The Fiscal Cost of Energy Insecurity: Import Expenditure versus Forgone Export Revenue after the 2026 Bhote Koshi Disaster in Nepal

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Abstract

On 26 August 2026 a glacial-origin debris flood on the Bhote Koshi River removed about 432 MW of capacity from Nepal's Trishuli corridor, destroyed its 220 kV evacuation hub and delayed a further 495 MW under construction, weeks after the country's largest electricity trade surplus. This paper quantifies the fiscal cost in two ledgers built from plant-level generation and revenue records. The first values forgone generation over each plant's repair or outage period: 14,274 GWh, worth USD 988 million at the Nepal Electricity Authority's average domestic sales realisation, comprising a net USD 581 million to the utility and USD 407 million in producers' contracted revenue. The annual loss begins at 4,469 GWh (USD 309 million) and reaches zero only in the fifth year. The second traces the cross-border trade account over the first year: a net cost to the utility of NPR 8.39 billion (USD 60 million; range NPR 6.98–12.27 billion), or 44 per cent of the FY 2082/83 trade surplus. The loss arrives first as forgone exports and shifts from mid-December to dry-season imports priced some 54 per cent above the forgone export realisation. Capacity stranded by transmission loss alone accounts for 41 per cent of the energy lost in the first six months, so much of the near-term loss is recoverable through transmission reconstruction without rebuilding powerhouses. The findings support prioritising the Trishuli 3B Hub reconnection, transmission redundancy in cascade corridors, storage-backed export contracts, a fixed-price emergency import tranche and parametric insurance against hydropower flow losses.

Keywords: energy security; fiscal cost; hydropower; cross-border electricity trade; Nepal; disaster economics; counterfactual analysis

JEL classification: Q41, Q54, F14, H54

1. Introduction

Nepal's power system is almost entirely hydropower-based. Since its first exchange-traded sale of 39 MW to India in October 2021 it has moved from chronic importer to wet-season exporter (The Kathmandu Post, 2026c). Annual imports fell from 2,175 GWh in FY 2073/74 (2016/17) to 1,171 GWh in FY 2082/83 (2025/26), while exports rose from 3 GWh to 3,965 GWh (Nepal Electricity Authority [NEA], 2026a). In FY 2082/83 the NEA earned NPR 29.53 billion on those exports, an average realisation of NPR 7.45 per kWh (NEA, 2026a), against an import bill of NPR 10.56 billion, 18.5 per cent lower than the year before. The net surplus of NPR 18.97 billion was more than four times the previous year's (NEA, 2026a).

On 26 August 2026 (Bhadra 10, 2083) a glacial collapse on the Nepal–China border sent a debris flood down the Bhote Koshi River into the Trishuli corridor of Rasuwa and Nuwakot districts. Preliminary government reporting counted 12 operational plants (431.1 MW) offline and 15 under-construction projects damaged (Nepal News, 2026a). The 111 MW Rasuwagadhi plant, the largest in the corridor, suspended generation indefinitely (ShareSansar, 2026a).

The 40 MW export to Bangladesh, sourced from corridor plants under the 2024 tripartite agreement (The Kathmandu Post, 2024), was suspended and exports to India were curtailed. On 13 September 2026 India's Ministry of Power approved emergency exports to Nepal of up to 654 MW for 18 hours a day until 31 December 2026, with volumes from January 2027 subject to review (The Kathmandu Post, 2026b). Within three weeks Nepal had become a net importer in its peak export season.

Megawatts lost and reconstruction costs are stock measures. The fiscal consequence is a flow: revenue forgone while the plants are down. Over the repair period, one to four years depending on the plant, each unit of forgone generation is revenue lost to the NEA and to producers. In the near term the loss also passes through the cross-border trade account at asymmetric prices: Nepal exported at NPR 7.45 per kWh in FY 2082/83, whereas dry-season imports average about NPR 11.50 and have peaked near NPR 16.00 (Republica, 2024).

This paper estimates (i) the revenue loss to the NEA and to producers over each plant's repair period, the reference estimate; (ii) the cost passing through the trade account in the twelve months after the flood, decomposed into forgone exports, excess imports, the Bangladesh contract and the offsetting saving in power purchase agreement (PPA) payments; and (iii) the allocation of the burden across the three parties. The estimates rest on recorded plant output, not nameplate capacity.

Reconstruction costs, load-shedding welfare costs and macroeconomic multipliers are excluded. Repair times are still being revised and most of the trade window post-dates the time of writing, so the near-term estimates are ex ante. Monthly generation records were available for the four NEA-owned plants and one independent producer; the other plants use annual records, design energies or capacity-scaled estimates (Section 4.2).

2. Background

Energy security is usually defined by availability, affordability, accessibility and acceptability (Asia Pacific Energy Research Centre [APERC], 2007), and is measurable only once the threat and the value at risk are specified (Cherp & Jewell, 2014; Winzer, 2012). Most metrics were built for fossil-fuel importers (Sovacool & Brown, 2010) and fit a hydropower exporter poorly. Here the threat is a natural hazard and the value at risk is a revenue stream. Disaster economics separates direct losses (destroyed capital) from indirect losses (output forgone while capacity is impaired) (Hallegatte & Przyluski, 2010). Indirect losses can rival direct ones in networked infrastructure (Cavallo & Noy, 2011) but are rarely measured because they need a counterfactual (Botzen et al., 2019). Emergency imports are a substitution response in the sense of Rose (2004): they turn a physical shortage into a priced fiscal flow.

Nepal's fleet is mostly run-of-river (RoR). The standard RoR tariff is NPR 8.40 per kWh in the four dry months, Poush to Chaitra (mid-December to mid-April), and NPR 4.80 in the other eight, with 3 per cent annual escalation in the early PPA years (The Kathmandu Post, 2017; The Himalayan Times, 2023). Upper Trishuli-1 (216 MW), for example, is contracted for 1,149.7 GWh in the wet season and 306.7 GWh in the dry season (The Kathmandu Post, 2018). Nameplate capacity therefore overstates dry-season energy, and the season of a loss determines its fiscal channel: forgone exports in autumn, imports in mid-winter.

Exports are sold through the Indian Energy Exchange day-ahead and real-time markets, NTPC Vidyut Vyapar Nigam (NVVN) and a trilateral arrangement with Bangladesh (NEA, 2026a). The Bangladesh contract is 40 MW from 15 June to 15 November each year at 6.4 US cents per kWh (The Kathmandu Post, 2024); its expansion to 60 MW stalled in June 2026 on Indian transmission constraints (The Kathmandu Post, 2026c). Import prices exceed export realisations: the average import tariff rose from NPR 8.26 per kWh in FY 2020/21 to NPR 10.74 in FY 2022/23, with a dry-season average near NPR

11.50 and peaks of NPR 16.00 (Fiscal Nepal, 2024; Republica, 2024). Import routes approved via NVVN in 2025 were priced at INR 7.05 (about NPR 11.28) per kWh (Urja Khabar, 2025).

Post-disaster studies of Nepal's power sector are mostly engineering assessments of damage and restoration. A flood from the same source area on 8 July 2025 damaged corridor hydropower and was followed by repair, not by a reassessment of corridor concentration (Nepal News, 2026b). The Rapid Damage and Needs Assessment (RDNA) prices direct damage to the energy system at NPR 390.62 billion, out of NPR 723.31 billion in total needs (Republica, 2026; The Kathmandu Post, 2026e). The revenue loss has not been quantified, decomposed by channel or by destroyed versus stranded capacity, or allocated across the NEA, producers and the state.

3. The Bhote Koshi Disaster and the Affected Asset Base

3.1 The Event

The flood destroyed the 220 kV Trishuli 3B Hub substation, the corridor's main evacuation node, and brought down several transmission lines, cutting supply to Rasuwa and causing partial outages in Nuwakot, Dhading and Gorkha (Nepal News, 2026a). The Independent Power Producers' Association, Nepal assessed eight operational plants totalling 281 MW as cut off from the grid (IPPAN, 2026). Hundreds of workers were killed or reported missing, most at construction sites; this paper is confined to system and fiscal effects.

3.2 Destroyed versus Stranded Capacity

Former NEA managing director Kulman Ghising put destroyed capacity at roughly 250 MW, with a further 230–235 MW intact but offline (Spotlight Nepal, 2026). The plant-level record (Table 1) gives 261.1 MW destroyed or severely damaged across seven operating plants, 20 MW (Langtang Khola) destroyed weeks before commissioning, and 170.6 MW stranded: 149.6 MW on the Chilime–Trishuli 220 kV line through the destroyed hub and 21.0 MW on the Tadi Khola–Samundratar 132 kV route. The total, 431.7 MW, is within one megawatt of the official 431.1 MW. The NEA later reported 176.1 MW stranded (The Kathmandu Post, 2026d; Nepal Energy Forum, 2026); the difference from Tables 1 and 2 lies in the capacity ratings used in company filings. Reconnection is targeted for about March 2027. Rasuwagadhi was still shut six weeks after the flood (ShareSansar, 2026b).

Destroyed capacity imposes a multi-year loss bounded by reconstruction, from 12 months (solar) to 48 months (Rasuwagadhi); stranded capacity imposes a loss that ends when evacuation is restored.

3.3 Affected Operational Plants

Table 1 *Operational and near-operational plants affected by the 26 August 2026 Bhote Koshi flood*

Plant	MW	Ownership	Status after 26 Aug 2026	Indicative repair time
Rasuwagadhi	111.0	Chilime Group (NEA subsidiary)	Destroyed: dam, gates, access roads and cofferdam swept away; most severely affected per IPPAN	48 months
Upper Trishuli 3A	60.0	NEA	Severely damaged; powerhouse and switchyard buried	36 months
Trishuli	24.0	NEA	Severely damaged	36 months
Chilime	22.0	Chilime Group (NEA subsidiary)	Damaged	24 months
Langtang Khola	20.0	IPP	Destroyed shortly before commissioning (no operating record)	24 months
Devighat	14.1	NEA	Severely damaged	36 months
Grid solar (Nuwakot)	25.0	NEA	Severely damaged	12 months
Mailung Khola	5.0	IPP	Heavily damaged	12 months
Salasungi (78); Sanjen (42.5); Upper Sanjen (14.8); Upper Mailung (14.3)	149.6	Chilime Group and IPP	Intact but stranded (Chilime–Trishuli 220 kV evacuation through the destroyed Trishuli 3B Hub)	Reconnection targeted in about 6 months
Tadi corridor: Upper Tadi (11); Tadi Thaprek (5); Lower Tadi (5)	21.0	IPP	Intact but stranded (Tadi Khola–Samundratar 132 kV evacuation lost)	Reconnection targeted in about 6 months

Note. Compiled from the Ministry of Energy damage list and IPPAN assessments as reported by Ratopati and myRepublica, NEA damage reporting, The Kathmandu Post (2026a, 2026d), Spotlight Nepal (2026) and Nepal Energy Forum (2026). Repair times are the indicative estimates adopted at the data freeze of Section 4.6. Under-construction projects damaged in the same event, Upper Trishuli-1 (216 MW), Rasuwa Bhotekoshi (120 MW), Super Trishuli (100 MW), Upper Trishuli 3B (37 MW), Middle Trishuli Ganga (15.6 MW) and Upper Mailung A (6.4 MW) among others, enter the revenue ledger of Section 5.2 through their delayed commissioning where a design or contracted energy is available, and are excluded from the trade-window model, which requires an operating baseline.

3.4 The 2024 and 2025 Precursors in the Generation Record

The plant-level record (Appendix A) shows two earlier corridor disruptions. In the floods of late September 2024, Upper Trishuli 3A fell from 35,325 MWh in Shrawan 2081 to 4,163 MWh in Bhadra and 6,050 MWh in Ashwin, and Trishuli and Devighat produced about half of their prior-year output in those two months. On 8 July 2025 the Lhende Khola flood triggered force majeure at Rasuwagadhi, which exported nothing for four months and resumed in Mangsir 2082 at 8.5 GWh against a later monthly norm of 23–28 GWh. The three-year baselines include these depressed months, so the baselines and the losses built on them are conservative (Section 4.6).

3.5 Trade Disruption

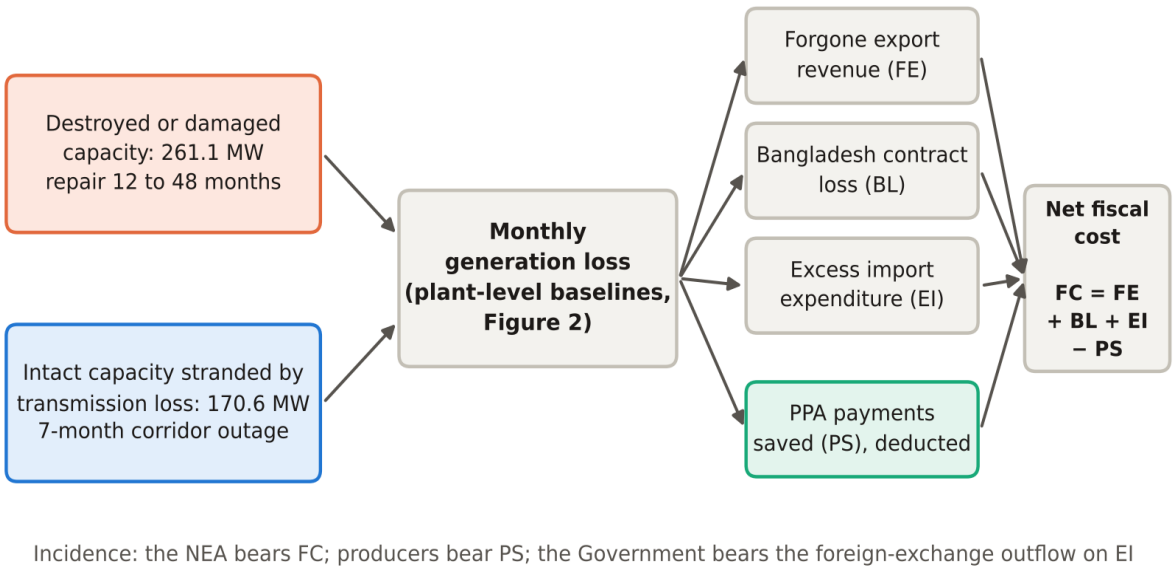
The Bangladesh export was suspended with about two and a half months of its delivery window remaining, and exports to India were curtailed at the seasonal peak. India's emergency approval allows up to 654 MW for 18 hours a day until 31 December 2026 over the Dhalkebar–Muzaffarpur 400 kV and Tanakpur–Mahendranagar 132 kV lines (The Kathmandu Post, 2026b), an energy ceiling of about 11.8 GWh a day. This is several times the replacement requirement estimated in Section 5.3, so the binding constraint on imports is price, not transfer capability.

4. Methods

4.1 Research Design

The design is a counterfactual before–after comparison with 26 August 2026 as the intervention date. Counterfactual generation, exports and imports are built from the pre-flood record, and the gap to the observed or projected path is attributed to the flood. Two measures result: a repair-period revenue ledger (the reference estimate) and a twelve-month trade-account ledger (Figure 1).

Figure 1 *Conceptual framework: transmission of the corridor loss to the fiscal account*



Note. Destroyed and stranded capacity feed the same monthly generation loss, which splits into three additive cost channels and one offsetting saving; the netted total is allocated across stakeholders in Section 6.2.

4.2 Energy Basis of Each Plant

NEA-owned plants. For Trishuli, Upper Trishuli 3A, Devighat and the Nuwakot grid solar plant, annual energy is the mean of recorded generation over FY 2080/81 to FY 2082/83 (mid-July 2023 to mid-July 2026), the span with consistent monthly records, and the monthly profile is the three-year mean of each calendar month. The solar plant is the exception: monthly records exist only for FY 2082/83 (32.72 GWh), so its annual energy of 33.36 GWh is the mean of three annual totals and its monthly profile is the FY 2082/83 record. Profiles are in Appendix B.

Independent producer with records. Mailung Khola (5 MW) is valued at the mean of its FY 2081/82 and FY 2082/83 monthly export statements, 23.63 GWh a year (dry 4.33, wet 19.30). Its PPA is past the escalation period and carries plant-specific tariffs of NPR 5.27 (dry) and NPR 3.72 (wet) per kWh, used here in place of the standard rates.

NEA subsidiaries. Chilime (22 MW) is valued at mean company-reported generation for FY 2080/81 and FY 2081/82, 144.42 GWh a year, with realised revenue of NPR 1,120.8 million a year (NPR 7.76 per kWh). Rasuwagadhi (111 MW) entered commercial operation in Poush 2081 (January 2025) and lost four months to the July 2025 flood, so it has no clean operating year; it is valued at its design energy of 613.9 GWh a year (dry 84.3, wet 529.6) at the PPA rates of NPR 8.40 and 4.80 per kWh.

Pre-commissioning projects. These are valued at design or contracted energy, and their loss is delayed, not interrupted, output: Upper Trishuli-1 at its PPA contract energy of 1,456.4 GWh (dry 306.7, wet

1,149.7); Langtang Khola at its published design energy of 133.3 GWh (dry 34.7, wet 98.6); Upper Trishuli 3B at 292.58 GWh (dry 134.88, wet 157.70). No energy figure is published for Rasuwa Bhotekoshi (120 MW). Its 654.9 GWh (dry 93.9, wet 561.0) is a flow-duration estimate calibrated on the adjacent Rasuwagadhi plant, which shares the river reach and the design discharge of 80 m^3/s; the scale factor was set so that the Rasuwagadhi model reproduces its design energy of 613.9 GWh. Super Trishuli, Middle Trishuli Ganga and Upper Mailung A have no energy basis and are excluded, which makes the ledger conservative.

Stranded plants. The 170.6 MW stranded tranche comprises seven plants on two corridors (Table 2). No monthly records were available. Annual energy and realised revenue are published for five: Sanjen, Upper Sanjen, Upper Mailung, Upper Tadi and Lower Tadi. The other two are scaled by capacity from an audited cascade neighbour, Salasungi from Sanjen and Tadi Thaprek's revenue from the equal-capacity Lower Tadi. For Lower Tadi and Tadi Thaprek the energy is the developer's published design energy (32.1 and 32.5 GWh), not recorded output. A rating report puts Lower Tadi's FY 2022/23 generation at about 83 per cent of contract energy, so the energy of these two plants is an upper bound. The tranche produces 952.5 GWh a year for a reported NPR 4,932.2 million, a realised tariff of NPR 5.18 per kWh and an implied plant factor of 0.637, close to the 0.651 of the measured corridor plants. The loss booked is the seven-month corridor outage (Bhadra–Falgun 2083): 58 per cent of the annual figures, the mean share of annual output falling in that window across the six affected plants with monthly records (range 53.1–62.6 per cent). This gives 552.5 GWh and NPR 2,860.7 million (USD 20.4 million) of plant-level revenue. The residual estimation error, confined to the two scaled plants, is bounded in Section 5.4.

Table 2 *The stranded tranche: capacity, energy and revenue basis by plant*

Plant	MW	Evacuation corridor	Annual energy (GWh)	Annual revenue (NPR million)	Basis	Seven-month revenue loss (NPR million)
Salasungi (Sanjen Khola)	78.0	Chilime–Trishuli 220 kV	422.6	2,244.3	Estimated	1,301.7
Sanjen (Lower)	42.5	Chilime–Trishuli 220 kV	241.9	1,227.8	Company report	712.1
Upper Sanjen	14.8	Chilime–Trishuli 220 kV	82.4	413.8	Company report	240.0
Upper Mailung	14.3	Chilime–Trishuli 220 kV	79.7	431.1	Company report	250.0
Upper Tadi	11.0	Tadi Khola–Samundratar 132 kV	61.3	248.7	Company report	144.2
Tadi Thaprek	5.0	Tadi Khola–Samundratar 132 kV	32.5	181.5	Estimated	105.3
Lower Tadi (Tadikhola)	5.0	Tadi Khola–Samundratar 132 kV	32.1	185.0	Company report	107.3
Total	**170.6**		**952.5**	**4,932.2**		**2,860.7**

Note. Annual energies and revenues are the latest available company disclosures; the energies of Lower Tadi and Tadi Thaprek are published design energies, not recorded output; Salasungi and Tadi Thaprek are scaled by installed capacity from the audited figures of Sanjen and Lower Tadi respectively and carry 49 per cent of the tranche's revenue. The seven-month loss applies the 58 per cent Bhadra–Falgun window share to the annual figures; the total of NPR 2,860.7 million converts to USD 20.4 million at

NPR 140 per USD. The Sanjen plants are Chilime-group companies, so part of the tranche's loss accrues within the NEA group (Section 4.3).

Monthly profiles. Plants with monthly records use their own profiles. Rasuwagadhi's design dry and wet energies are distributed within each season in proportion to the composite monthly shape of the measured hydropower plants; for Chilime and the stranded plants, annual energy is distributed across all twelve months by the same shape (Figure 2).

4.3 The Repair-Period Revenue Ledger

For each affected plant *i*, the revenue loss over its repair period is

$$RL_i = A_i \times T_i \times P \quad (1)$$

where A_i is annual energy (Section 4.2), T_i the repair time in years (Table 1) and P the valuation rate. For the stranded tranche T_i is the seven-month corridor outage, and the producer-level value is company-reported revenue (Table 2), not a PPA-tariff inference. The economy-wide loss values each unit at the NEA's average domestic sales realisation of NPR 9.69 per kWh (FY 2082/83 gross domestic sales revenue of NPR 119,830 million over internal sales of 12,367 GWh; NEA, 2026a).

The economy-wide figure is split by ownership. The loss to an IPP is its forgone PPA revenue: dry-season energy at NPR 8.40 and wet-season energy at NPR 4.80 per kWh in the first year, escalated at 3 per cent a year (Mailung Khola at its plant-specific tariffs, without escalation). The net loss to the NEA is the residual, sales value less the PPA payments it would have made, so the two parts sum to the economy-wide figure. Rasuwagadhi and Chilime sell under PPAs but are consolidated subsidiaries; their loss is carried in the NEA column and the subsidiary-level portion is given in the note to Table 4. Sums are undiscounted, at constant prices, converted at NPR 140 per USD.

4.4 The Trade-Account Ledger

Let *t* index the twelve Nepali months from the flood (Bhadra 2083 to Shrawan 2084; 26 August 2026 to mid-August 2027, with Bhadra counted for its 21 post-flood days). The fiscal cost to the utility in month *t* is

$$FC(t) = FE(t) + EI(t) + BL(t) - PS(t) \quad (2)$$

where FE is forgone export revenue, EI excess import expenditure, BL the Bangladesh contract loss and PS the saving in PPA payments on undelivered energy. PS enters negatively because the NEA is relieved of take-or-pay obligations; nationally it is a transfer between utility and producers (Section 6.2). The monthly corridor loss L(t) is the sum of the Section 4.2 profiles of all operating plants, with the stranded tranche included until reconnection (end of Falgun 2083, mid-March 2027, in the central case). The Bangladesh tranche B(t) is 40 MW around the clock until 15 November 2026 (Kartik 29, 2083): 20.2 GWh in the truncated Bhadra, 29.8 GWh in Ashwin and 27.8 GWh in Kartik. The residual, L(t) − B(t), is split by a marginal rule taken from the national trade record. While the same-month FY 2082/83 net export position covers the residual, it displaces exports one-for-one. Otherwise displacement is capped at the same-month export volume and the remainder is imported.

Prices come from the record where one exists. Displaced exports are valued at the FY 2082/83 realisation of NPR 7.45 per kWh (NPR 29,526 million over 3,965 GWh), and the Bangladesh tranche at its contract tariff of 6.4 US cents (NPR 8.96 at NPR 140 per USD). Replacement imports are priced at NPR 11.50 per kWh in the dry months, the published dry-season average (Republica, 2024), and at the FY 2082/83 blended cost of NPR 9.02 (NPR 10,560 million over 1,171 GWh) otherwise; NPR 9.02 and NPR 16.00 bound the dry-season price in the sensitivity analysis. PS applies to all lost energy other than that of the four NEA-owned plants: NPR 8.40 (dry) and NPR 4.80 (otherwise) for Rasuwagadhi

and the stranded plants, NPR 7.76 for Chilime and NPR 5.27/3.72 for Mailung Khola. Bangladesh deliveries are assumed to resume on 15 June 2027.

4.5 Nature and Sources of Data

The secondary data used in the two ledgers, and their sources, are listed in Table 3.

Table 3 Secondary *data and sources*

Data	Source	Frequency
Plant-level monthly generation, FY 2080/81–2082/83: Trishuli, Devighat, Upper Trishuli 3A, Nuwakot grid solar	NEA Load Dispatch Centre and NEA Grid Solar and Energy Efficiency Project records	Monthly
Rasuwagadhi energy export, Poush 2081–Shrawan 2083; Chilime annual generation and revenue	Company monthly export statements and annual disclosures	Monthly; annual
Mailung Khola energy export, Baisakh 2081–Shrawan 2083	Company records via Ministry of Energy damage reporting	Monthly
National import and export volume and value, FY 2073/74–2082/83	NEA Power Trade Department; NEA annual reports	Monthly and annual
Design energies and PPA tariffs	PPA filings; Department of Electricity Development; company reports	Fixed
Bangladesh contract tariff and delivery schedule	NEA–NVVN–BPDB agreement (public summary)	Fixed
Stranded-plant annual energies and revenues (Table 2)	Company annual reports and disclosures (five plants); capacity-scaled estimates (Salasungi, Tadi Thaprek)	Annual
Plant damage status and repair timelines	Ministry of Energy damage list; IPPAN; NEA damage committee	Event-dated
Exchange rate	NPR 140 per USD, as used in the underlying records	Fixed

Note. The monthly series are reproduced in Appendix A. Primary data comprise five to six semi-structured interviews with officials of the NEA's Power Trade Department and Load Dispatch Centre, IPPAN, one affected independent producer and an energy economist; interview data are used for interpretation and validation, not estimation.

4.6 Study Period and Validity

The baseline runs from Shrawan 2080 to Ashadh 2083 (July 2023 to July 2026) and the trade window from Bhadra 10, 2083 to the end of Shrawan 2084. A six-month subtotal to the end of Magh 2083 (12 February 2027) is reported separately. Damage classifications are frozen at 25 September 2026; later reclassifications enter only the sensitivity analysis, which varies the import price, the reconnection date and the stranded-plant energy basis.

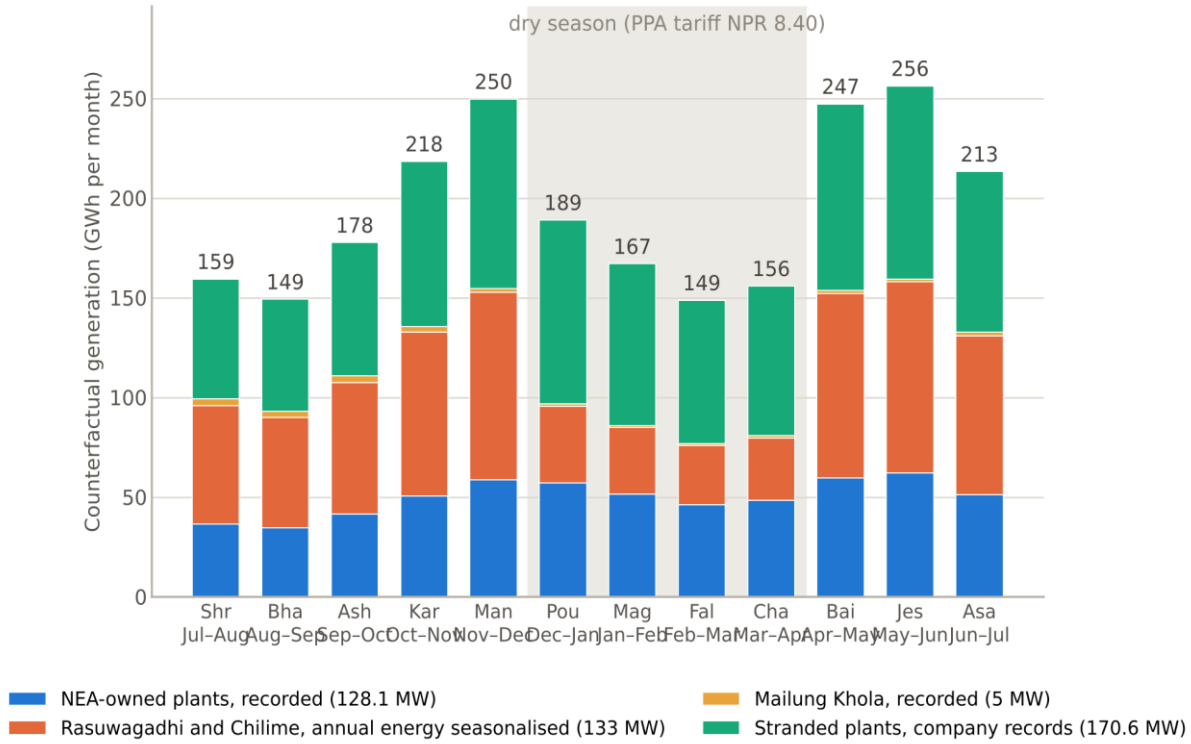
Hydrological variation is mitigated by three-year averaging. The baselines are biased downward because they include the months depressed by the 2024 and 2025 floods (Section 3.4); excluding those months would raise the annual baselines of Upper Trishuli 3A, Trishuli and Devighat to 436.7, 113.7 and 85.9 GWh, or 11.5, 15.6 and 15.8 per cent above the values used. Nepal's own import demand may raise exchange prices, which would make the central trade-ledger estimate a lower bound. Conversely, wet-season export displacement is counted one-for-one although some lost monsoon energy might have been curtailed by interconnection limits, so FE is an upper bound for those months. Results are therefore reported as ranges.

5. Results

5.1 Counterfactual Generation of the Affected Operating Plants

Figure 2 shows the monthly profiles of the operating plants. Counterfactual output is 2,332.0 GWh a year: 597.6 GWh from the four NEA-owned plants, 758.3 GWh from Rasuwagadhi and Chilime, 23.6 GWh from Mailung Khola and 952.5 GWh from the stranded plants. This is 12.5 per cent of total energy available in FY 2082/83 (18,624 GWh), 59 per cent of export volume and 19 per cent of internal sales (NEA, 2026a). The recorded plants peak in Kartik and Mangsir (October to December) and hold about three-quarters of that output through the dry season; with Rasuwagadhi's wet-heavy design split, the composite falls to about 150–190 GWh a month between Poush and Chaitra.

Figure 2 *Counterfactual monthly generation of the affected operating plants, by group*



Note. NEA-owned plants and Mailung Khola are three-year and two-year monthly means of recorded generation; Rasuwagadhi (design energy) and Chilime (two-year mean of annual generation) are seasonalised by the measured hydropower plants' composite shape; the stranded plants are the seven-plant tranche of Table 2 (952.5 GWh a year from company records), distributed by the same composite shape. Values are in Appendix B.

5.2 The Reference Estimate: Revenue Loss over the Repair Period

Table 4 gives the reference estimate from Equation (1).

Table 4 *Forgone generation and revenue over indicative repair or outage periods, by plant*

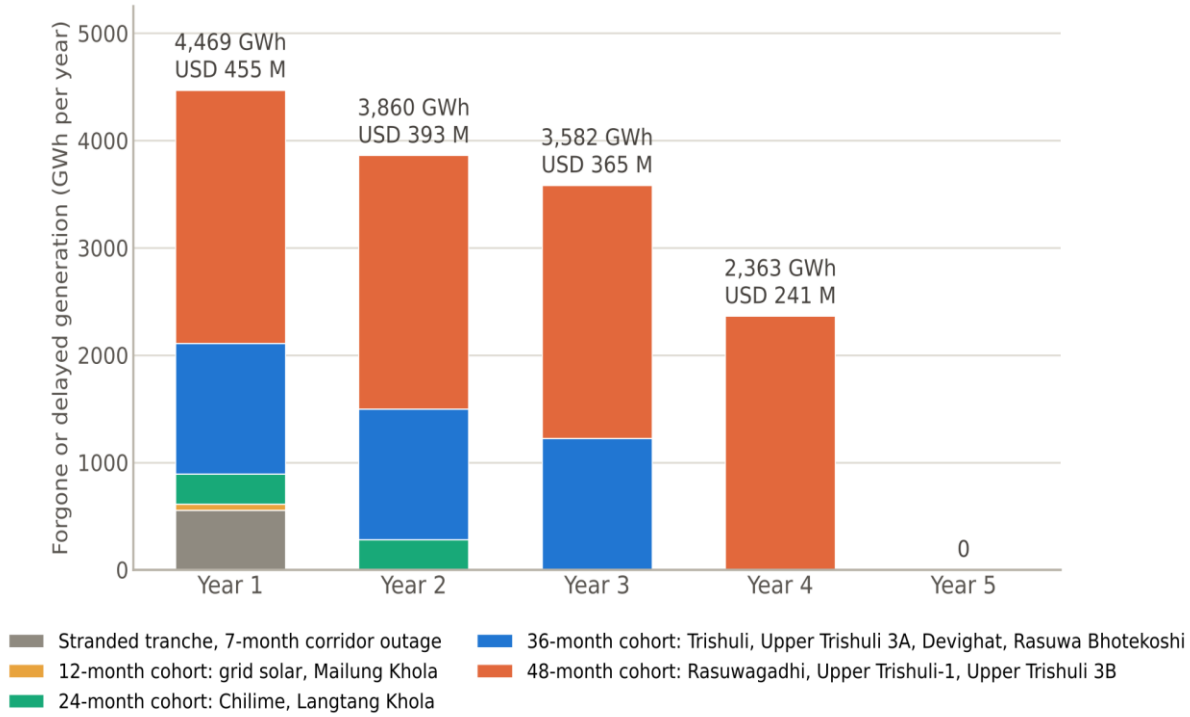
Plant	Energy basis	Annual energy (GWh)	Repair (months)	Generation loss (GWh)	Net loss to NEA (USD M)	Loss to producers (USD M)	Economy-wide loss (USD M)
Trishuli	3-yr mean, recorded	98.36	36	295.1	20.4	—	20.4
Upper Trishuli 3A	3-yr mean, recorded	391.64	36	1,174.9	81.3	—	81.3
Devighat	3-yr mean, recorded	74.24	36	222.7	15.4	—	15.4
Grid solar (Nuwakot)	3-yr mean, recorded	33.36	12	33.4	2.3	—	2.3
Rasuwagadhi†	Design energy	613.90	48	2,455.6	170.0	—	170.0
Chilime†	2-yr mean, recorded	144.42	24	288.8	20.0	—	20.0
Mailung Khola	2-yr mean, recorded	23.63	12	23.6	1.0	0.7	1.6
Stranded tranche (7 plants) ‡ (	Company records Table 2)	952.50	7 (outage)	552.5	17.8	20.4	38.2
Langtang Khola*	Design energy	133.30	24	266.6	7.4	11.1	18.5
Upper Trishuli-1*	PPA contract energy	1456.40	48	5,825.6	161.3	241.9	403.2
Rasuwa Bhotekoshi*	Modelled (flagged)	654.90	36	1,964.7	59.1	76.9	136.0
Upper Trishuli 3B*	Design energy	292.58	48	1,170.3	24.5	56.5	81.0
Total				**14,273.8**	**580.5**	**407.4**	**987.9**

Note. Calculated from NEA and company records (NEA, 2026b) as described in Section 4.2. Operating plants are valued at recorded output; pre-commissioning plants (*) at design or contracted energy, so their rows measure delayed rather than interrupted generation. The economy-wide column values each unit at the NEA's average domestic sales realisation of NPR 9.69 per kWh; the producer column is the PPA revenue forgone by independent producers (NPR 8.40 dry and 4.80 wet, escalated 3 per cent a year; Mailung Khola at 5.27/3.72 without escalation); the NEA column is the residual, so the NEA and producer columns are additive. †Rasuwagadhi and Chilime are NEA subsidiaries consolidated in the NEA column; at subsidiary level their forgone PPA revenue is USD 103.0 million (Rasuwagadhi, four years at 8.40/4.80 escalated from its 2081 commissioning) and USD 16.0 million (Chilime, two years at realised revenue). The stranded tranche is valued over its seven-month corridor outage; its producer figure is company-reported revenue scaled by the 58 per cent window share (Table 2), of which the Chilime-group Sanjen plants account for NPR 952.1 million (USD 6.8 million) accruing within the NEA group. Sums are undiscounted at constant prices over the stated repair or outage times; columns may not add exactly owing to rounding. Converted at NPR 140 per USD.

Forgone generation of 14,274 GWh has an economy-wide revenue value of USD 987.9 million (NPR 138.3 billion). The NEA bears a net USD 580.5 million and producers lose USD 407.4 million in contracted revenue, led by Upper Trishuli-1 (USD 241.9 million), whose 2027 commissioning is set back by an estimated four years. The stranded tranche contributes 552.5 GWh and USD 38.2 million, of which USD 20.4 million is plant-level revenue; it is the only row whose loss ends with a transmission repair. Upper Trishuli-1, Rasuwagadhi and Rasuwa Bhotekoshi account for 72 per cent of the total. Forgone revenue is about 35 per cent of the RDNA's NPR 390.62 billion for physical reconstruction.

Figure 3 shows the time path. The annual loss starts at 4,469 GWh (USD 309 million, about USD 0.85 million a day), including 552.5 GWh from the stranded tranche until its March 2027 reconnection. It falls only modestly in Years 2 and 3 (3,860 and 3,582 GWh), because the 12- and 24-month repairs are the smallest plants, then to 2,363 GWh in Year 4, and reaches zero in Year 5 when Rasuwagadhi, Upper Trishuli-1 and Upper Trishuli 3B return. The 48-month cohort carries 66 per cent of the total loss.

Figure 3 *Annual generation loss by repair cohort, Years 1–5 after the flood*

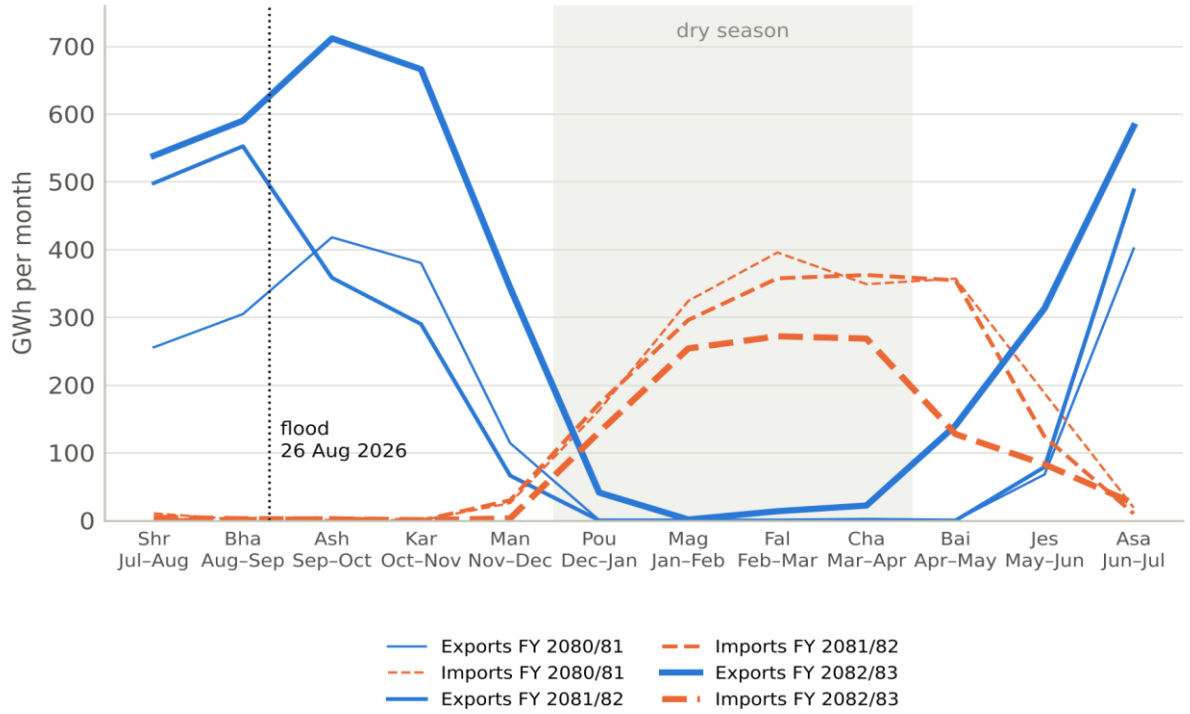


Note. Calculated from Table 4. Each cohort leaves the loss when its repair period ends; the stranded tranche leaves at its central-case reconnection in mid-March 2027. Pre-commissioning projects are counted from their planned 2027 commercial operation dates, which fall within the first year after the flood. Revenue is valued at NPR 9.69 per kWh and converted at NPR 140 per USD.

5.3 The Trade-Account Cost in the First Twelve Months

The trade ledger covers the twelve months to mid-August 2027. At the time of writing (late October 2026) actuals exist only for the opening weeks, and later months are projections from the Section 4.2 profiles. In the national trade account (Figure 4), exports run from Shrawan to Mangsir and collapse by Poush, when imports rise towards the late-winter peak, so the composition of the loss changes midway. Table 5 gives the monthly energy accounting.

Figure 4 *National monthly electricity trade, FY 2080/81–2082/83*



Note. Constructed from NEA Power Trade Department records (NEA, 2026b). Line weight increases with recency; FY 2082/83 is the heaviest line. Exports (solid) peak between Bhadra and Kartik; imports (dashed) peak between Magh and Baisakh. The flood struck at the height of the export season; the shaded band marks the PPA dry season.

Table 5 *Monthly energy accounting of the corridor loss, central scenario (GWh)*

Month	Destroyed plants	Stranded plants	Corridor loss	Bangladesh tranche	Export displacement	Import replacement	Counterfactual net exports
Bhadra* (from 26 Aug)	63.1	38.0	101.1	20.2	80.9	0.0	398.5
Ashwin	110.7	66.9	177.6	29.8	147.8	0.0	710.0
Kartik	135.6	82.8	218.4	27.8	190.6	0.0	665.5
Mangsir	154.7	95.0	249.7	0.0	249.7	0.0	340.5
Poush	96.8	92.1	189.0	0.0	41.1	147.9	-89.3
Magh	85.9	81.0	167.0	0.0	1.4	165.6	-252.5
Falgun	76.7	72.0	148.7	0.0	13.6	135.1	-258.1
Chaitra	80.7	0.0	80.7	0.0	22.0	58.6	-246.4
Baisakh	153.5	0.0	153.5	0.0	140.2	13.3	12.8
Jestha	159.2	0.0	159.2	0.0	159.2	0.0	230.5
Ashadh	132.6	0.0	132.6	0.0	132.6	0.0	556.5
Shrawan	99.3	0.0	99.3	0.0	99.3	0.0	534.4
Six months to Magh	646.8	455.9	1,102.7	77.8	711.5	313.4	—
Twelve months	**1,348.9**	**527.8**	**1,876.7**	**77.8**	**1,278.5**	**520.4**	—

Note. Calculated from the profiles of Appendix B and Equation (2). *Bhadra is counted for 21 of 31 days. The counterfactual net trade position is the same-month FY 2082/83 actual (Figure 4), prorated in Bhadra. Export displacement in Poush to Chaitra is capped at the same-month export volume; the remainder of the residual loss is replaced by imports. The stranded plants return at the start of Chaitra 2083 (mid-March 2027) in the central case, so they are counted for exactly the seven-month outage of Table 2.

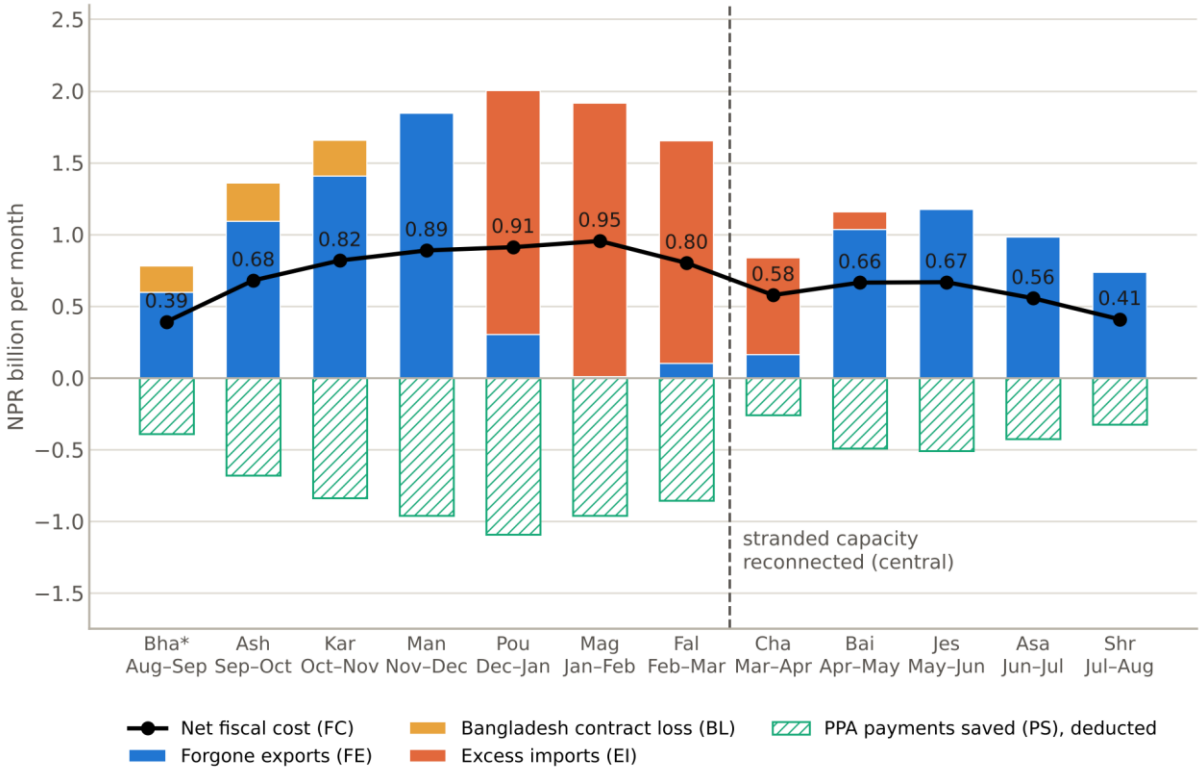
Table 6 and Figure 5 value these flows at the prices of Section 4.4. In Ashwin, for example, the residual 147.8 GWh is entirely export displacement, so FE = 147.8 GWh × NPR 7.45 = NPR 1,101 million, BL = 29.8 GWh × NPR 8.96 = NPR 267 million, EI = 0, PS = NPR 681 million and FC = NPR 687 million.

Table 6 *Estimated monthly trade-account cost components, central scenario (NPR million)*

Month	Forgone exports (FE)	Bangladesh loss (BL)	Excess imports (EI)	PPA saving (PS), deducted	Net fiscal cost (FC)
Bhadra*	603	181	0	(388)	396
Ashwin	1,101	267	0	(681)	687
Kartik	1,420	249	0	(839)	830
Mangsir	1,860	0	0	(958)	903
Poush	306	0	1,700	(1,093)	913
Magh	10	0	1,904	(960)	954
Falgun	101	0	1,553	(853)	801
Chaitra	164	0	674	(260)	578
Baisakh	1,044	0	120	(492)	672
Jestha	1,186	0	0	(509)	677
Ashadh	988	0	0	(425)	563
Shrawan	740	0	0	(325)	414
Six months to Magh	5,301	697	3,605	(4,919)	4,683
Twelve months	**9,525**	**697**	**5,952**	**(7,784)**	**8,390**

Note. Central scenario: dry-season import price NPR 11.50, stranded plants reconnected mid-March 2027. Twelve-month FC = NPR 8.39 billion ≈ USD 59.9 million; six-month FC = NPR 4.68 billion ≈ USD 33.4 million at NPR 140 per USD. Parentheses denote a deduction; columns may not add exactly owing to rounding. *Partial month.

Figure 5 *Monthly trade-account cost components and net cost, central scenario*



Note. Positive bars stack the three cost channels; the hatched bar below zero is the PPA saving; the line marks the monthly net cost. The dashed line marks the central-scenario reconnection of the stranded plants.

The monthly net cost rises from NPR 0.40 billion in the truncated first month to a peak of NPR 0.95 billion in Magh, and its composition reverses. Through Mangsir the loss is almost entirely forgone exports (NPR 5.0 billion over four months, plus NPR 0.70 billion on the Bangladesh contract). From Poush it is almost entirely import expenditure at NPR 11.50 against a forgone export realisation of NPR 7.45, a wedge of 54 per cent. After the stranded plants reconnect in March the cost settles at NPR 0.4–0.7 billion a month. Over twelve months the net cost to the utility is NPR 8.39 billion (USD 60 million), 44 per cent of the FY 2082/83 trade surplus; the six months to Magh account for NPR 4.68 billion. The gross flow, before netting the PPA transfer, is NPR 16.2 billion, of which the import bill of NPR 5.95 billion (USD 43 million) is a foreign-currency outflow. Replacement imports of 507 GWh in the four dry months imply an average draw of about 176 MW, well inside India's emergency ceiling.

5.4 Sensitivity

Table 7 *Twelve-month net trade-account cost across reconnection and import-price scenarios (NPR billion)*

Reconnection of stranded plants	Dry-season import at NPR 9.02	NPR 11.50 (central)	NPR 16.00
By mid-December 2026 (start of Poush)	6.98	7.63	8.81
Mid-March 2027 (central; seven-month outage)	7.14	8.39	10.68
Not within the first year	8.20	9.65	12.27

Note. The central cell pairs the NEA's stated reconnection timeline with the published dry-season average import price. The six-month subtotal to Magh is NPR 3.80–6.09 billion across the same cells (NPR 4.68 billion central).

Table 7 varies the two parameters that dominate the trade ledger: the reconnection date and the dry-season import price. Each rupee on the dry-season import price adds NPR 0.51 billion over the first year (507 GWh of replacement imports); the spread between the NPR 11.50 and 16.00 paths is NPR 2.29 billion. Each month by which reconnection is advanced within the dry season saves about NPR 0.22 billion net (NPR 0.83 billion gross, before the PPA offset). A reconnection that slips past the 2027 monsoon adds NPR 1.24 billion.

The stranded-tranche inputs are narrowly bounded. A ±20 per cent error on the energy of the two capacity-scaled plants moves the twelve-month net cost by only ±NPR 0.14 billion, because the tranche is PPA-held and only the margin between the trade price and the PPA tariff is at stake. Across the observed range of the window share (53.1–62.6 per cent), the seven-month revenue loss to the stranded producers lies between NPR 2.62 and 3.09 billion (USD 18.7–22.1 million).

5.5 Impact on Imports and Exports

Within FY 2083/84, export displacement of 1,179 GWh and suspended Bangladesh deliveries of 78 GWh take annual exports from 3,965 GWh towards 2,708 GWh. Replacement imports of 520 GWh lift annual imports from 1,171 GWh towards 1,691 GWh, reversing three years of decline (1,895, 1,681 and 1,171 GWh). Table 8 summarises the projection.

Table 8 *Projected cross-border trade with post-flood capacity, FY 2083/84 central scenario*

Indicator	FY 2082/83 actual	FY 2083/84 projected	Change
Exports (GWh)	3,965	2,708	-32%
Imports (GWh)	1,171	1,691	+44%
Net energy surplus (GWh)	2,794	1,017	-64%
Export earnings (NPR billion)	29.53	20.17	-32%
Import bill (NPR billion)	10.56	16.51	+56%
Net trade surplus (NPR billion)	18.97	3.66	-81%

Note. Projected from the monthly model of Section 4.4 over Bhadra 2083 to Ashadh 2084 (Shrawan 2083 pre-dates the flood), with the stranded plants reconnected in mid-March 2027, the dry-season import price at NPR 11.50 and the Bangladesh contract suspended for the 2026 season. The projection isolates the flood effect: capacity commissioned elsewhere on the system, demand growth and hydrology would shift both columns and are netted out. Values at FY 2082/83 average realisations (NEA, 2026a).

Nepal remains a wet-season net exporter in energy terms, but the net trade surplus shrinks by more than four-fifths in value: each displaced unit is forgone at NPR 7.45 and replaced at NPR 11.50 or more. Imports peak in Magh to Chaitra, beyond the current Indian emergency approval. Exports recover stepwise with the repair cohorts of Figure 3, and fully only when the 48-month cohort returns.

6. Discussion

6.1 Principal Findings

Repair speed is the main lever. The economy-wide revenue loss is USD 987.9 million on 14,274 GWh, of which USD 580.5 million falls on the NEA and USD 407.4 million on producers (Table 4). Three projects carry nearly three-quarters of the total and the 48-month cohort carries the later years; Year 4 alone is worth USD 164 million.

The near-term cost shifts from exports to imports. Within the NPR 8.39 billion net cost of the first twelve months, the loss arrives first as forgone exports (NPR 10.2 billion gross, including the Bangladesh contract) and from Poush as imports (NPR 6.0 billion) bought at NPR 11.50–16.00 against a forgone realisation of NPR 7.45–8.96. Measuring only one side would understate the total. The import requirement peaks as India's emergency approval lapses, so the December 2026 review is the most consequential near-term decision.

Much of the near-term loss needs no powerhouse rebuilt. Stranded plants account for 41 per cent of the energy lost in the six months to Magh and 28 per cent over the first year. The loss of one substation hub took 170.6 MW offline for seven months at a plant-level revenue cost of NPR 2.86 billion (USD 20.4 million), about NPR 0.41 billion a month, which makes reconnection the highest-return recovery investment identified here.

6.2 Distribution of the Burden

Table 9 *Estimated distribution of the fiscal burden*

Stakeholder	Estimated burden	Channel
Nepal Electricity Authority	NPR 8.39 billion net in the first twelve months; USD 581 million net over the repair period	Forgone trading and sales revenue, lost margin on units purchased from independents, and excess import cost, net of PPA savings
Power producers (IPPs and NEA subsidiaries)	NPR 7.78 billion of PPA revenue in the first twelve months; USD 407 million (IPPs and stranded tranche, incl. USD 20.4 million over the seven-month outage) and USD 119 million (subsidiaries) over the repair period	Forgone PPA revenue on undelivered energy under take-or-pay contracts; partially insurable
Government of Nepal	Indirect	Foreign-exchange outflow of USD 43 million on first-year replacement imports; reduced NEA dividend, royalty and tax capacity; contingent reconstruction liabilities

Note. Because PS is a transfer from producers to the NEA rather than a national saving, the economy-wide gross flow in the first year is NPR 16.2 billion, of which the import bill is a real foreign-currency outflow. The repair-period figures are the net NEA loss and the producer losses of Table 4; the subsidiary figure is the PPA revenue forgone by Rasuwagadhi and Chilime noted there.

Table 9 allocates the losses across the three exposed parties. For the NEA the shock falls on revenue (lost trading margin) and on cost (dry-season imports) at once, compressing the operating surplus from

which dividends and counterpart financing are drawn. For listed corridor producers the revenue interruption comes on top of asset damage and raises debt-service and refinancing risk on project-financed structures whose covenants assume contracted delivery.

6.3 Policy Implications

Transmission redundancy. Cascade corridors should have at least two independent evacuation routes. Each avoided month of outage at dry-season import prices is worth about NPR 0.83 billion gross to the trade account (NPR 0.22 billion net of the PPA offset) and NPR 0.41 billion to the stranded producers.

Storage-backed export commitments. Firm cross-border contracts such as the Bangladesh sale should be backed by storage or by a portfolio spread across basins, so that a single-corridor loss does not suspend the contract.

Flow-loss insurance. Parametric insurance triggered by observable indices (gauged discharge, seismic intensity, substation outage duration) could cover the revenue losses measured here, which conventional asset insurance does not; Table 4 and Figure 3 give the exposure.

Import-price management. A fixed-price emergency tranche with India for declared-disaster periods would cap the most sensitive near-term parameter; the spread between the NPR 11.50 and 16.00 paths is NPR 2.29 billion in the first year.

Basin-wide risk assessment. Licensing should require corridor-level hazard assessment that treats co-located plants, lines and substations as a single exposure (Nepal News, 2026b; Section 3.4).

7. Conclusion

The Bhote Koshi flood removed about 432 MW and delayed a further 495 MW under construction. Over the repair horizon the forgone generation of 14,274 GWh is worth USD 0.99 billion, about USD 0.85 million a day in the first year, in addition to NPR 390.62 billion of physical reconstruction needs. In the trade account the first twelve months cost the utility NPR 8.39 billion net (range NPR 6.98–12.27 billion), first as forgone exports and then as dry-season imports priced more than 50 per cent above the forgone realisation. More than two-fifths of the near-term energy loss requires only transmission to recover.

The priorities that follow are the Trishuli 3B Hub reconnection, or a bypass line, ahead of any generation rebuild; a fixed-price disaster tranche in the December 2026 review of India's 654 MW emergency approval; and dual evacuation routes, parametric flow-loss insurance and storage or multi-basin backing for firm export contracts. The estimates are limited mainly by the absence of monthly records for the stranded tranche, and the near-term figures should be re-run as actuals are published.

CRediT authorship contribution statement

Puja Kharel: Conceptualization, Methodology, Investigation, Data curation, Formal analysis, Validation, Visualization, Resources, Project administration, Writing – original draft, Writing – review and editing. Aashish Katuwal: Formal analysis, Writing – review and editing.

Declaration of competing interest

No competing interests are declared.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Data availability

No separate dataset has been deposited. The data used are drawn from the published and institutional sources cited in the article and are reproduced in its tables and appendices.

Declaration of generative AI and AI-assisted technologies in the manuscript preparation process

During the preparation of this work the authors used Claude (Anthropic) to edit and condense the text, check the consistency of figures between the manuscript. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the published article.

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Appendix A: Plant-Level Generation Records

All values in MWh. Sources: NEA Load Dispatch Centre records (Trishuli, Devighat, Upper Trishuli 3A); NEA Grid Solar and Energy Efficiency Project generation summary; Rasuwagadhi Hydropower Company and Mailung Khola monthly energy export statements. Months depressed by the September 2024 and July 2025 floods (Section 3.4) are retained in the three-year means used in this study.

Table A.1 *Trishuli (24 MW)*

FY	Shr	Bha	Ash	Kar	Man	Pou	Mag	Fal	Cha	Bai	Jes	Asa	Total
2080/81	10,057	9,092	10,299	11,192	11,069	10,746	9,410	8,585	8,176	10,311	9,272	8,835	117,044
2081/82	8,308	4,699	4,520	9,235	8,827	8,780	9,991	8,298	9,457	10,046	9,286	6,253	97,700
2082/83	2,716	5,988	6,943	7,149	5,335	6,889	7,733	8,452	7,015	8,548	7,621	5,960	80,348
Mean	**7,027**	**6,593**	**7,254**	**9,192**	**8,410**	**8,805**	**9,045**	**8,445**	**8,216**	**9,635**	**8,726**	**7,016**	**98,364**

Table A.2 *Upper Trishuli 3A (60 MW)*

FY	Shr	Bha	Ash	Kar	Man	Pou	Mag	Fal	Cha	Bai	Jes	Asa	Total
2080/81	29,358	37,043	38,190	39,715	40,575	36,843	30,240	26,495	26,868	39,253	44,528	37,950	427,058
2081/82	35,325	4,163	6,050	23,033	42,640	39,815	34,760	29,105	32,158	36,223	43,010	29,693	355,975
2082/83	0	19,200	32,535	33,095	41,718	42,533	34,298	30,100	33,052	42,890	42,387	40,090	391,897
Mean	**21,561**	**20,135**	**25,592**	**31,948**	**41,644**	**39,730**	**33,099**	**28,567**	**30,693**	**39,455**	**43,308**	**35,911**	**391,643**

Table A.3 *Devighat (14.1 MW)*

FY	Shr	Bha	Ash	Kar	Man	Pou	Mag	Fal	Cha	Bai	Jes	Asa	Total
2080/81	7,170	6,384	7,138	8,432	8,382	7,903	6,864	6,475	6,276	7,967	7,137	6,703	86,831
2081/82	6,060	3,436	3,453	7,241	7,226	7,514	7,837	6,699	7,516	7,611	7,004	4,763	76,360
2082/83	1,700	4,328	5,062	5,290	3,797	5,262	5,865	6,485	5,532	6,633	5,597	3,976	59,527
Mean	**4,977**	**4,716**	**5,218**	**6,988**	**6,468**	**6,893**	**6,855**	**6,553**	**6,441**	**7,404**	**6,579**	**5,147**	**74,239**

Table A.4 *Nuwakot grid solar (25 MW), FY 2082/83 monthly; annual 33,681 (FY 2080/81), 33,682 (FY 2081/82), 32,720 (FY 2082/83), mean 33,361*

FY	Shr	Bha	Ash	Kar	Man	Pou	Mag	Fal	Cha	Bai	Jes	Asa	Total
2082/83	**2,783**	**3,003**	**3,230**	**2,515**	**2,059**	**1,783**	**2,312**	**2,488**	**3,080**	**2,995**	**3,335**	**3,137**	**32,720**

Table A.5 *Mailung Khola (5 MW), energy export*

FY	Shr	Bha	Ash	Kar	Man	Pou	Mag	Fal	Cha	Bai	Jes	Asa	Total
2081/82	3,886	3,757	3,544	2,802	1,795	1,105	928	744	837	764	1,062	1,739	22,964
2082/83	3,145	2,590	2,918	3,176	2,430	1,745	1,095	942	1,258	1,905	1,471	1,622	24,297
Mean	**3,515**	**3,174**	**3,231**	**2,989**	**2,113**	**1,425**	**1,011**	**843**	**1,048**	**1,334**	**1,267**	**1,681**	**23,631**

Note. Mailung Khola's fiscal-year totals here follow the monthly statements; the company's reported totals were 23,884 MWh for calendar year 2081, 22,865 MWh for 2082 and 5,881 MWh for the four months of 2083 before the flood (Baisakh–Shrawan), with revenues of NPR 95.9 million and NPR 89.2 million in the first two years, implying a realised tariff of about NPR 4.0 per kWh.

Table A.6 *Rasuwagadhi (111 MW), energy export by month*

Period	Month	Export (MWh)	Note
2081	Poush	12,070	Commercial operation period
2081	Magh	23,672	
2081	Falgun	19,963	
2081	Chaitra	22,508	
2082	Baisakh	26,511	
2082	Jestha	47,302	
2082	Ashadh	38,001	Force majeure recorded Ashadh 24, 3:00 a.m. (8 July 2025 flood)
2082	Shrawan–Kartik	—	No export for four months (2025 flood outage)
2082	Mangsir	8,491	Partial resumption
2082	Poush	27,979	
2082	Magh	24,707	
2082	Falgun	23,723	
2082	Chaitra	23,193	
2083	Baisakh	35,027	
2083	Jestha	40,447	
2083	Ashadh	25,021	
2083	Shrawan	45,902	Last full pre-disaster month

Note. The absence of a clean operating year is the reason Rasuwagadhi is valued at its design energy of 613.9 GWh (Section 4.2). Its recorded dry-season months (Poush–Chaitra 2082: 99.6 GWh) exceed the design dry-season energy of 84.3 GWh, so the design basis does not overstate dry-season output.

Appendix B: Monthly Profiles Used in the Trade Ledger (GWh)

Table B.1 *Monthly profiles used in the trade ledger (GWh)*

Plant	Shr	Bha	Ash	Kar	Man	Pou	Mag	Fal	Cha	Bai	Jes	Asa	Total
Trishuli	7.03	6.59	7.25	9.19	8.41	8.80	9.04	8.45	8.22	9.63	8.73	7.02	98.4
Upper Trishuli 3A	21.56	20.14	25.59	31.95	41.64	39.73	33.10	28.57	30.69	39.46	43.31	35.91	391.6
Devighat	4.98	4.72	5.22	6.99	6.47	6.89	6.86	6.55	6.44	7.40	6.58	5.15	74.2
Grid solar	2.78	3.00	3.23	2.51	2.06	1.78	2.31	2.49	3.08	3.00	3.33	3.14	32.7
Mailung Khola	3.52	3.17	3.23	2.99	2.11	1.42	1.01	0.84	1.05	1.33	1.27	1.68	23.6
Rasuwagadhi	50.33	46.98	56.05	69.38	79.58	24.25	21.33	18.94	19.79	78.49	81.27	67.53	613.9
Chilime	9.11	8.50	10.14	12.56	14.40	13.97	12.29	10.91	11.40	14.21	14.71	12.22	144.4
Stranded (170.6 MW)	60.08	56.09	66.91	82.82	95.00	92.12	81.03	71.95	75.18	93.70	97.02	80.62	952.5
Total	**159.38**	**149.20**	**177.62**	**218.39**	**249.68**	**188.96**	**166.96**	**148.70**	**155.84**	**247.21**	**256.22**	**213.26**	**2331.4**

Note. Trishuli, Upper Trishuli 3A, Devighat and Mailung Khola are the monthly means of Appendix A; grid solar is the FY 2082/83 monthly record (32.7 GWh, against the three-year annual mean of 33.36 GWh used in Table 4, so the total here is 0.6 GWh below the 2,332.0 GWh of Section 5.1). Rasuwagadhi distributes its design dry (84.3 GWh) and wet (529.6 GWh) energies within season by the composite shape of the four measured hydropower plants; Chilime (144.42 GWh) and the stranded plants (952.5 GWh, Table 2) distribute their annual energy by the same shape across all months. In the trade ledger each month is multiplied by the fraction of the month after the flood (21/31 for Bhadra 2083) and the stranded row is dropped after reconnection.