Critical-Load & Outage-Scenario Worksheet

Read the assumptions, then follow the 17 worksheet entries

This planning exercise carries the article's 300 kW continuous load plus 150 kW of pumping for two hours through the worksheet. It represents no actual utility project. It records load requirements, not resource sizing, engineering approval or H2PWR capability.

Added assumptions for CL-24

L1 and L2 are bookkeeping IDs at a notional critical-load boundary. The outage lasts 24 elapsed hours. L1 runs continuously; L2 runs concurrently for one contiguous window at hours 8–10, chosen only to display the two-hour duty. Power is constant within each window. No other loads or variability are represented.

Calculate running demand and load energy

Time is relative to outage start, not local clock time. No calendar date, season, hazard or time zone is assigned.

Elapsed hours	Running demand	Duration	Load energy
0–8	300 kW	8 h	2,400 kWh
8–10	450 kW	2 h	900 kWh
10–24	300 kW	14 h	4,200 kWh
Total / peak	**450 kW peak**	**24 h**	**7,500 kWh**

Cross-check: 300 kW × 24 h + 150 kW × 2 h = 7,500 kWh = 7.5 MWh.

What these totals leave open

Generation auxiliaries, electrical losses, motor-starting demand and operating reserves are outside the calculation: they are unquantified, not zero. Running peak does not establish pickup capability or source capacity; load energy is not battery size, fuel requirement or proof of runtime.

Pages 2–4 follow all 17 original prompts. Open questions show where evidence belongs. Use the separate blank worksheet for your site; replace every exercise assumption and assign evidence owners and dates.

Critical-Load & Outage-Scenario Worksheet

1. Define the service and interruption limits

CL-24 | Assumed load duty from page 1. Entries below map to the blank worksheet prompts.

Site, boundary and record owner

Utility/site; electrical boundary or drawing reference; scenario ID; preparer, role and date.

CL-24; notional critical-load boundary containing only L1 and L2. No utility, site, one-line drawing, preparer or site record date supplied. Assign these for a real record.

Critical service and priority basis

What service must continue, who sets its priority, and what consequence defines unacceptable loss?

L1 represents the article's continuous critical-load group; L2 represents pumping. What functions, consequences and priority owners define each group? No priority tier is assigned.

Load register - one line per load or group

Load ID; service; circuit/location; priority; maximum allowable interruption with units; basis/owner.

L1: 300 kW continuously, hours 0–24; circuit/location unknown.
L2: 150 kW pumping, hours 8–10; circuit/location unknown.
For each: who approves the priority and maximum allowable interruption? Both remain open; 24 hours is the outage duty, not interruption tolerance.

Conditional priorities and deferrable loads

Which loads may be deferred or shed, by whom, and under what scenario? Record proposed order only.

No shedding order or deferrable-load permission assumed. Is pumping movable, and under what process constraints? Who may change load priorities during CL-24?

Transfer, restart and continuity requirements

By load ID: required transfer time, restart delay, manual actions and any no-break power requirement.

For L1 and L2: what transfer time, restart delay, manual actions and no-break support are required? No successful island transition or restart is assumed by the running-load arithmetic.

Existing backup evidence

By load ID: backup path, startup time, supported duration, test date/conditions and unresolved limits.

No existing backup equipment, runtime or test record supplied. What path supports each load, how quickly can it start, and what dated tests establish its limits?

Critical-Load & Outage-Scenario Worksheet

2. Record time-varying demand and pickup needs

CL-24 | Assumed load duty from page 1. Entries below map to the blank worksheet prompts.

Demand evidence and boundary

Load IDs; meter/file reference; date range, time zone and sampling interval; units; gross or net boundary.

Assumed running real power (kW), not meter data or nameplate evidence. Boundary includes L1/L2 only; no gross/net meter designation assigned. No dates, time zone or sampling interval; elapsed outage hours are used.

Demand by time window

Load IDs; window/season; minimum, typical and peak demand with units; concurrent loads; evidence basis.

Hours 0–8: L1 only, 300 kW; 2,400 kWh.
Hours 8–10: L1 + L2, 450 kW; 900 kWh.
Hours 10–24: L1 only, 300 kW; 4,200 kWh.
Constant power assumed within each window; season unknown.

Demand changes during the outage

Scenario ID; loads added/removed; duty cycles, weather/occupancy/process assumptions and uncertainty.

L2 adds 150 kW of running demand at hour 8 and stops at hour 10; L1 continues. Timing is a display assumption. No other variation, weather effect or process change is modeled; obtain site evidence.

Pickup events and sequence for evaluation

Load ID; proposed pickup order; running demand; step change; motor start/transformer inrush and duration.

Evaluate energization at outage start and L2 restart at hour 8. The 150 kW running-demand increase is not a motor-start/inrush value. What sequence, simultaneous starts, transient magnitude and duration apply?

Electrical and startup evidence still needed

Voltage/phase, kVA or power factor, starting method, equipment/test reference; distinguish data from estimates.

What voltage/phase, power factor or kVA, starting method, transformer/motor data and test records apply to L1/L2? None supplied. Identify the required equipment evidence and measurements.

Pickup and transition review questions

What remains to be studied for controls, protection, voltage/frequency and restart? Name owner and evidence.

Who will review controls, protection, voltage/frequency behavior and restart under CL-24? Define studies and acceptance tests for the chosen configuration; no resource or equipment approval is recorded.

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3. Define outage duration, dependencies and evidence gaps

CL-24 | Assumed load duty from page 1. Entries below map to the blank worksheet prompts.

Outage scenario and duration basis

ID; hazard; start time/season; duration and units with historical, assumed or required basis. Load IDs; service/reduced-duty windows; restoration requirements to evaluate.

CL-24: assumed 24-hour outage, elapsed hour 0 to 24; not a forecast or runtime claim. Hazard, season and calendar start unknown. L1 runs throughout; L2 at hours 8–10. What restoration and reduced-duty cases are required?

Supply and resupply assumptions

Fuel/feedstock, water or other supply: initial availability; resupply timing/route/agreement; no-resupply case.

No fuel/feedstock, water, inventory or resupply availability assumed. For a candidate resource, what starting stock, outage supply and delivery evidence apply? Define delayed/no-resupply cases.

Common-cause dependencies

Pipeline, roads, communications, controls, auxiliary power and staffing: event impact; evidence; fallback gap.

What common event affects roads, pipelines, water, communications, controls, auxiliaries and staffing? No availability or fallback credited. Identify dependencies and evidence for CL-24.

Evidence gaps and follow-up

Unknown/input; document, measurement or study needed; responsible owner; target date; affected scenario.

All open inputs affect CL-24. Obtain function/priority and interruption limits; demand records; pickup/electrical data; supply and dependency evidence; equipment studies/tests. Assign a responsible person and target date for each; neither is supplied.

Site discussion summary

Highest-priority service; controlling interruption limit; outage case; key uncertainty; requested next review.

CL-24: 450 kW running peak; 7.5 MWh load energy. Highest priority and controlling interruption limit remain open. Next: confirm service requirements and evidence owners before comparing resource configurations.

Basis and next steps

Arithmetic: RPW microgrid planning article. Prompt structure: existing blank worksheet, adapting PNNL-33549 (2023) and NREL/TP-7A40-72586 (rev. January 2020). Federal-site and defense guidance informs the prompts; it is not a utility requirement or endorsement.

Read the planning article
Use the reader and original blank worksheet
PNNL-33549
NREL/TP-7A40-72586