumers were able to receive electricity from the national grid even when the MHP was temporarily out of operation. This case illustrates the operational vulnerability of aging MHP infrastructure and highlights the importance of grid backup in maintaining reliable electricity supply during maintenance and repair periods.

3.2.3 MAINTENANCE AND ASSET MANAGEMENT

The interconnection process triggered substantial rehabilitation and modernization investments across all projects. Rather than merely connecting the plants to the grid, most MHPs used the opportunity to address long-standing technical deficiencies.

At **Jhumsakhola**, interconnection works included penstock rehabilitation, landslide protection measures, canal repairs, intake improvements, installation of new synchronization equipment, digital protection relays, transformers, and metering systems.

At **Syaurebhum**, the generator was replaced and major canal, intake, and slope protection works were undertaken before grid connection.

For **Nisikhola II**, **Chachalghat**, and **Girindi**, interconnection required conversion from Electronic Load Controllers (ELCs) to Dump Load Controllers (DLCs), transformer installation, DC supply systems, protection equipment, turbine rehabilitation, runner replacement, canal repairs, and other upgrades. These investments significantly improved the technical condition of facilities that had been operating for more than a decade.

Unlike the older projects, **Tarakhola** required comparatively limited rehabilitation because the plant was commissioned only in 2019 and had experienced no major operational disruptions before interconnection. The interconnection investment mainly focused on synchronization equipment, control systems, and line construction.

3.2.4 RECORD KEEPING AND MONITORING

Record keeping practices improved considerably after grid interconnection. All six MHPs reported maintaining more systematic operational and financial records than during their earlier years of operation. Plant operators now routinely record electricity generation, electricity sales to NEA, electricity imports from NEA, maintenance activities, and financial transactions.

The introduction of bidirectional metering and formal power transactions with NEA has further strengthened monitoring practices. More accurate operational

data has improved transparency, facilitated financial reporting, and supported better management decision-making. Field observations confirmed the use of operational logbooks, meter records, audit reports, and maintenance documentation across the studied MHPs.

3.2.5 GOVERNANCE AND INSTITUTIONAL PERFORMANCE

A notable operational change observed across the six MHPs was the gradual professionalization of management practices. Cooperative representatives reported that grid interconnection increased the need for regular energy accounting, financial reporting, and technical documentation because of commercial transactions with NEA.

One particularly interesting example comes from **Tarakhola MHP**. Following successful grid interconnection and increased income from electricity sales to NEA, the cooperative reduced the retail tariff charged to local consumers from NPR 12 per kWh to NPR 7 per kWh. This demonstrates how additional revenue streams from grid interconnection can generate direct benefits for local consumers while maintaining operational sustainability.

4 LEARNING FOR THE FUTURE OF MHPs

The studies of six MHPs demonstrate that grid interconnection can provide a practical pathway for improving the long-term sustainability of community-managed MHPs in Nepal. However, the benefits and outcomes vary considerably depending on plant capacity, technical condition, financing arrangements, operational performance, and management practices. Several key lessons emerge from the experiences of the studied MHPs.

1. Grid Interconnection improves utilization of existing MHP assets

Before grid interconnection, most MHPs were unable to fully utilize their installed capacity due to limited local demand. The ability to export surplus electricity to NEA enables more productive use of existing infrastructure and increases overall energy generation.

2. Financial sustainability can be improved, but is not guaranteed

Grid interconnection creates an additional source of revenue. However, financial performance depends on plant capacity, operating costs, and financing arrangements. Projects with strong operational performance benefit the most from interconnection.

3. Grid backup enhances service reliability

Access to the national grid helps maintain electricity supply during plant outages, maintenance activities, and seasonal disruptions, reducing the impact of technical failures on local consumers.

4. Grid interconnection encourages infrastructure upgrading

The interconnection process often requires rehabilitation of aging civil, electrical, and electro-mechanical components, leading to improved plant performance and operational reliability.

5. Strong governance is critical for long-term success

Technical improvements alone are insufficient. Effective cooperative management, regular maintenance, transparent financial management, and systematic record keeping are essential for sustaining grid-connected MHPs.

6. Financial support mechanisms remain important

The studied cases suggest that grants, viability gap funding, or concessional financing can play an important role in improving the financial attractiveness of MHP grid interconnection projects.

A general conclusion of this study is:

Grid interconnection is a viable pathway for revitalizing MHPs, but its success depends on combining technical solutions with strong governance, financing, and operational capacity.

5 RECOMMENDATIONS

Based on the operational and economic analysis of the six MHPs after grid interconnection, the following stakeholder-specific recommendations are proposed to enhance the sustainability and performance of existing and future MHPs:

A. MHP Operators

- Gradual tariff adjustments can be implemented once an MHP achieves financial sustainability.
- Upgrade civil infrastructure and invest in slope stabilization and flood prevention in order to reduce downtime, particularly during monsoon seasons.
- Modernize mechanical and electrical equipment, ensuring proper voltage regulation, load control, and protective systems.
- Adopt preventive maintenance schedules and systematic record keeping improving reliability and reduce operational disruptions.
- Leverage grid interconnection to sell surplus electricity while maintaining affordable local tariffs.
- Dedicate a fixed share of revenue to maintenance and future upgrades.
- Provide training for local operators and technicians on preventive maintenance, fault diagnosis, and grid-synchronized operations.

B. Local Government

- Facilitate cooperative governance through regular meetings, transparent decision-making, and structured record management.
- Support tariff adjustments that balance affordability with financial sustainability.
- Encourage knowledge sharing and adoption of best practices from successful grid-connected MHPs.
- Promote replication of successful MHP models within their jurisdiction.

C. Alternative Energy Promotion Centre (AEPD)

- Develop clear technical and procedural guidelines for MHP grid interconnection.
- Provide financial assistance and capacity-building programs for MHPs transitioning to grid connection.
- Establish monitoring mechanisms to track operational efficiency and financial outcomes post-grid interconnection.
- Document and disseminate lessons learned from successful projects nationwide.

D. Nepal Electricity Authority (NEA)

- Prioritize interconnection of high-potential MHPs with surplus generation and strong governance.
- Use grid support to stabilize supply during outages and balance seasonal loads.
- Ensure smooth technical integration of MHPs into the national grid, including support for synchronization and troubleshooting.
- Offer standardized agreements for surplus electricity purchase from MHPs.

E. Policy Makers and Development Partners

- Ensure coordinated support from government agencies, development partners, and local institutions to provide financial assistance, streamline approvals, and establish monitoring mechanisms.
- Establish a performance tracking framework to assess operational efficiency and financial outcomes post-grid interconnection.
- Promote strategic scale-up by identifying and supporting high-potential MHPs.
- Encourage other MHPs to learn from operational and financial experiences to plan for grid interconnection strategically.

6.2 ANNEX II: DETAIL CALCULATION OF THREE MHPs

Detailed Calculation of 3 MHPs (6 Months Reading)

MHP	Electricity Received from NEA (Units)				Electricity Supplied to NEA (Units)				Net Electricity (Units)				Estimated Annual Income (NPR)
	Month 1	Month 2	Month 3	Month 4 to 6	Month 1	Month 2	Month 3	Month 4 to 6	Month 1	Month 2	Month 3	Month 4 to 6	
Nisikhola II	20,958	33,958	7,310	4,620	6,543	9,802	28,300	27,451	-14,415	-24,156	20,990	22,831	788,778
Girindi	673	394	356	3,359	35,365	14,265	12,327	49,412	34,692	13,871	11,971	46,053	1,279,044
Chachalghat	6,248	1,028	790	3,880	22,863	15,110	12,423	30,121	16,615	14,082	11,633	26,241	822,852

Note:

- I) For Girindi and Chachalghat MHPs, as they have been connected to the grid for only Six months (as of May 2026), the available data have been extrapolated to estimate annual revenue.
- II) For Nisikhola II MHP, as it was not fully operational for two months, only the data from the last four months when the plant was running at full capacity have been extrapolated to estimate annual revenue.
- III) NEA Tariff Structure: Rs 4.8/ Unit (Wet Season, 8 Months) and Rs 8.4/unit (Dry Season, 4 Months)

