

Hawaii Power Grid Resilience

What four cyclones in seven weeks revealed, what the Philippine record shows, and a costed plan for the next decade

The 2026 season in one paragraph. Four tropical cyclones struck the Hawaiian Islands between 14 August and 3 October 2026. A Category 1 storm that never made landfall, whose eyewall passed within about thirty miles of South Point, cut power to 197,400 customers at a single moment on the morning of 16 August. A Category 5 hurricane, twice at that intensity, then struck Ni‘ihau and Kaua‘i directly and removed supply from 92% of Kaua‘i Cooperative's members. A Category 2 storm stalled south of the Big Island and left one community on Moloka‘i without power for five days — not for want of crews or weather, but because a private landowner withheld right-of-entry at the top of a trail. O‘ahu and Maui were restored inside two days. The difference between those two outcomes is not luck, and this report sets out exactly what it was.

The central finding is uncomfortable and specific. Hawaiian Electric's own quarterly reporting to the Department of Energy, published before the season, shows distribution hardening at about seventy per cent and fire-mitigation work effectively complete. It also shows transmission hardening still at the design phase, with installation not started. Two transmission lines that had not been hardened were destroyed by Lala and both now require full rebuilds. The money was not missing; it was sequenced after the assets that failed.

Prepared for	State of Hawaii — energy infrastructure resilience
Scope	2026 Central and East Pacific season; Hawaiian Electric, MECO, HELCO, KIUC and DoD utilities; Philippine transmission, distribution and regulatory record
Evidence base	16 figures, 16 costed actions, 8 transferable measures, 13 targets
Status of numbers	Every figure and table is traceable to a source listed in Appendix C. Claims that could not be verified are listed in Appendix A and appear nowhere as fact.
Plan cost	\$2.42B across three phases (\$598M / \$1,562M / \$262M). Planning estimates, not appropriations.

1 Executive summary

1.1 Four storms, seven weeks, two very different outcomes

The 2026 season produced the state's largest and its smallest restoration events inside the same five weeks. Both are documented, and the gap between them is the argument for everything that follows.

Storm	Dates	Intensity	Peak concurrent	Restoration	Disclosed cost
Lala	14-17 Aug	Cat 1	197,400	O'ahu/Maui 2; Hawai'i Is. 17 (major systems 31 Aug)	\$15-20M; \$30-40M (incl. Kona Lows)
Moke	20-23 Aug	TS	—	Delayed Lala work 4 days	not disclosed
Lowell	27 Aug-11 Sep	Cat 2 (Cat 5 twice)	33,319	Kaua'i 8 (mass), 14 (98%), 20+ (Kōke'e); O'ahu 1.5	\$40-50M (KIUC)
Nolo	23 Sep-3 Oct	Cat 2	16,000	West Maui 2; Kalaupapa 5	not disclosed

Peak concurrent is the maximum number of customers without power at one moment. It is not the number of customers who experienced an interruption; for Lala the two differ by roughly seventy thousand.

1.2 The five findings that matter

- Finding 1 — the assets that failed had not been hardened**

Two lines destroyed by Lala — the Hawai'i Volcanoes National Park to South Point Road circuit and the Upper Puna feeder — were both still in the design phase when the storm arrived. Both require full rebuilds. Hawaiian Electric's Vice President for engineering stated the trade-off plainly: hardening was concentrated in leeward fire-risk areas from Kona to Waikoloa, not in the southern regions Lala devastated. This is a sequencing decision, not a funding one.
- Finding 2 — the state cannot say why its own outages happened**

Hawaiian Electric is required to report granular outage-cause data in wildfire-prone areas. No equivalent requirement exists for extreme weather events. The Natural Hazard Mitigation Reports on file are still dated 21 August 2024, although the Commission's own order requires an update as soon as practicable after any natural hazard event. Civil Beat reported in September 2026 that HECO declined to release the last ten root-cause analyses for East Honolulu outages.
- Finding 3 — restoration speed is the whole story**

O'ahu cleared 95% of customers inside 24 hours and everyone inside 36. Kaua'i cleared a mass outage in eight days, reached 98% by day 14, and was still not complete at day 20. The difference was not the wind: O'ahu lost 21,000 customers to a stronger hurricane and recovered faster than Kaua'i did from a weaker one.
- Finding 4 — the four islands do not share anything**

There is no inter-island transmission. Four cyclones in seven weeks meant that no truck, transformer, line crew or helicopter could move between islands. Cooperation between the utilities ran on phone calls and an informal mutual assistance group with no standing protocol and no shared spares pool.

Finding 5 — federal help has not yet reached a household

Two emergency declarations and two major disaster declarations were issued between 25 August and 7 October 2026, all with Public Assistance and Direct Federal Assistance. Individual Assistance was still pending for all three storms as of 17 October, and the State's own record shows \$0 approved for individuals to date.

1.3 What the Philippine record actually shows

The Philippines is regularly cited in Hawaii as the model to copy. Some of that is right and much of the popular version is wrong. The verified record supports four specific lessons, and it undercuts three frequently repeated claims.

Frequently repeated claim	What the record shows
RA 11483 is a Philippine ‘lifeline systems’ law	RA 11483 is a national road act. The relevant laws are RA 9136 (EPIRA, 2001), DOE DC2018-01-0001 (Energy Resiliency Policy, 2018), RA 11646 (Microgrid Systems Act, 2022) and DOE DC2026-02-0008 (2026).
The Mindanao-Visayas link is 230 kV DC, 437 km, 400 MW	It is ±350 kV DC: 184 ckm of submarine cable plus about 526 ckm of overhead line, 450 MW, PhP 52bn, energised 30 April 2023.
The Leyte-Luzon HVDC link carries 2,000 MW	It has carried 440 MW in monopolar operation since 10 August 1998. A further 440 MW is planned under the Luzon-Visayas HVDC Bipolar Operation Project from March 2028.
Meralco cut SAIDI from 287 to 85 minutes	This appears in no Meralco or ERC record and is not used here. Meralco's own reported basis shows 163.00 minutes in 2020 falling to 97.501 in 2025.

Four corrections to widely repeated figures, established against primary sources. The Philippines' relevance to Hawaii is its small-island and cooperative-utility experience, not its largest utility.

1.4 The recommendation in one page

Adopt a sixteen-action programme costing \$2.42B across three phases. Phase 1, at \$598M, closes the gaps the 2026 season exposed and is dominated by completing transmission hardening. Phase 2, at \$1,562M, is the build. Phase 3, at \$262M, covers the structural work that outlasts this administration. The four cheapest actions in the plan — cause reporting, resilience compliance plans, statutory right-of-entry and a microgrid service-provider rule — together cost \$7.5M, under one third of one per cent of the total.

The plan is sequenced rather than scheduled. Nothing in the source record establishes a committed start date for any action, so this report does not invent one.

2 The 2026 season

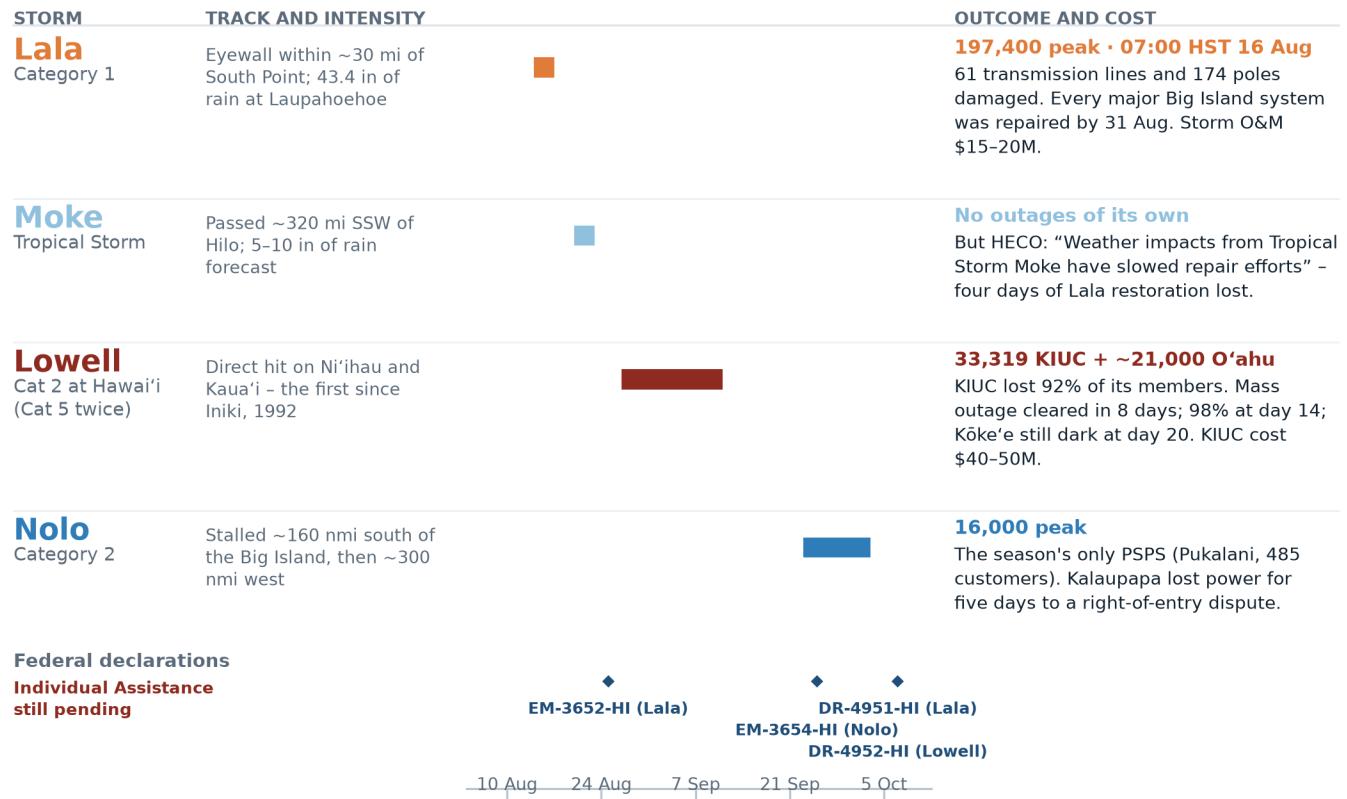
2.1 Chronology

Four tropical cyclones affected the Hawaiian Islands in seven weeks. Only one of them, Nolo, never came closer than about 160 nautical miles. That is the point of the season: the exposure was cumulative, and each storm landed on a system still recovering from the last.

Figure 1. Lala was the only storm to cause a mass outage; Moke caused none of its own but slowed Lala's restoration for four days; Lowell was the most intense cyclone of the season by a wide margin and the only one to strike an island directly; Nolo triggered the season's only planned shutoff.

Four tropical cyclones in seven weeks: the 2026 Hawai'i season

Storm windows, peak concurrent outages, what happened next, and the federal response



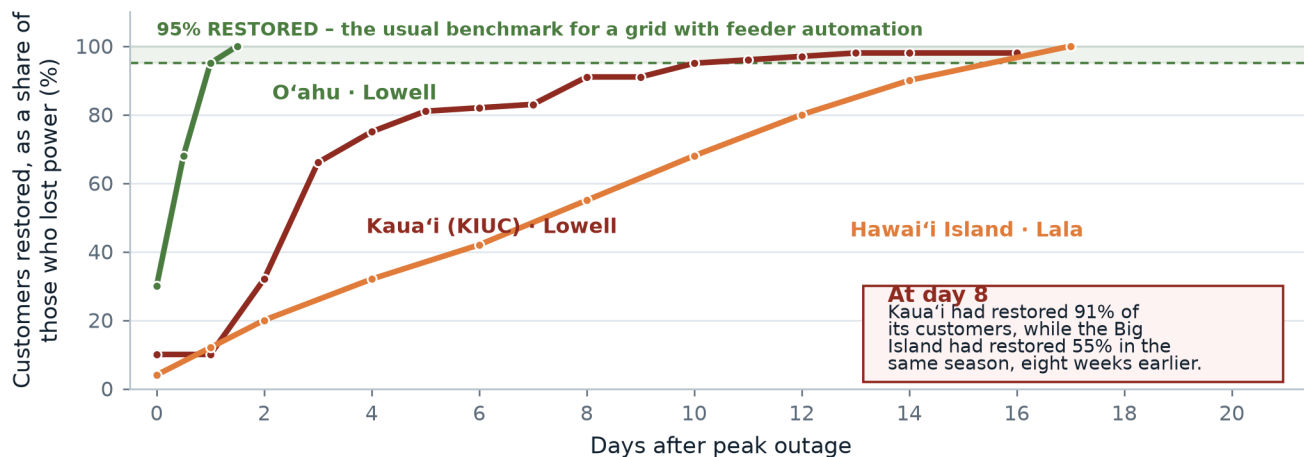
Peak outage figures: Lala 197,400 (Hawaiian Electric, 07:00 HST 16 Aug 2026); Lowell 33,319 of 36,333 KIUC members plus ~21,000 on O'ahu; Nolo 16,000 statewide. KIUC never published a 100%-restoration release, so no completion date is shown for Kaua'i. Sources: Hawaiian Electric news releases 16 Aug – 2 Oct 2026; KIUC restoration updates 8-24 Sep 2026; NWS Honolulu post-tropical cyclone reports for Lala and Nolo; FEMA and Federal Register declaration record; Governor's office releases Aug-Oct 2026.

Figure 2. O‘ahu, which lost fewer customers than Kaua‘i, restored them nearly eight times faster. The Hawai‘i Island line is interpolated between disclosed milestones and shows the shape of recovery, not a published daily series.

Restoration speed is the clearest measure of grid readiness

Kaua‘i cleared a mass outage in eight days; O‘ahu cleared a comparable event in 36 hours.

Each line is a separate island system on a separate island grid



Kaua‘i percentages are KIUC’s own daily releases, 8–24 Sep 2026; KIUC published no 100% restoration release and reported Kōke‘e still without power at day 20 with a “several weeks” estimate, so the series stops at 98%. O‘ahu is Hawaiian Electric Vice-President testimony of 8 Oct 2026 (95% within 24 hours, all within 36). The Hawai‘i Island line is interpolated from Hawaiian Electric milestone releases of 16, 20, 23, 25, 26 and 31 Aug 2026 and shows the shape of the recovery, not a published daily series.

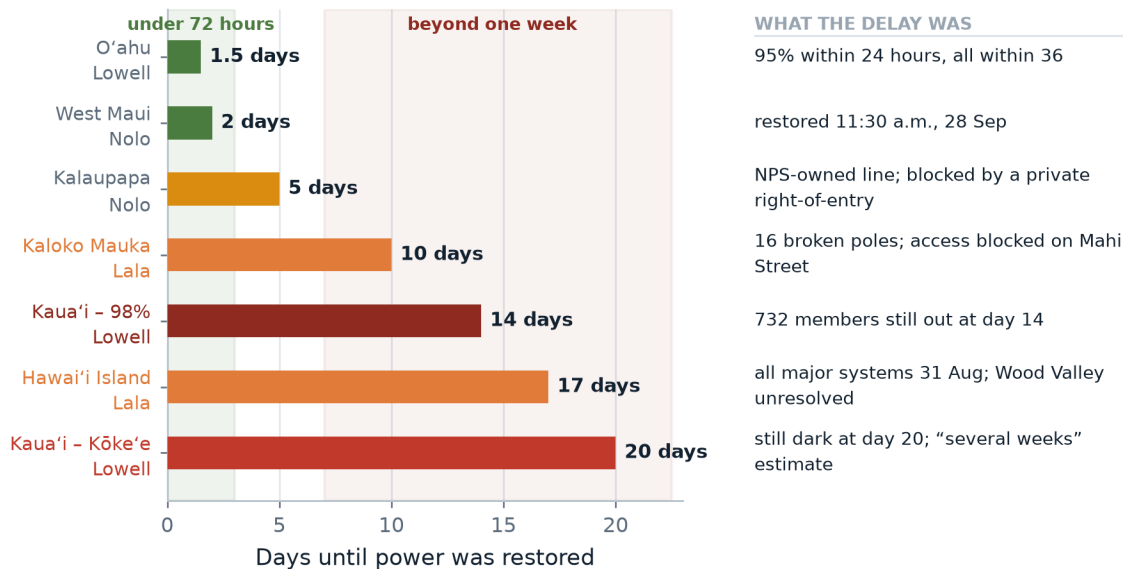
2.2 The long tail is where the political risk lives

Averages hide the case that decides an inquiry. The mean restoration time for the 2026 season was hours; the worst-affected customers waited days to weeks, and in two cases the delay had nothing to do with the weather or with crew availability.

Figure 3. Two of the three longest delays — Kalaupapa and Kaloko Mauka — were caused by blocked access rather than by damaged plant, which is the part of the problem a utility controls directly.

The long tail: how long the worst-affected customers waited

Five of the seven measured 2026 restoration events exceeded 72 hours.



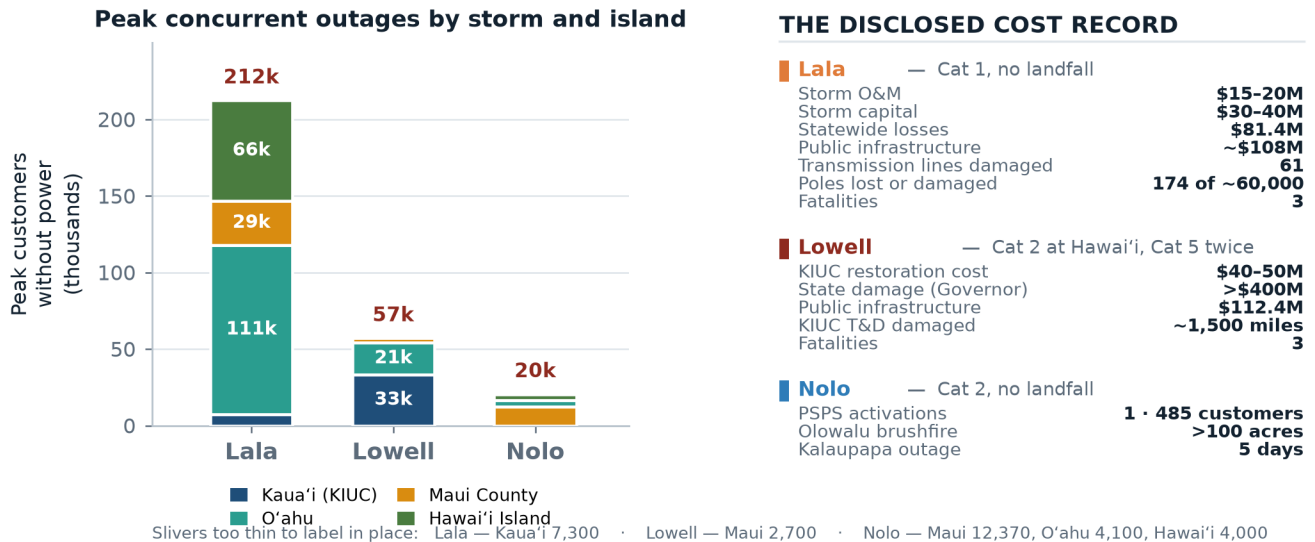
Kalaupapa lost service on 27 Sep and was restored at 13:45 on 2 Oct; the delay was a private landowner's right-of-entry at the top of the pali, not a crew or weather constraint. Kaua'i durations are from KIUC daily releases; the Hawaiian Electric durations are from its own restoration releases. The Kaloko Mauka duration is documented by Civil Beat from resident accounts. No duration is published for Wood Valley, so none is plotted. The Kaua'i 20-day bar is a lower bound: KIUC never published a completion release.

2.3 What was damaged, and what it cost to find out

Figure 4. Peak outage counts are documented; the total cost of the season is not, and the two panels should not be read as if they were the same kind of number.

Scale of the 2026 damage, and the limits of what is on the record

Peak outage counts are documented; the total cost of the season is not.



Lala: Hawaiian Electric release 16 Aug 2026 (Hawai'i Island revised to 65,700 on 31 Aug); storm cost estimates are HEI management estimates as of 4 Sep 2026; statewide loss figure of 25 Aug 2026. Lowell: KIUC deferred-accounting filing 24 Sep 2026; damage estimate by the Governor, 9 Sep 2026. Nolo: Hawaiian Electric PSPS and restoration releases of 27-28 Sep 2026. Totals are sums of disclosed island-level peaks and therefore exclude the compounding of separate interruptions.

2.4 Two denominators, both correct

The most common factual dispute about Lala is not a dispute about arithmetic. 197,400 is the number of customers without power at one moment, from a Hawaiian Electric snapshot taken at 7:00 a.m. on 16 August. Approximately 270,000 is the number who lost power at least once, from a consumer group's filing with the Commission. State officials said "about 200,000". Third-party trackers reported 219,000. Hawaiian Electric never published a formal single-peak figure.

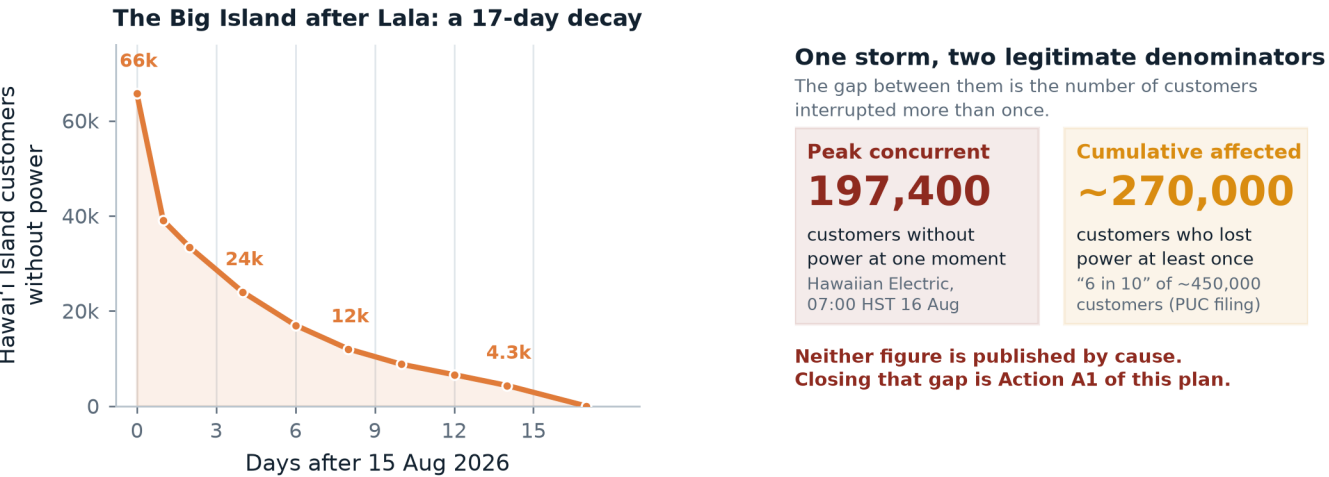
Why this matters more than it looks

A peak figure measures simultaneous exposure and drives mutual aid, crew deployment and public communication. A cumulative figure measures customers harmed and drives the political cost. Neither is wrong and they cannot be substituted for one another. HECO's own documentation records both. The unresolved problem is a third number that does not exist at all: how many of the 270,000 were interrupted more than once, and why.

Figure 5. The difference between them is the number of customers interrupted more than once.

How many customers were affected - and why the two counts differ

Recovery on the island that was hit hardest took two to three weeks.



Hawai'i Island series reconstructed from Hawaiian Electric milestone releases: 65,700 peak (31 Aug revision), 13,380 (20 Aug), 6,600 (23 Aug), 4,330 (25 Aug), 1,600 (26 Aug) and all major systems complete (31 Aug); intermediate points are interpolated. The cumulative figure comes from Life of the Land's filing with the Public Utilities Commission in August 2026.

3 Why restoration took weeks

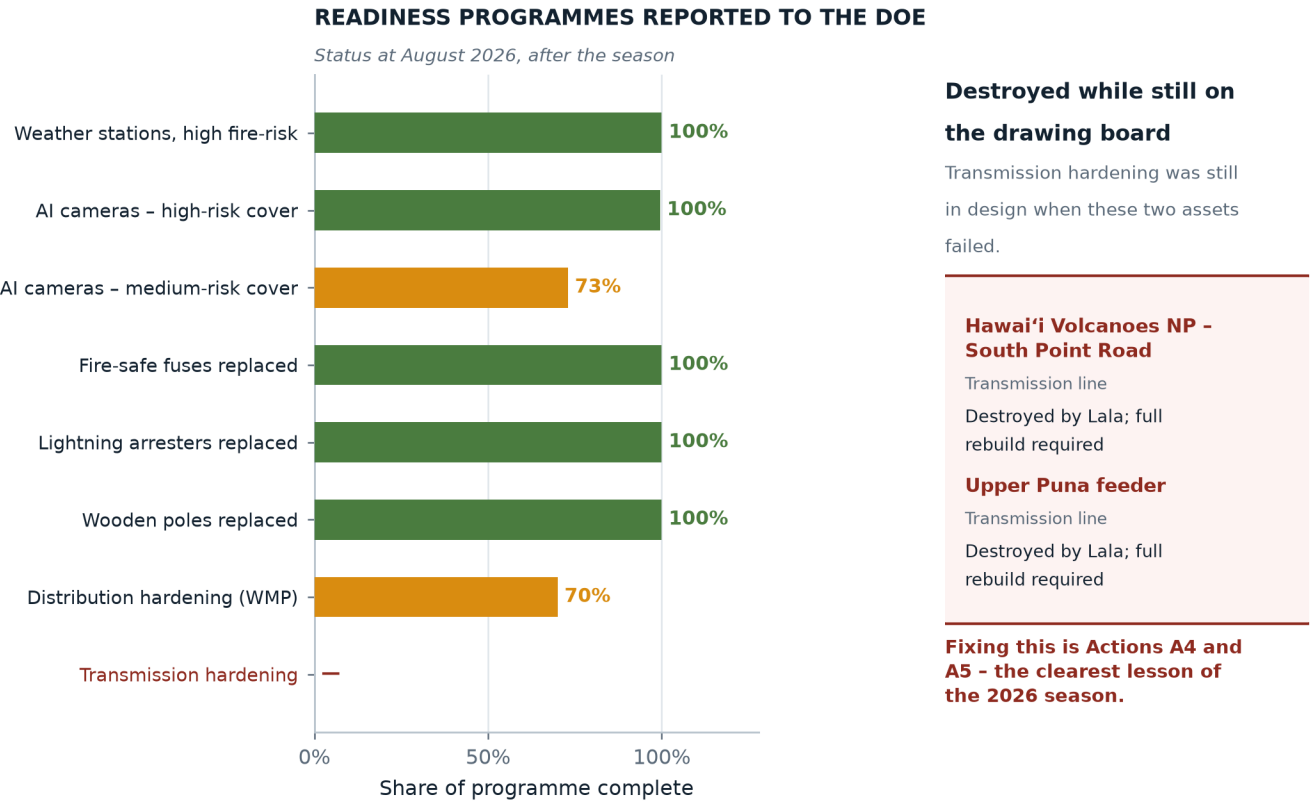
3.1 What was actually finished before the storms

Hawaiian Electric reports its wildfire and resilience programme quarterly to the Department of Energy. The August 2026 reporting describes an organisation that had largely finished the work it had chosen, on the assets it had chosen, and had not started the work that the season then required.

Figure 6. Distribution hardening was at about 70%. Transmission hardening had not moved past design, and both assets that Lala destroyed were still at that stage when it arrived.

What was finished before the storms - and what was still on paper

Hawaiian Electric's own quarterly reporting to the Department of Energy, as reported in August 2026.



Source: Hawaiian Electric quarterly grid-hardening reports to the Department of Energy, as reported by Civil Beat on 23 August 2026, and the utility's own programme disclosures. The transmission-hardening row is the finding that matters: at the time Lala destroyed the Hawai'i Volcanoes National Park - South Point Road line and the Upper Puna feeder, transmission hardening had not moved past the design phase, and installation was expected to begin in June.

"HECO VP Jim Kelly, September 2026: "Most of the work to strengthen the infrastructure has been in drier areas at risk of burning, such as the leeward side of the Big Island from Kona to Waikoloa - not the island's southern regions that were devastated by Lala. We haven't done anything but kind of the traditional resilience work done in Puna.""

3.2 Six causes, and what each one traces back to

Every cause below is one the utilities disclosed. None is attributed to a failure the record does not support, and none is a weather event: weather is the trigger in all seven cases and the cause in none.

Figure 7. The causes are ordered by severity. The cost column is a separate register of disclosed figures and is not additive with them, and none of the six is a weather event.

Why restoration took weeks - and what it cost to find out

Six causes, each traceable to a specific decision or omission that could have been made differently.

THE SIX CAUSES, RANKED BY SEVERITY

Transmission hardening never left the drawing board Two lines that Lala destroyed were still at design stage Hawai'i Volcanoes NP – South Point Road; Upper Puna feeder
Vegetation on hazard-tree corridors More than half of Big Island Lala interruptions were vegetation-driven HECO spends \$20M/yr statewide; \$103M over 2022-25; hazard-tree removal was cut 65% by the PUC in 2024
No binding mutual-aid or restoration compact across islands Four storms in seven weeks and no shared spares pool or standing protocol Cooperation ran on phone calls and an informal mutual assistance group
Access, right-of-way and debris clearance Kalaupapa stayed dark for five days over a private landowner's permission Kaua'i's worst transmission damage was on a road that stayed closed until 17 Sep
No feeder automation on critical circuits A single interrupted feeder took days, not minutes, to recover The Philippine benchmark is automatic restoration of the majority of faults within minutes
No outage-cause reporting for weather events It is not publicly possible to say why Kaloko Mauka failed and Puna did not Granular cause reporting exists for wildfire areas but not for storms

WHAT THE SEASON COST

Storm O&M, Lala (HECO)	\$15-20M
Storm O&M, Lala + March Kona	\$25-30M
Lows	
Storm capital, Lala + Kona	\$30-40M
Lows	
KIUC restoration, Lowell	\$40-50M
Statewide losses, Lala	\$81.4M
Public infrastructure, Lala	~\$108M
Public infrastructure, Lowell	\$112.4M
State damage, Lowell (Governor's estimate)	>\$400M
Federal disaster aid approved to date	\$0 for individuals
State Major Disaster Fund available	\$100M + \$50M

Public Assistance has been approved, but no household has yet received Individual Assistance for any of the three storms.

Outage causes are those the utilities disclosed. Hawaiian Electric stated that more than half of the Hawai'i Island interruptions during Lala were caused by invasive albizia and other vegetation. Cost figures are HEI management estimates as of 4 September 2026 and KIUC's preliminary estimate filed with the Public Utilities Commission on 24 September 2026. No state audit, independent engineering study or 2026 post-storm Natural Hazard Mitigation Report has been completed; the latest mitigation reports on file are dated 21 August 2024.

3.3 The regulatory record bears on this

Four filings and reports bear directly on the question of whether the 2026 outcome was foreseeable and reportable. They are set out here because a resilience plan that ignores them is not addressing the inquiry the State is likely to face.

Date and source	What it establishes
Life of the Land (Henry Curtis), 17 Aug 2026	Formally asked the PUC to open an investigation into the systemic causes of the Lala and March Kona Low outages, citing that ~60% of HECO's ~450,000 customers lost power during Lala.
Office of the Consumer Advocacy, 28-29 Sep 2026	Backed the call, writing that recent hazards "have exposed several vulnerabilities in the Hawaiian Electric Companies' grids... and exacerbated reliability issues."
Gap Curtis identified	"While the PUC requires HECO to report granular data on the causes of outages in areas prone to wildfires... there's no such reporting requirement when it comes to extreme weather events."
Civil Beat, Sep 2026	"HECO Knows What's Behind Outages. It Just Won't Tell You." - HECO declined to release the last ten root-cause analyses for East Honolulu outages.
HECO response (VP Communications, Jim Kelly)	HECO "will likely have to file a report on Lala with the PUC," but did not expect it to explain why some circuits failed while others did not.
Natural Hazard Mitigation Reports	Still dated 21 Aug 2024. No post-2026-storm update on file, despite Order No. 40396 requiring one 'as soon as practicable following any natural hazard event.'

"Hawaii State Chief Energy Officer Mark Glick, 3 Sep 2026: "It's probably something that they just simply were not geared up to deal with, so we need to get additional capital and people to help sort of shore up the system.""

4 The federal and state response

4.1 Declarations

Four declarations were issued across the season. Two emergency declarations carried a 75% federal share with Public Assistance Category B and Direct Federal Assistance. Both major disaster declarations were Public Assistance only.

Declared	Designation	Type	Storm	Assistance	Counties
25 Aug 2026	EM-3652-HI	Presidential Emergency Declaration	Hurricane Lala	PA Cat. B + Direct Federal Assistance, 75% federal share	Hawai'i, Maui, Honolulu
25 Sep 2026	EM-3654-HI	Presidential Emergency Declaration (pre-landfall)	Hurricane Nolo	PA Cat. B + Direct Federal Assistance, 75% federal share	Hawai'i, Maui, Kaua'i, Honolulu
7 Oct 2026	DR-4951-HI	Major Disaster Declaration	Hurricane Lala	PUBLIC ASSISTANCE ONLY	Honolulu, Hawai'i, Maui
7 Oct 2026	DR-4952-HI	Major Disaster Declaration	Hurricane Lowell	PUBLIC ASSISTANCE ONLY	Kaua'i, Maui

Individual Assistance

Individual Assistance was still PENDING for all three storms as of 17 Oct 2026. HIEMA confirmed IA 'is still under consideration'; FEMA's own OpenFEMA record shows 'None reported' for households approved, IA and PA obligated under DR-4951 and DR-4952.

SBA disaster loans are open and separate from FEMA assistance.

Disaster	SBA declaration	Loan numbers	Terms
HI-20018	Hurricane Lala	SBA #21940 / #21941	Physical 7 Dec 2026 EIDL 7 Jul 2027
HI-20019	Hurricane Lowell	SBA #21942 / #21943	Physical 7 Dec 2026 EIDL 7 Jul 2027

4.2 State funding

Item	Amount	Basis
Major Disaster Fund appropriation, FY2027	\$100.0M	HB 2275 CD1, SD2, CD1, as amended by HFA 9; effective 1 Jul 2026
Additional draw on the Major Disaster Fund	~\$50M	Emergency shifting of departmental funds by the Governor
Proposed Emergency Budget & Reserve Fund draw	up to \$300M	Requires two-thirds of both chambers; Legislature does not reconvene until January
Statewide 2026 natural-disaster recovery spending to date	>\$1.0B	Governor, 23 Sep 2026
Storm-related public school damage, Lala	\$12.5M	38 schools; Konawaena and Nā'ālehu High School require rebuild

State funding is real and is not the binding constraint. The binding constraints identified in this review are sequencing, standing protocol and reporting — none of which requires new money to fix.

5 The baseline we are working from

5.1 Five utilities, five separate grids

Utility	Service area	Customers	Ownership	Relevant characteristic
Hawaiian Electric Company (HECO)	O'ahu	~458,700	Investor-owned (HEI)	Largest US combined utility; single 138 kV north-south spine; downtown network
Maui Electric Company (MECO)	Maui, Lāna'i, Moloka'i	~162,000	Investor-owned (HEI)	Highest rooftop-solar penetration; Kahului retiree; Wāena BESS
Hawaiian Electric Light Company (HELCO)	Hawai'i Island	~162,000	Investor-owned (HEI)	Longest radial feeds in the state; Puna geothermal; 2026 storm epicentre
Kaua'i Island Utility Cooperative (KIUC)	Kaua'i	36,344	Member-owned cooperative	Single-island grid; 2026 direct-hit casualty; lowest restoration curve
Hawai'i Electric Light Company (HELCO, military)	O'ahu, Maui, Kaua'i	~100,000	US Navy / DoD	Schofield 50 MW biofuel CT; serves federal facilities on three islands

5.2 Money that is already committed

The programme is not underfunded in aggregate. It is mis-sequenced, and in one case the Commission itself moved the line item.

Programme	Amount	Note
Regulated rate base (HEO+HELCO+MECO, 31 Dec 2025)	~\$4.0B	HEI disclosure
2026-2028 utility capital plan	\$2.2-2.4B	HEI disclosure; ~\$288M expected to be securitised
Wildfire Mitigation Plan 2025-2027 (PUC-approved)	\$350M	\$270M capital + \$80M O&M; securitisable
2022 Climate Adaptation T&D; Resilience Program	\$190M	\$95M DOE IIJA match; PUC CUT critical transmission hardening ~50% and hazard-tree removal 65% (to \$11.1M) in 2024
Pending general rate case (Docket 2026-0162)	~\$170M	~\$11/month average residential increase by 2028
IGP RFP filed 17 Jul 2026	-	1,650 GWh variable RE + 465 MW grid-forming + 111 MW firm capacity
Storm O&M; Lala (management estimate, 4 Sep 2026)	\$15-20M	\$25-30M with the March Kona Lows

Programme	Amount	Note
Storm capital, Lala + Kona Lows (mgmt estimate)	\$30-40M	Deferral application planned for 2026
Vegetation management spend	\$20M/yr	\$103M spent statewide 2022-2025; 20,000 trees removed on Hawai'i Island in H1 2026

The cut that mattered

The 2022 Climate Adaptation T&D; Resilience Program carried \$190M, \$95M of it matched by the Department of Energy. The Commission cut critical transmission hardening by roughly half and hazard-tree removal by 65%, to \$11.1M. In 2026 Hawaiian Electric reported spending \$20M a year on vegetation management statewide, having spent \$103M between 2022 and 2025. More than half of the Hawai'i Island interruptions during Lala were vegetation-driven.

6 The Philippine record, read properly

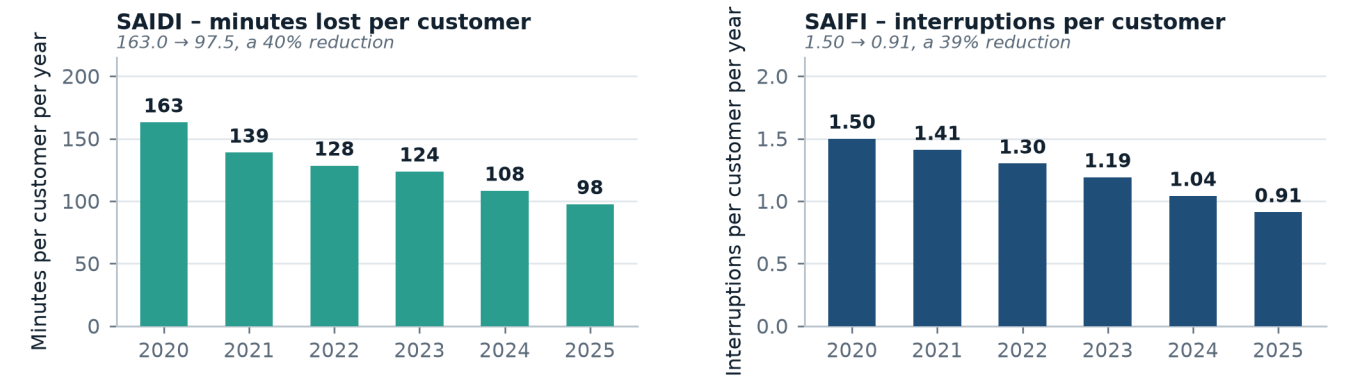
6.1 Meralco's own numbers

Meralco's reported reliability has improved measurably over six years. The figures below are on Meralco's own basis, which excludes interruptions caused by the transmission operator and by major storms, and they are quoted only on that basis throughout this report.

Figure 8. The accounting basis is not a footnote to these numbers; it is most of what they mean. The Energy Regulatory Commission publishes a different figure for the same utility on an all-cause basis, and the two are never combined anywhere in this report.

The Philippine record: measurable improvement, on a stated basis

Meralco's reported reliability, 2020–2025. The accounting basis matters – see Figure 9.



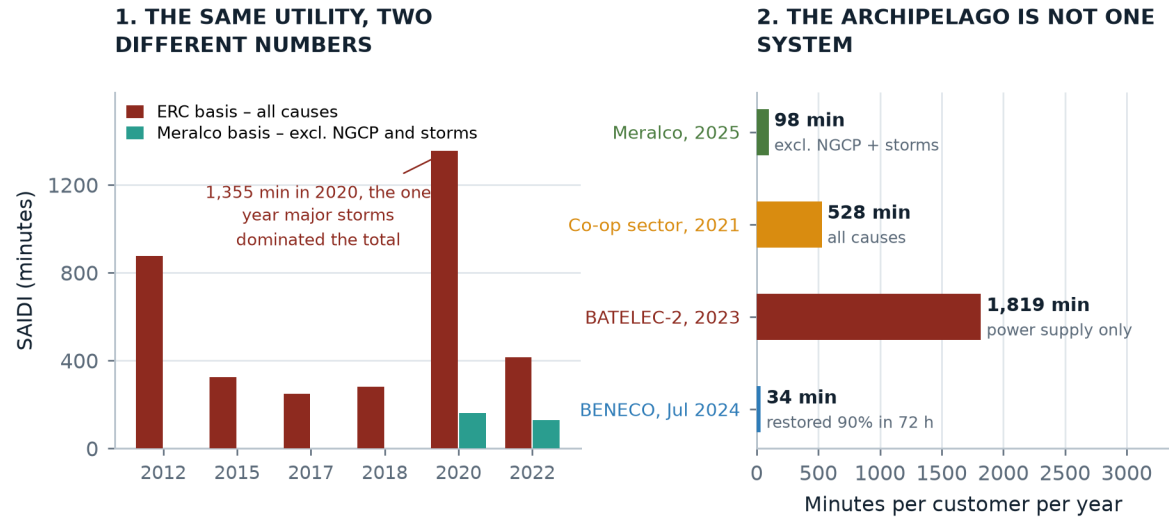
Sources: Meralco FY2021, FY2024 and FY2025 results presentations and the 2021 Annual Report; ERC Freedom of Information reply on Meralco reliability 2012–2022; ERC Resolution No. 17, Series of 2011. IMPORTANT: Meralco's reported figures exclude interruptions caused by the transmission operator and by major storms. The ERC published 128.42 minutes for the same utility for 2022 on an all-cause basis. The two series are not comparable and are never combined in this report. The widely repeated claim that Meralco cut SAIDI from 287 to 85 minutes appears in no Meralco or ERC record and is not used here. Meralco's own 2021 Annual Report separately claims SAIDI 66% lower and SAIFI 64% lower over the preceding ten years. Meralco serves 8.2 million customers on 5.85% system losses.

6.2 Two things the headline numbers hide

Figure 9. Left: the same utility, two different published numbers, because two different bases. Right: the spread across Philippine systems is far wider than the national discussion implies, and the outliers are the small island utilities.

Two things the Philippine headline numbers hide

The comparison is only fair once the accounting basis is stated – and the archipelago is not one system.



Sources: ERC Freedom of Information reply on Meralco reliability 2012–2022; ERC Resolution No. 17, Series of 2011, under which the SAIDI pass mark is 2,700 minutes and the SAIFI pass mark is 20 interruptions – limits every Philippine utility clears by an enormous margin; ERC Case No. 2025-008 RM, the draft amended reliability guidelines posted 11 December 2025, which introduce a Major Event Day exclusion and a minimum cause-code taxonomy. Cooperative-sector hours are the Philippine Institute for Development Statistics figures derived from National Electrification Administration Monthly Interruption Reports, 2021. BATELEC-2 and BENECO are single-utility examples, not sector averages. The 2,700-minute figure is a regulatory ceiling rather than an engineering target, and ERC is tightening the standards in Case 2025-008 RM. For an isolated island utility the honest analogue is the co-operative sector, not Meralco.

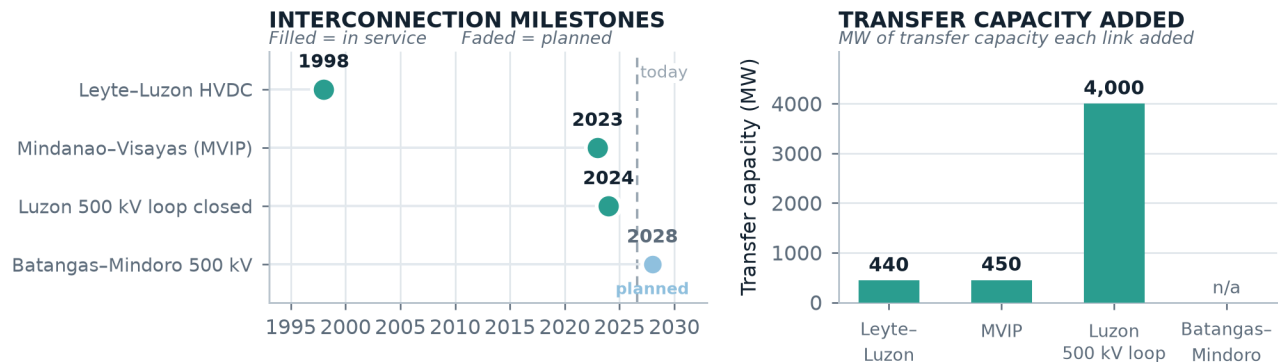
6.3 Transmission: from isolation to interconnection

Four interconnections in thirty years ended Mindanao's 68 years of grid isolation in 2023. The scale of the build is the relevant lesson; the popular descriptions of it are not reliable.

Figure 10. The Batangas–Mindoro link is planned, not built, and is shaded accordingly.

How the Philippines meshed, then joined its islands

Four interconnections in thirty years – ending 68 years of Mindanao's grid isolation in 2023.



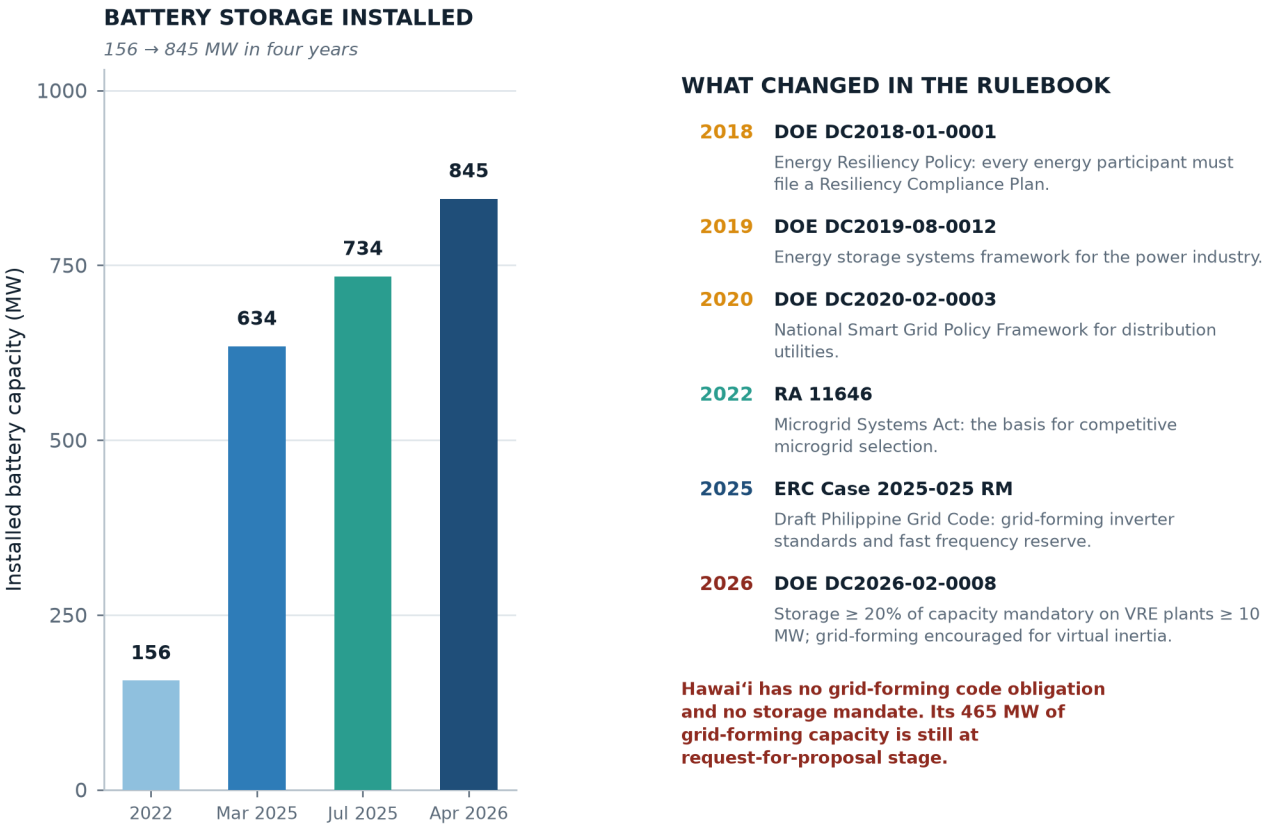
Sources: NGCP Transmission Development Plan 2024–2050 and 2025–2050; NGCP energisation release of 30 April 2023 and inauguration release of 26 January 2024 for the Mindanao–Visayas link; NGCP release of 25 June 2024 on the Mariveles–Hermosa–San Jose line; NGCP corporate operations data. Two corrections to figures that circulate widely: the Mindanao–Visayas link is ± 350 kV DC of 184 ckm submarine plus about 526 ckm overhead at 450 MW – not 230 kV DC, 437 km, 400 MW; and the Leyte–Luzon HVDC has carried 440 MW in monopolar operation since 10 August 1998 – not 2,000 MW. The Leyte–Luzon link doubles to 880 MW under the Luzon–Visayas HVDC Bipolar Operation Project from March 2028. The Philippines now shares reserve, power and crews across three grids; Hawai’i still shares nothing.

Interconnection	Voltage	Length	MW	Year	Cost	Note
Leyte–Luzon HVDC	± 350 kV DC (asym. monopole)	432 km	440	1998	—	Ormoc (Leyte) – San Juanico Strait – Santa Magdalena – Naga. World Bank + JEXIM financed; ABB/Marubeni. A further 440 MW is planned under the Luzon–Visayas HVDC Bipolar Operation Project (PhP 22.46bn; Stage 1 Mar 2028, Stage 2 Dec 2030).
Mindanao–Visayas Interconnection Project (MVIP)	± 350 kV DC	710 km	450	2023	PhP 52bn	184 ckm submarine + 526 ckm overhead (NGCP 2021); 450 MW expandable to 900 MW. Dapitan (Zamboanga del Norte) – Santander (Cebu); sea depth to ~650 m. Energised 30 Apr 2023, inaugurated 26 Jan 2024. Ended Mindanao's 68-year grid isolation.
Mariveles–Hermosa–San Jose 500 kV	500 kV AC	276 km	4,000	2024	PhP 20.94bn	395 towers, 2 new substations (2,000 MVA). +2,200 MW of Bataan/Zambales generation into Luzon. With Bolo–Nagsaag–San Jose it closes a complete 500 kV Luzon loop.
Batangas–Mindoro 500 kV	500 kV AC + 230 kV DC	37 km	not stated	2028	PhP 90.6bn	Two stages; 28.5 km 500 kV submarine cable + 8.5 km 230 kV DC link. The Philippines' next archipelagic interconnection.

Figure 11. Battery storage rose more than fivefold in four years. The driver was not preference: DOE Department Circular 2026-02-0008 requires prospective variable renewable plants of 10 MW or more to integrate storage equal to at least 20% of installed capacity, and the draft Philippine Grid Code would make grid-forming capability a code standard rather than a procurement preference.

Storage and the rulebook: what forced the Philippines to move

Battery capacity rose more than fivefold in four years, driven by mandatory code obligations rather than preference.



Sources: Department of Energy List of Existing Power Plants, 31 July 2025 and 30 April 2026; Philippine Energy Plan 2023-2050 Volume I; DOE Department Circular DC2026-02-0008 (19–20 February 2026), which requires every prospective variable renewable plant of 10 MW or more to integrate storage equal to at least 20% of its installed capacity and explicitly encourages grid-forming inverters to provide virtual inertia; the draft ERC Philippine Grid Code, 2026 Edition (ERC Case No. 2025-025 RM, posted 11 December 2025), which introduces grid-forming inverter standards and fast frequency reserve. The Philippine Energy Plan calls for 65 GWh of storage energy by 2030, rising to 466 GWh by 2040. Kalayaan pumped storage adds a further 1,200 MW.

6.4 What transmission planning actually delivered

The single most useful Philippine fact for Hawaii is not a project. It is a transparency: NGCP publishes its delivery record against its own plan, and the record is poor.

Metric	Value
Transmission system	21,027 circuit km, 20,000 towers, 140 substations, 48,801 MVA (2023-24)
Plan	Transmission Development Plan 2025-2050: Php 1106bn to 2034, 5,145 new km, 63,625 new MVA
Targeted projects complete	75 of 258 (29%) on 10% of allocated capex

Metric	Value
Projects delayed	58, some by more than 9 years
ERC penalty exposure	PhP 15.8bn

Why this is the most transferable finding

Hawai'i has no equivalent disclosure. There is no published delivery record against which to judge whether the State's resilience programmes are on track, and the federal money the State has received carries no Hawaii-specific public milestone schedule. Action A3 and the pre-season readiness report in the plan exist to create that record before the next season, not after it.

6.5 Typhoon restoration, measured

Three Philippine storms give a comparable restoration record on the same small-island, overhead-distribution problem Hawaii faces.

Storm	Year	Intensity	Towers down	Substations lost	Days to 50%	Days to 90%	Note
Haiyan (Yolanda)	2013	Cat 5	562	7	18	90	Leyte-Samar collapse; Tacloban energised via an emergency 69 kV line on day 18
Rai (Odette)	2021	Cat 5	187	3	5	14	Visayas restoration 2.5x faster than Haiyan; drone survey in 3 days vs 14
Carina (Gaemi)	2024	Cat 3	42	1	—	—	Meralco 66% of ~662,000 restored within ~36 h; flooded customers took longest

Meralco after Cat 3 24-25 Jul 2024: peak 662,000 customers, 66% restored within about 36 hours. Meralco restored 66% within about 36 hours of peak. The commonly repeated claim of '95% in 72 hours' is NOT supported by any Meralco release.

6.6 The co-operative sector is the honest analogue

Meralco is a metropolitan utility. The Philippine electric cooperatives serve the island and rural systems that actually resemble Hawai'i's, and their numbers have improved measurably over the same period.

Metric	Earlier	Latest	Source
Average hours of outage per customer per year	11.0	8.8 (2021)	NEA Monthly Interruption Reports via PIDS; NEA Q4 2025 Overall Performance Assessment
Median outages per customer per year	47 (2010)	28 (2022)	NEA Monthly Interruption Reports via PIDS; NEA Q4 2025 Overall Performance Assessment
Median outage hours per customer	94 (2010)	65 (2022)	NEA Monthly Interruption Reports via PIDS; NEA Q4 2025 Overall Performance Assessment
Interruptions per customer, 2021	—	5.7	NEA Monthly Interruption Reports via PIDS; NEA Q4 2025 Overall Performance Assessment
NEA system performance assessment, Q4 2025	—	81 green, 26 yellow, 6 orange, 8 red (of 121 systems)	NEA Quarterly Overall Performance Assessment

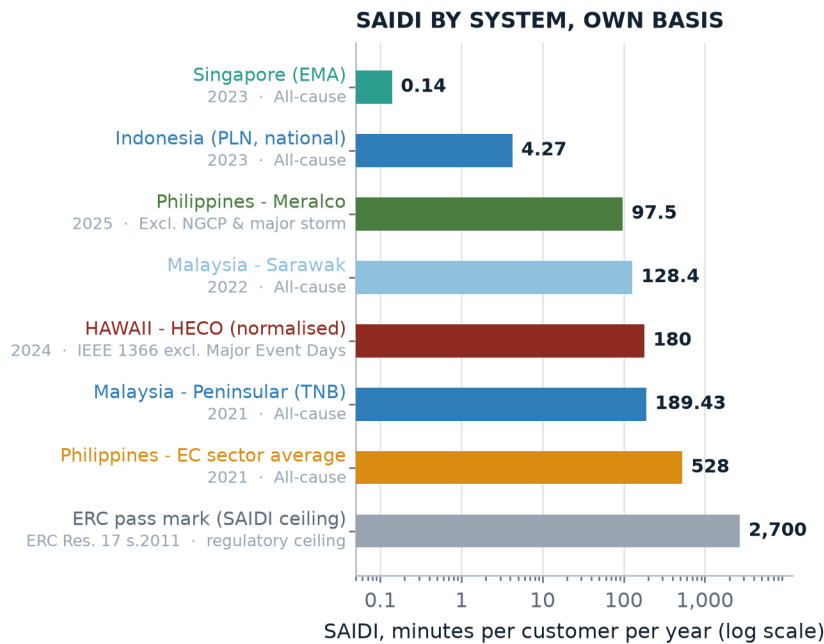
The co-operative sector at 528 minutes per customer per year is the closest published comparison to an isolated island utility, and it is the row that should anchor any claim about how good Hawai'i's performance has been.

6.7 Benchmarks, with the basis on every row

Figure 12. SAIDI on each system's own basis. Three different accounting conventions appear in this one chart. Hawaii's 180-minute normal-year figure excludes Major Event Days and therefore excludes the 2026 season entirely — it is not an answer to the question the State is asking.

Two archipelagos, five systems, one honest comparison

Every bar carries its own accounting basis. Definitions differ enough that mixing them is meaningless.



HOW TO READ IT

The gap is a basis gap.

Meralco excludes transmission and storm-caused interruptions; the co-operative figure includes them.

The pass mark is not a goal.

2,700 minutes is the ceiling ERC set so that every utility passes.

Singapore is not a target.

0.14 minutes describes an underground urban network, not an island grid with overhead lines.

The honest analogue is the co-op sector.

528 minutes is the closest published comparison to an isolated island utility.

Rows are read from the verified benchmark set, not retyped here, so a figure that changes in the dataset changes here. Sources: JICA Study on ASEAN Power Grid, Final Report, 25 June 2025, for Singapore, Malaysia and Indonesia; Singapore Energy Market Authority SAIDI/SAIFI statistics; Meralco FY2025; Philippine Institute for Development Statistics from National Electrification Administration Monthly Interruption Reports, 2021; Hawaiian Electric's IEEE 1366 submission to the Public Utilities Commission, which excludes Major Event Days and therefore excludes the 2026 season entirely. Three different bases appear in this one chart, which is the point: Hawaii's 180-minute normal-year figure is better than nothing and no answer at all to what happened in 2026. Singapore's 0.14 minutes describes a near-continuously supplied, largely underground urban network and is not a like-for-like target for an island system with overhead distribution and typhoon exposure. The 2,700-minute figure is the SAIDI ceiling set by ERC Resolution No. 17, Series of 2011; it is a regulatory pass mark, not an engineering target.

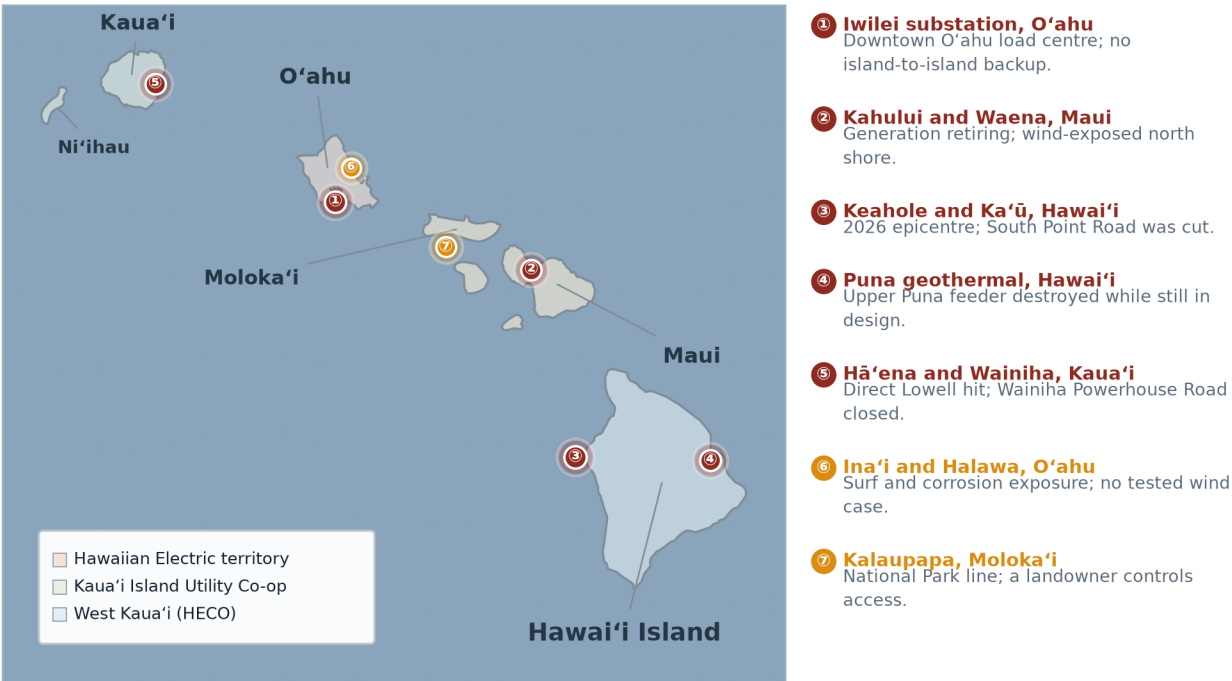
7 Where Hawai‘i is fragile

7.1 The assets with no backup

Figure 13. Island outlines, centroids and the map extent are derived from Natural Earth data, not hand-placed; marker positions are localities, not engineering locations.

Where the grid is fragile: critical assets with no backup

Every asset marked below lost service in 2026. None can be supported by a neighbouring island.



Base map: Natural Earth 1:10m administrative boundaries and 50m shaded relief; island outlines, centroids and the map extent are derived from that data, not hand-placed. Marker positions are approximate localities, sufficient for a state-scale map and not for engineering. Asset status is taken from the 2026 utility restoration releases and the September to October 2026 public hearings before the Public Utilities Commission. No independent engineering study of the 2026 storms has been completed, and the most recent Natural Hazard Mitigation Report on file is dated 21 August 2024. Full descriptions of each numbered asset are in the table following this figure.

Table 13a. The numbered assets on Figure 13.

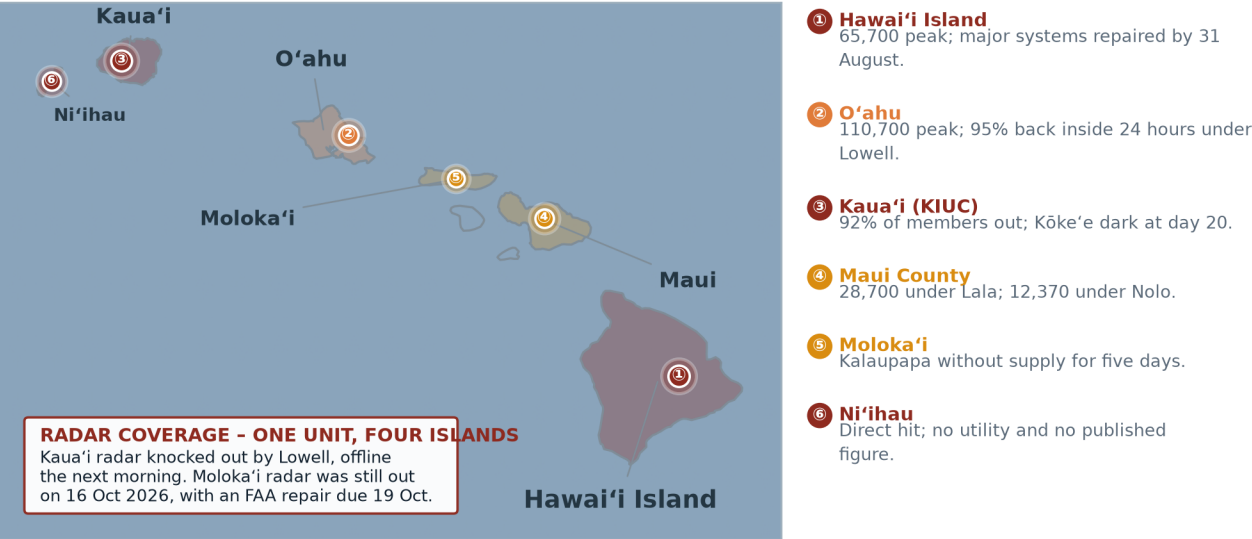
#	Asset	Why it matters
1	Iwilei substation, O'ahu	Downtown network on the island's largest load centre and the highest-consequence single point of failure in the state. No other island can feed it.
2	Kahului substation and Waena BESS, Maui	Kahului generation retires and Waena storage is the replacement. Wind-loading exposure on the northern leeward shore.
3	Keahole and Ka'ū, Hawai'i Island	The 2026 epicentre. Ka'ū lost all service and the South Point Road corridor was cut.
4	Puna geothermal and Upper Puna feeder, Hawai'i	The Upper Puna feeder was destroyed by Lala while it was still in the design phase. It requires a full rebuild rather than a repair.
5	Hā'ena and Wainiha, Kaua'i	Direct hit from Lowell; 92% of KIUC members lost supply. The worst transmission damage was on Wainiha Powerhouse Road, which stayed closed until 17 September.
6	Ina'i and Halawa substations, O'ahu	North Shore substations, repeatedly exposed to surf, salt and corrosion. Not hardened to a tested wind case.
7	Kalaupapa, Moloka'i	The line down the 2,000-foot pali is owned by the National Park Service. Kalaupapa stayed dark for five days because a private landowner controlled access at the top of the trail.

7.2 Where the damage landed, and what we could not see

Figure 14. One weather radar covered four islands for the closing weeks of the season, which constrained restoration planning before the first crew was mobilised.

Where the 2026 damage landed, and the sensor gap around it

Three storms, five island systems, and one weather radar still out of service on 16 October 2026. Island tint and marker size show the scale of the 2026 customer impact.



Base map: Natural Earth 1:10m boundaries and 50m shaded relief. Outage figures are the utilities' own disclosed peaks: Lala 197,400 statewide at 07:00 HST on 16 August 2026, with the Hawai'i Island figure revised to 65,700 on 31 August; Lowell 33,319 of 36,333 KIUC members plus about 21,000 on O'ahu; Nolo 16,000 statewide. Radar status is from the National Weather Service Honolulu status page as of 16 October 2026, which listed the Moloka'i radar out of service pending FAA repairs scheduled for 19 October. The Kaua'i radar was knocked out by Hurricane Lowell and was offline the following morning. With one radar covering four islands, a storm can blind restoration planning before the first crew is mobilised. Full descriptions of each numbered island are in the table following this figure.

Table 14a. The numbered islands on Figure 14.

#	Island system	2026 record
1	Hawai'i Island	65,700 peak under Lala. All major systems repaired by 31 August, seventeen days after the storm. Kaloko Mauka still without power after ten days.
2	O'ahu	110,700 peak under Lala, restored in two days. Lost 21,000 again under Lowell, with 95% restored inside 24 hours — the 2026 season's best response.
3	Kaua'i (KIUC)	33,319 peak under Lowell, 92% of members. Mass outage cleared in eight days and 98% at day 14. Kōke'e still dark at day 20, with no completion date published.
4	Maui County	28,700 peak under Lala and 12,370 under Nolo. West Maui took about two days under Nolo, delayed by winds above 60 mph that blocked helicopter inspection.
5	Moloka'i	Kalaupapa had no supply for five days under Nolo. The line is National Park Service property and access is controlled by a private landowner.
6	Ni'ihau	Direct hit by Lowell, 60 miles from the centre. No utility and no published outage figure.

8 What actually transfers

Eight measures were assessed for transferability from the Philippine record. All eight are carried into the plan. The test applied was narrow and deliberate: does the Philippine measure address a mechanism Hawai'i actually faces, and has it been implemented rather than announced?

#	Philippine measure	The evidence	Hawai'i's gap	Action, with the metric it is held to
T1	Mandatory Resiliency Compliance Plans (DOE DC2018-01-0001, 2018)	Every licensed energy participant files a resilience plan with the energy regulator; a dedicated Task Force on Energy Resiliency monitors implementation.	No equivalent filing exists for hurricane/tsunami resilience. HECO's Natural Hazard Mitigation Reports are still dated 21 Aug 2024.	Hawai'i statute: a Resilience Compliance Plan filed with the PUC by HECO, HELCO, MECO and KIUC for the 2027-2036 decade, audited annually. Metric: 4 RCPs on file and audited · By: 2027
T2	Grid Code standards for grid-forming inverters (ERC PGC 2026 draft; DOE DC2026-02-0008)	Grid-forming capability becomes a code requirement, not a procurement preference; storage $\geq$ 20% of capacity is mandatory on VRE plants $\geq$ 10 MW. BESS rose 156 MW (2022) → 845 MW (Apr 2026).	465 MW of grid-forming capacity is still at RFP stage (IGP, filed 17 Jul 2026). No code obligation yet.	Adopt IEEE 2800-2022 grid-forming conformance plus a mandatory black-start test as a licensing condition for all new BESS. Metric: GFM code adopted; 465 MW procured · By: 2028
T3	Luzon 500 kV closed loop; MVIP ended Mindanao's isolation (1998-2024)	A second island group was connected by $\pm$ 350 kV DC submarine HVDC (MVIP, 450 MW, Php 52bn), and Luzon was meshed into a closed 500 kV loop.	Zero inter-island transmission. Four typhoons in seven weeks could not share a single crew, truck or spare transformer between islands.	Inter-island tie study scoped and funded; prioritise the O'ahu-Kaua'i and O'ahu-Hawai'i corridors as mutual-assistance enablers, not just power paths. Metric: Tie study complete; first link financed · By: 2032
T4	Distribution automation and remote control (Meralco Smart Grid Program)	2,390 remotely controlled circuit devices contributed a 6% SAIDI improvement in 2023; 334 reclosers added in 2024 alone; 12,012 poles replaced.	HECO's distribution automation is partial; a single island blackout of vegetation can take a feeder down for days.	Remote reclosing and sectionalising on every feeder serving a hospital, shelter, water plant or emergency operations centre, plus all feeders on Kaua'i. Metric: 100% of critical-circuit feeders automated · By: 2029
T5	ERC reliability standards with a Major Event Day exclusion (ERC Case 2025-008 RM)	The regulator publishes per-utility monthly indices from a single cause-code taxonomy, with MED explicitly isolated so storms cannot be netted out.	No granular storm-day cause reporting is required. This is the gap that makes it impossible today to say why Kaloko Mauka failed and Puna did not.	Amend the reporting order to require daily, circuit-level outage cause data for any event affecting >5,000 customers, published within 30 days. Metric: Cause data published for every major event · By: 2027
T6	Microgrid Systems Act + competitive selection (RA 11646 / DC2025-04-0007)	8 unserved areas awarded competitively in Apr 2024 to hybrid solar+BESS+diesel microgrids on a 20-year subsidy; 407 areas identified on the 2023-2032 roadmap.	Kalaupapa lost power for 5 days and Kalaupapa's resilience was decided by a private landlord's right-of-entry, not by the utility or the state.	Hawaii microgrid tender for Kalapana, Ka'u, Kaloko Mauka, Kōke'e, Hāna and Kalaupapa; legislate a right-of-entry protocol for third-party corridors. Metric: 6 resilient nodes operating · By: 2030
T7	Meralco underground cabling (567 ckm → 1,500 ckm by 2030)	Undergrounding is targeted at business districts, heritage sites and typhoon/flood-prone zones at roughly 10x the cost of overhead - but on a 6% system-loss franchise.	Meralco's losses are 5.85%. Hawaiian Electric's customers pay far more per kilowatt-hour and still lost 200,000 customers' service to a Category 1 storm.	Underground the specific corridors destroyed or disabled in 2026, and price them on a vulnerability-weighted, not a political, basis. Metric: 60 critical corridor miles underground · By: 2034

#	Philippine measure	The evidence	Hawai'i's gap	Action, with the metric it is held to
T8	Single national transmission operator with a binding 30-year plan (NGCP TDP)	NGCP: 21,027 ckm, 48,801 MVA, and a rolling 30-year TDP. The plan's weakness - only 29% of targeted projects complete on 10% of capex - is precisely the transparency Hawaii lacks.	Four separate island utilities coordinate restoration by goodwill, phone calls and an informal mutual assistance group.	Constitute a binding Island Resilience Compact: one restoration protocol, one spares pool, one pre-season readiness report, reviewed by the PUC. Metric: Compact operational before 2028 season · By: 2027

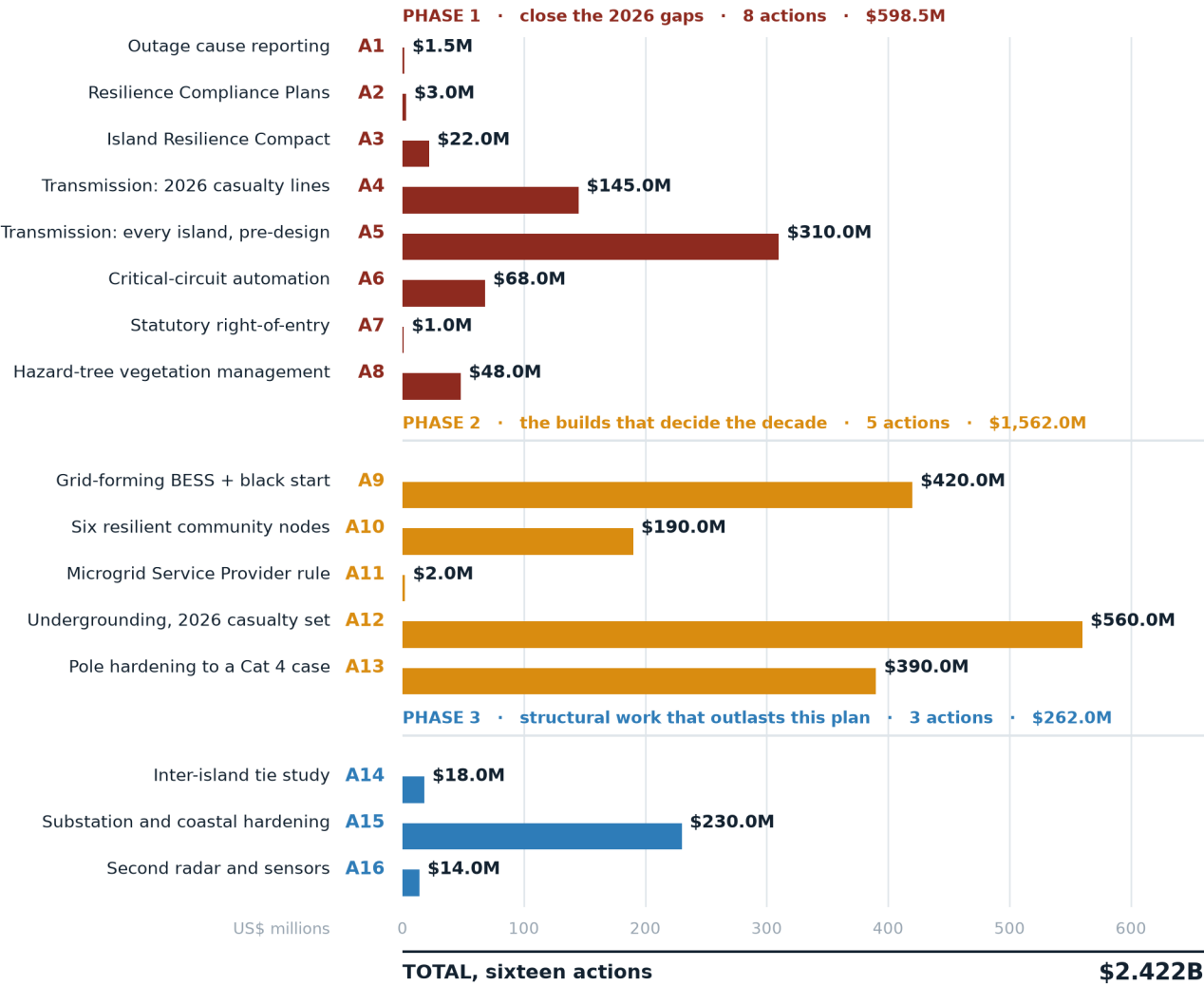
9 The costed plan

Sixteen actions, \$2.42B, three phases. The chart is sequenced by phase rather than drawn on a calendar because no action in the source record has a committed start date.

Figure 15. The sixteen actions in phase order. Phase 1, \$598M, closes the gaps the season exposed and is dominated by completing transmission hardening. Phase 2, \$1,562M, is the build that decides the next decade. Phase 3, \$262M, is the structural work.

The costed plan: sixteen actions, three phases

\$2.42 billion in total. Bars are the capital and programme cost of each action; phases run top to bottom in sequence.



Costs are order-of-magnitude planning estimates in US\$ millions, built from the disclosed 2026 restoration and capital cost record, the utility's own programme spending, and the Philippine programmes each action is modelled on. They are not bids, budgets or approved appropriations. No action in this plan has a committed start date, so the chart is sequenced by phase rather than drawn on a calendar. The plan total is the sum of the sixteen bars: Phase 1 \$598.5M, Phase 2 \$1,562.0M, Phase 3 \$262.0M, giving \$2.422B.

9.1 The actions in full

Costs are order-of-magnitude planning estimates in US\$ millions. They are not bids, budgets or approved appropriations, and the plan total is the sum of the sixteen lines.

ID	Phase	Action	What it involves	Owner	Cost	Evidence
A1	1	Extreme-weather outage cause reporting	Amend the PUC reporting order to require daily, circuit-level outage cause data for any event affecting more than 5,000 customers, published within 30 days, with Major Event Days isolated from the annual indices.	PUC / HEO companies	\$2M	Philippines T5 (ERC Case 2025-008 RM)
A2	1	Resilience Compliance Plans	Require HECO, HELCO, MECO and KIUC to file a decade-scale Resilience Compliance Plan (structural + non-structural measures, pre/during/post), audited annually, and update the stale Natural Hazard Mitigation Reports from 21 Aug 2024.	PUC	\$3M	Philippines T1 (DOE DC2018-01-0001)
A3	1	Island Resilience Compact and joint spares	Convert the informal Western Region Mutual Assistance Group into a standing compact: one restoration protocol, a shared strategic spares pool held on two islands, a joint pre-season readiness report, and a standing helicopter-drone inspection roster.	HECO / KIUC / PUC	\$22M	Response to 2026 season
A4	1	Complete transmission hardening on the 2026 casualty lines	The Hawai'i Volcanoes NP – South Point Road line and the Upper Puna feeder were both still in the design phase when Lala destroyed them. Finish design, fund construction, and harden every remaining Big Island 138 kV structure to a Cat 4 wind case.	HEI / DOE GRIP	\$145M	HECO readiness reporting, Aug 2026
A5	1	Transposition: rebuild transmission hardening ahead of design	Fund transmission hardening to the point of installation for every island before the design phase of the next funding tranche closes - the specific sequencing failure of 2026.	HEI / DOE	\$310M	HECO readiness reporting, Aug 2026
A6	1	Critical-circuit automation	Remote reclosing and fault sectionalising on every feeder serving a hospital, emergency operations centre, shelter, water or wastewater plant, communications hub or port, plus all Kaua'i feeders serving Wainiha, Hā'ena and Kōke'e.	HECO / KIUC	\$68M	Philippines T4
A7	1	Right-of-entry protocol for third-party corridors	Kalaupapa stayed dark for 5 days because a private landowner controlled access at the top of the pali. Establish a statutory right-of-entry for lifelines and a pre-negotiated access protocol for NPS, military and private corridors.	State Legislature	\$1M	Nolo / Kalaupapa, Oct 2026
A8	1	Vegetation management on a hazard-tree basis	Restore hazard-tree removal to the level cut in 2024 and extend it to the Ka'ū, Kaloko Mauka, Kona and North Kohala corridors that Lala destroyed. HECO already spends \$20M/yr; more than half of Big Island Lala outages were vegetation-driven.	HECO / HELCO	\$48M	HECO Lala fact sheet
A9	2	Grid-forming BESS fleet with black-start certification	Convert the 465 MW grid-forming procurement into a certified fleet: IEEE 2800 grid-forming conformance, island-forming black start, and an annual proof test. Priority sites: Ka'ū, Kaloko Mauka, Kōke'e, Wainiha, Ka'ū-pali.	HEI	\$420M	Philippines T2

ID	Phase	Action	What it involves	Owner	Cost	Evidence
A10	2	Six resilient community nodes	Hybrid solar + grid-forming BESS + storage microgrids at Kalapana, Ka'ū, Kaloko Mauka, Kōke'e, Hāna and Kalaupapa, sized to carry critical loads for 72 hours with the feeder de-energised.	HECO / KIUC / DOE MGSP-equivalent	\$190M	Philippines T6
A11	2	Microgrid Service Provider programme (Hawaii)	Legislate a competitive selection process for unserved and resilience-underserved areas modelled on the Philippine MGSP: competitive tender, standardised service obligation, long-term subsidy contract.	HSEO / Legislature	\$2M	Philippines T6
A12	2	Critical-corridor undergrounding, 2026 casualty set	Underground the Ka'ū South Point Road corridor, the Upper Puna feeder and the North Shore Kaua'i corridors; scale proven costs from the 2026 rebuild rather than from legacy estimates.	HECO / KIUC	\$560M	Philippines T7
A13	2	Pole and crossarm hardening to a Cat 4 wind case	Replace poles, crossarms and structures on all circuits within 1,000 ft of the shoreline and all feeders on Kaua'i, to a documented Cat 4 basic wind speed, with structures certified by test rather than by analogy.	HECO / KIUC	\$390M	2026 casualty pattern
A14	3	Inter-island transmission tie study	Scope, study and obtain PUC cost-of-service approval for an O'ahu-Kaua'i HVDC link. The Philippine precedent is MVIP: 184 ckm of ±350 kV DC submarine cable and 450 MW for PhP 52bn.	HEI / DOE GRIP	\$18M	Philippines T3
A15	3	Substation and coastal hardening	Flood-proof the substations that serve Ka'ū, North Kohala, Wainiha and Kōke'e to a 500-year flood elevation plus freeboard, with redundant feed for each.	HECO / KIUC	\$230M	2026 casualty pattern
A16	3	Second operational radar and sensor coverage	Restore full NEXRAD coverage: with one radar out of service since Lowell, four islands are covered by a single unit and a storm can blind restoration planning.	NOAA / state	\$14M	Lowell radar outage; PHMO still down 16 Oct 2026

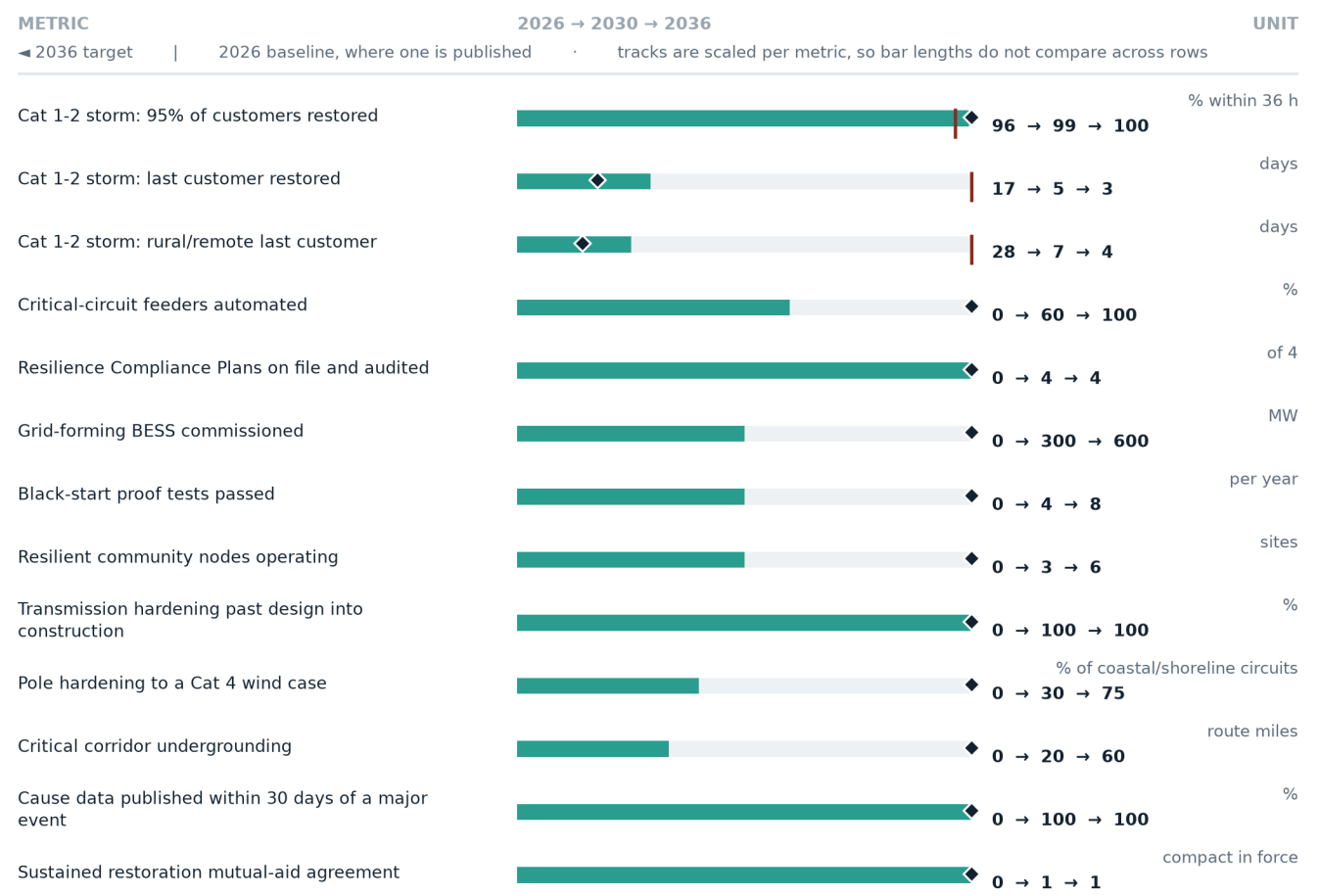
10 Targets

Thirteen metrics, each on its own scale, with the 2026 baseline shown only where one is actually published. A zero baseline means the metric is not currently reported or does not exist — it does not mean performance was zero.

Figure 16. The 2030 commitment and the 2036 target for each metric, against the 2026 baseline where one is published.

What the plan has to deliver, and by when

Each track is one metric on its own scale. The filled bar is the 2030 commitment; the diamond is 2036.



Baselines are the 2026 observed position where one exists publicly: the 95%-within-36-hours figure and the 17-day last-customer restoration are the Hawaiian Electric record for the 2026 season, the 28-day figure is the Hawai'i Island and Kaua'i rural-remote equivalent, and every other baseline is zero because the metric is not currently reported or does not exist. The 2026 figures are themselves incomplete: KIUC has never published a 100%-restoration release and Kōke'e was still dark at day 20. Targets are policy commitments proposed by this report, not adopted undertakings, and none has been agreed with the utilities or the Commission.

Table 16a. The targets in full.

Metric	2026 baseline	2030	2036	Unit
Cat 1-2 storm: 95% of customers restored	96	99	99.5	% within 36 h
Cat 1-2 storm: last customer restored	17	5	3	days
Cat 1-2 storm: rural/remote last customer	28	7	4	days
Critical-circuit feeders automated	0	60	100	%
Resilience Compliance Plans on file and audited	0	4	4	of 4
Grid-forming BESS commissioned	0	300	600	MW
Black-start proof tests passed	0	4	8	per year
Resilient community nodes operating	0	3	6	sites
Transmission hardening past design into construction	0	100	100	%
Pole hardening to a Cat 4 wind case	0	30	75	% of coastal/shoreline circuits
Critical corridor undergrounding	0	20	60	route miles
Cause data published within 30 days of a major event	0	100	100	%
Sustained restoration mutual-aid agreement	0	1	1	compact in force

These are proposals, not commitments

None of the thirteen targets has been agreed with the utilities, the Commission or the federal funding agencies. They are the targets this report proposes, set against the 2026 record, and they should be treated as the opening position for negotiation rather than as a programme already adopted.

Appendix A What could not be verified

These items were actively sought and could not be confirmed against a primary source. None is used anywhere in this report as fact. They are listed so that a reader who has seen the figure quoted elsewhere can see exactly why it is not repeated here.

#	Item sought	Status
1	A single authoritative peak-outage figure for Lala (sources span 178,400-250,900; HECO published only a 7 a.m. snapshot of 197,400).	Not verified
2	HECO-served West Kaua'i outage counts during Lala.	Not verified
3	The date on which KIUC reached 100% restoration after Lowell - no such release was ever published.	Not verified
4	A pole or downed-line count for Kaua'i after Lowell; KIUC published only '~1,500 miles of T&D; damaged'.	Not verified
5	HECO's post-Lala report to the PUC (filed 'likely', not located).	Not verified
6	Any completed state audit, independent engineering study, or 2026 post-storm Natural Hazard Mitigation Report.	Not verified
7	Total state loss for Lowell comparable to Lala's \$81.4M (only public-infrastructure and political estimates exist).	Not verified
8	Wood Valley's actual restoration date after HECO's planned reroute.	Not verified
9	HEI Q3 2026 results (scheduled 6 Nov 2026).	Not verified
10	Individual Assistance determinations for Lala, Lowell or Nolo.	Not verified

Appendix B Method, and the basis rules applied

B.1 Three accounting distinctions

Peak concurrent versus cumulative. The maximum number of customers without power at one moment is not the number of customers who experienced an interruption. For Lala the two differ by roughly seventy thousand. Both are quoted; neither is substituted for the other.

Philippine reliability bases. Meralco's own reported indices exclude interruptions caused by the transmission operator and by major storms. The Energy Regulatory Commission's published indices are all-cause. The two are never plotted against each other and never combined. Figure 12 shows five systems on five bases precisely so that the reader can see the conventions rather than infer them.

Restoration without a completion release. Where no utility published a 100% restoration release — which is the case for KIUC after Lowell — the duration is given as a lower bound and the absence is stated.

B.2 How the figures were built

Every figure's height is derived from its own measured content in inches rather than from a fixed canvas, and every figure was rendered and inspected after generation. Where a layout could not be solved, the figure build raises an error rather than emitting a clipped image. Map geometry, island centroids and the map extents are derived from Natural Earth 1:10m boundaries; the shaded relief is a Natural Earth 50m crop.

B.3 Limits of this review

This is a documentary review of public records. No field inspection, no engineering study, no independent audit and no modelling of any system was performed, and none of the utilities was interviewed. Cost estimates are planning-grade. Where the record is silent, this report says so rather than estimating.

Appendix C Sources

Grouped by source class. Item-level citations for every figure and table appear in that figure's or table's own source note.

Hawaiian Electric Company — releases, factsheets and DOE quarterly reporting

- hawaiianelectric.com - Lala factsheet; 8 a.m./9 a.m./10 a.m. restoration releases 16-20 Aug 2026; Lala completion release 31 Aug 2026; crews-arrival release 24 Aug 2026; Nolo PSPS watch 27 Sep 2026; Nolo restoration release 28 Sep 2026; Kalaupapa restoration release 2 Oct 2026; DOE quarterly grid-hardening reports as reported Aug 2026

Hawaiian Electric Industries — investor and SEC disclosure

- HEI Q2 2026 results (7 Aug 2026); HEI September 2026 investor meeting transcript, SEC EDGAR CIK 0000354707 (storm O&M; and capex estimates as of 4 Sep 2026)

Kaua'i Island Utility Cooperative

- kiuc.coop - Hurricane Lowell damage release; Lowell restoration updates; deferred-accounting application news release 24 Sep 2026; CEO town-hall testimony via Civil Beat

National Weather Service Honolulu

- weather.gov/media/hfo - PSHHFO_2026CP01_Lala_Summary.pdf; PSHHFO_2026CP01_Lala_ImpactNarratives.pdf; PSHHFO_2026EP15_Nolo_Summary.pdf; WSR-88D status

Federal emergency management and declaration record

- EM-3652-HI (25 Aug 2026); EM-3654-HI (25 Sep 2026); DR-4951-HI and DR-4952-HI (7 Oct 2026); Federal Register 14 Oct 2026; OpenFEMA declaration record

State of Hawaii — Governor's office, HIEMA, Legislature

- Governor's office news releases 8-28 Aug, 8-11 Sep, 9 Sep, 23-25 Sep 2026; 8.20.26 Storm System Moke press-conference slides; HB 2275 CD1 HFA 9; HIEMA news releases

Public Utilities Commission of Hawaii

- puc.hawaii.gov - Public Informational Meetings on Hawaiian Electric's service reliability and weather-related impacts (Oct-Nov 2026); Docket 2026-0162 rate rebasing; Docket 2025-0156 WMP Order 41531; Docket 2022-0135 Climate Adaptation Program

Philippines — Department of Energy and statute

- DOE Philippines - LoEPP (31 Jul 2025, 30 Apr 2026); Department Circulars DC2018-01-0001, DC2019-08-0012, DC2020-02-0003, DC2025-04-0007, DC2026-02-0008; Philippine Energy Plan 2023-2050; Microgrid Systems Act RA 11646; DRRM Act RA 10121; RA 11552

National Grid Corporation of the Philippines

- NGCP TDP 2024-2050 and TDP 2025-2050; NGCP corporate operations data; MVIP energisation releases; Mariveles-Hermosa-San Jose 500 kV release 25 Jun 2024

Energy Regulatory Commission, Philippines

- ERC Resolution No. 17 s.2011 (interim reliability standards); ERC Case No. 2025-008 RM (Dec 2025); ERC Philippine Grid Code 2026 Edition draft, Case 2025-025 RM; ERC FOI reply on Meralco reliability 2012-2022

Manila Electric Company

- Meralco FY2025 consolidated financial and operating performance report; Meralco 2021 Annual Report; Meralco FY2021 / FY2024 / FY2025 results presentations; Meralco 2024 and 2025 Integrated Reports; ERC Case No. 2026-016 RC First Regulatory Period application

Philippine National Electrification Administration and PIDS

- NEA Monthly Interruption Reports via PIDS (pidsdps2248, pidsdps2349); NEA Q4 2025 Overall Performance Assessment; PIDS press release 'Climate-proof to cut power outages'

International Energy Agency, JICA and Singapore EMA

- IEA Energy Transition Review - The Philippines' power sector (2026); IEA Financing the ASEAN Power Grid (2026); JICA Study on ASEAN Power Grid Final Report (25 Jun 2025); Singapore EMA SAIDI/SAIFI statistics

World Bank

- World Bank P181389 Energy Transition and Climate Resilience DPL, US\$800M (31 Mar 2025); World Bank Philippine Economic Update (2024-2025)

Press reporting used for context and quotation

- Civil Beat (Aug-Oct 2026); Honolulu Star-Advertiser (Aug-Oct 2026, incl. 9 Sep editorial); Hawaii News Now; Hawaii Public Radio; Reuters; AP; Governor Josh Green press conferences

Appendix D Abbreviations and acronyms

Every abbreviation and acronym used in this report and in its figures, together with the units and the declaration identifiers. Harvested from the generated document rather than written from memory, so the list cannot fall short of what the report actually contains.

Abbreviation	Full form	Abbreviation	Full form
AC	Alternating current	JICA	Japan International Cooperation Agency
ADB	Asian Development Bank	KIUC	Kaua'i Island Utility Cooperative
AI	Artificial intelligence (AI-enabled ignition cameras)	kV	Kilovolt
A1-A16	Plan action identifiers, Sections 9 and Figures 15–16	MED	Major Event Day
ASEAN	Association of Southeast Asian Nations	MECO	Maui Electric Company
BATELEC-2	Bataan Electric Corporation, Region II (Philippines)	MERALCO	Manila Electric Company
BENECO	Bicol Electric Corporation (Philippines)	MGSP	Microgrid Service Provider (RA 11646)
BESS	Battery energy storage system	mph	Miles per hour
CD	Conference Draft (Hawaii Legislature)	MW	Megawatt
CIK	Central Index Key (SEC registrant identifier)	MVA	Megavolt-ampere
ckm	Circuit kilometres	MVIP	Mindanao-Visayas Interconnection Project
CT	Combustion turbine	MWh	Megawatt-hour
DC	Direct current	NEA	National Electrification Administration (Philippines)
DoD	Department of Defense	NEXRAD	Next Generation Weather Radar
DOE	Department of Energy (United States)	NGCP	National Grid Corporation of the Philippines
DOE DC	Department Circular: Philippine DOE Department Circular, e.g. DC2026-02-0008	nmi	Nautical miles
DOE-PH	Department of Energy, Republic of the Philippines	NOAA	National Oceanic and Atmospheric Administration
DRRM	Disaster Risk Reduction and Management (RA 10121)	NPS	National Park Service
EDGAR	Electronic Data Gathering, Analysis and Retrieval system (SEC)	NWS	National Weather Service, Honolulu
EIDL	Economic Injury Disaster Loan	PHMO	Moloka'i NEXRAD WSR-88D radar site identifier
EMA	Energy Market Authority (Singapore)	PIDS	Philippine Institute for Development Statistics
EPIRA	Electric Power Industry Reform Act (RA 9136)	PLN	Perusahaan Listrik Negara (Indonesia)
ERC	Energy Regulatory Commission (Philippines)	PhP	Philippine peso
FAA	Federal Aviation Administration	PSPS	Public Safety Power Shutoff
FEMA	Federal Emergency Management Agency	PUC	Public Utilities Commission of Hawai'i
FOI	Freedom of information	Q4	Fourth quarter
FY	Fiscal year	RA	Republic Act (Philippine legislation)
GFM	Grid-forming (inverter)	RFP	Request for proposals
GWh	Gigawatt-hour	ROW	Right-of-way

Abbreviation	Full form	Abbreviation	Full form
GRIP	Grid Resilience and Innovation Partnership (DOE grant programme)	SAIDI	System Average Interruption Duration Index (minutes per customer per year)
HB	House Bill (Hawaii Legislature)	SAIFI	System Average Interruption Frequency Index (interruptions per customer per year)
HECO	Hawaiian Electric Company	SBA	Small Business Administration
HEI	Hawaiian Electric Industries, Inc.	SD	Senate Draft (Hawaii Legislature)
HELCO	Hawaiian Electric Light Company	SEC	Securities and Exchange Commission
HEO	Hawaiian Electric Organization (HEO, HELCO and MECO together)	SSW	South-southwest
HFA	House Finance Amendment (Hawaii Legislature)	T1-T8	Transferable-measure identifiers, Section 8
HIEMA	Hawai'i Emergency Management Agency	TDP	Transmission Development Plan
HSEO	Hawai'i State Energy Office	TNB	Tenaga Nasional Berhad (Malaysia)
HST	Hawaii Standard Time	TS	Tropical Storm
HVDC	High-voltage direct current	UCME	Universal Charge for Missionary Electrification
IEEE	Institute of Electrical and Electronics Engineers	VRE	Variable renewable energy
IEEE 1366	IEEE reliability reporting standard (basis of HECO's normal-year SAIDI)	WMP	Wildfire Mitigation Plan
IEEE 2800	IEEE grid-forming inverter conformance standard	WSR-88D	NEXRAD Doppler weather radar model
IGP	Integrated Grid Plan	EM-36xx-HI	Presidential Emergency Declaration, State of Hawaii
IJA	Infrastructure Investment and Jobs Act	DR-49xx-HI	Presidential Major Disaster Declaration, State of Hawaii
JEXIM	Japan Exim Bank	HI-200xx	SBA disaster loan declaration number, State of Hawaii

Abbreviations are expanded on first use in the body text; this appendix is the single reference for all sixteen figures.

Report generated 17 October 2026 from the verified dataset held in data.py. Every number in this document resolves to that file and from there to Appendix C.