PG&E Grid Maintenance — Work Order Bundling  
Solution Summary

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# Opportunity Description

* Crews often return to the same area for separate work orders within days/weeks, causing avoidable truck rolls, overtime, and customer disruption.
* Dispatchers lack a single, tuned view of “what else is nearby and due soon.”
* Proximity + due-date logic exists but isn’t surfaced at the moment of dispatch with approval controls and audit trail.
* Opportunity: auto-surface bundleable work orders around a scheduled anchor job, quantify time/cost saved, and capture an approve/reject decision in Teams.

# Solution Description

**What it is:**

A Power BI–driven Work Order Bundling app that pairs an anchor work order with candidate work orders within a configurable radius and due-date window, ranks them by Bundle Score, and sends Teams Approvals via Power Automate. Decisions are logged to SharePoint.

**Core components:**

* Power Query (M): Builds Anchor×Candidate pairs; computes distance (Haversine), flags Within Radius/Window, calculates TimeSaved, Penalty, BundleScore, and CostSaved.
* Power BI report: Bundling Suggestions (table + map + KPIs + What-If sliders) and Anchor Detail (drillthrough KPIs, candidate list, mini-map).
* What-If Parameters: RadiusMiles, HighWindowDays, OverheadHoursPerTrip, CrewHourlyRate (+ optional AvgSpeedMph, EarlyPenaltyPerDay).
* Power Automate: Push-button Teams Approvals; writes decisions to SharePoint list (BundleDecisions).
* Governance: Transparent parameters, audit log of decisions, RLS-ready by Region/Cell.

**PG&E fit:**

Extensible to Gas Integrity (CP zones, ILI trends, inspection dates), Electric distribution, and other field ops where proximity + timing matters.

# Efficiencies and Benefits

* Fewer truck rolls by adding nearby candidates to anchor trips.
* Time & cost visibility: every candidate shows Time Saved (hrs) and Cost Saved ($), live with sliders.
* Decision at the edge: one-click Approve/Reject in Teams; no swivel-chair between tools.
* Auditability: SharePoint captures who approved, when, and comments.
* Change-friendly policy: tune radius/window/penalty without code (office vs. rural profiles).
* Customer impact: fewer repeat visits; shorter planned outage windows when outages are required to complete work.
* Safety/compliance ready: add integrity signals (CP status, ILI anomaly density, inspection dates) to deprioritize risky early work.

# Savings (Financial Impact)

**Formulas:**

* Weekly hours saved = CandidatesSuggested × ApprovalRate × TimeSavedPerCandidate
* Weekly $ saved = WeeklyHoursSaved × CrewHourlyRate
* Monthly/Annual = Weekly × 4.33 / Weekly × 52

Illustrative example (per operating cell):

|  |  |
| --- | --- |
| Input/Result | Value |
| Candidates suggested / week (S) | 12 |
| Approval rate (p) | 0.60 |
| Time saved / candidate (t, hrs) | 0.60 |
| Crew hourly rate (r, $/hr) | $150 |
| Weekly time saved (hrs) | 4.32 |
| Weekly cost saved ($) | $648 |
| Monthly cost saved ($) | $2,806 |
| Annual cost saved ($) | $33,696 |

Scale across multiple regions/cells to estimate portfolio impact. Fuel/vehicle wear and emissions reductions are additional benefits not included above.

# Effort (Work, Resources, Timeline)

* People: 1 Power BI dev (0.5–1.0 FTE for pilot), 1 Power Automate builder (0.2 FTE), 1 Dispatch/Ops SME (0.2 FTE), 1 Data owner (ad hoc), optional Integrity SME.
* Week 1: Data hookup (CSV/SharePoint/SQL), Power Query pair logic, Parameters, base visuals/map.
* Week 2: DAX KPIs, drillthrough, Teams Approvals flow, SharePoint list, UAT.
* Week 3: Pilot rollout, dispatcher training (1–2 hrs), parameter tuning, success metrics baseline.
* Total pilot effort: ~80–120 hours (incl. testing & enablement). Uses existing M365 stack.

# Scalability

* Geographic: Add Regions/Cells via slicers; apply RLS to limit local views; scale with incremental refresh.
* Domain: Extend to Gas (transmission/distribution, casing, corrosion-prone assets) and Electric (poles, vegetation follow-ups, patrols).
* Feature: Swap straight-line miles for route-aware time (Azure Maps), add multi-stop optimization, or richer risk signals (CP/ILI/soil/coating).
* Process: Weekly CP digest in Teams, auto-suppression of already-decided pairs, BI usage telemetry for adoption.

# Operations and Maintenance

* Data & refresh: Power BI Service scheduled refresh or DirectQuery; SharePoint list for decisions with governed retention.
* Flow health: Power Automate run history alerts; service account connections for stability; notifications on failures.
* Parameter governance: publish default slider values by region (bookmark or Deployment Pipeline rules); document changes in README.
* Security: Workspace permissions + RLS by Region/Cell; SharePoint list inherits site security.
* Support model: BI owner (L2), Power Automate owner (L2), Dispatch SME (L1 triage); quarterly review of parameters and savings.
* Telemetry & KPIs: candidates suggested, approval rate, time/$ saved, coverage (% anchors with ≥1 candidate).

# Appendix — Outage Metrics & Benchmarks (Public)

Benchmark planned/sustained outage performance using public sources such as:

* CPUC Annual Electric Reliability Reports (IOUs file SAIDI/SAIFI/MAIFI/CAIDI each July).
* U.S. EIA Form 861 reliability data (SAIDI/SAIFI/CAIDI, with/without Major Event Days).
* PG&E Electric Reliability Reports page (multi-year SAIDI/SAIFI trends).

To contextualize potential reductions in planned outage minutes (e.g., fewer repeat planned outage windows in the same neighborhood).