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Rate Design and Revenue Analysis Dashboard
(Power Query + DAX + Power BI + pgAdmin + PostgreSQL + Excel)

Interactive dashboard to track revenue, variance drivers, and customer bill changes by month, with slicers for year and month.

Objective

- Measure revenue performance over time with kWh volume and average rate per kWh.
- Explain revenue change using driver effects: usage volume, rate changes, and fixed charges.
- Compare average customer bills under current rates versus prior rates to estimate rate impact.

Tools used

- Power BI Desktop for data visualization.
- pgAdmin to manage PostgreSQL connections and run SQL scripts
- PostgreSQL for cleaning, joining, and creating analysis-ready tables.
- Excel for exporting consistent CSVs before loading into PostgreSQL and Power BI.
- Power Query for shaping and table preparation.
- DAX for measures, time intelligence, and driver calculations.

Questions explored

1. How does total revenue trend by month and year?
2. Which months show the largest month over month revenue shifts?
3. How does average rate per kWh change across time?
4. How much of revenue change comes from usage volume versus rate changes versus fixed charges?
5. Which driver explains the largest share of the selected period revenue change?
6. How do current average bills compare to bills at prior rates by month?
7. What is the rate impact in dollars and percent for the selected month and year?
8. Do rate schedules or customer classes show higher rate impact than others?

Data cleaning and modeling

- Created a dedicated Date table with Year, Month, and MonthNum for clean time filtering.
- Standardized numeric fields for kWh, rates, fixed charges, and revenue to support aggregation.
- Built measures for revenue, kWh, average rate, and period over period change.
- Built variance measures to isolate effects: Prior Revenue, Revenue Change, Volume Effect, Rate Effect, Fixed Charge Effect, and Residual.
- Built bill comparison measures: Avg Bill (Current), Avg Bill (Prior), Avg Bill Change, Rate Impact, and Rate Impact %.

Key findings

- Total revenue across 2025 to 2026 was $407.91M.
- Total revenue increased from $200.33M in 2025 to $207.59M in 2026, up $7.26M, 3.62%.
- Total kWh across 2025 to 2026 was 2.43B.
- Total kWh was 1.215B in both 2025 and 2026, 0 kWh change, 0.00%.
- Effective revenue per kWh increased from 16.49¢ in 2025 to 17.09¢ in 2026, up 0.60¢.
- Average monthly revenue per customer increased from $166.94 in 2025 to $172.99 in 2026, up $6.05.
- The fixed monthly charge increased from $10 in 2025 to $12 in 2026, up $2 per customer per month.
- The variable rate increased from 15.5¢ per kWh in 2025 to 15.9¢ per kWh in 2026, up 0.4¢ per kWh.
- Jan 2026 increased by $576K versus Jan 2025, driven by $376K rate effect plus $200K fixed charge effect, with $0 volume effect.
- Peak usage month was July at 122.0M kWh in both years, and higher 2026 pricing increased July revenue by $688K versus July 2025.
- Driver totals reconcile to revenue change each month, with residual at $0.

Dashboard pages

- Revenue: KPI cards, revenue trend, year and month slicers, and a revenue versus target gauge.
- Variance: KPI cards for each driver and a combo chart showing monthly driver effects with a detail table.
- Bill Comparison: cards for bill metrics, current versus prior bill trend, bill change drivers bar chart, and a supporting detail table.

Key measures created

- Total Revenue, Total kWh, Avg Rate per kWh
- MoM Revenue Change, MoM Revenue Change %
- YoY Revenue Change, YoY Revenue Change %
- Prior Revenue, Revenue Change
- Volume Effect, Rate Effect, Fixed Charge Effect, Residual
- Avg Bill (Current), Avg Bill (Prior), Avg Bill Change
- Rate Impact, Rate Impact %

Dashboard interactions

- Year and Month slicers drive every visual for fast period selection.
- Cross highlighting links KPI cards, charts, and detail tables.
- Consistent layout across pages for quick comparison across Revenue, Variance, and Bill Comparison.

Folder directory

- Raw Data Files: original source files
- Clean Data Files: cleaned and standardized tables used in the model

- Dashboards: PBIX file and exported visuals
- Documents: project summary
- Images: dashboard screenshots for README or portfolio posts

Skills demonstrated

- SQL data modeling and table design
- ETL and data preparation in PostgreSQL
- Data validation and reconciliation checks
- Time series analysis, YoY and MoM comparisons
- Variance analysis, volume, rate, fixed charge decomposition
- Metric design and KPI definition
- DAX measures and calculated tables in Power BI
- Interactive dashboard design with slicers
- Data visualization and storytelling for stakeholders
- Excel data structuring, cleaning, and exports
- Documentation and project organization for reproducibility

Data attributes
- usage_month: month and year of usage
- customer_class: customer segment such as Residential
- rate_schedule: tariff or rate plan identifier
- customers: customer count in the segment
- kwh: energy usage volume
- variable_rate: price per kWh
- fixed_charge: monthly fixed fee
- current_revenue: revenue under current rates
- prior_variable_rate and prior_fixed_charge: prior period rate inputs
- revenue_at_prior_rates: revenue estimate using prior rates
- rate_impact: bill change tied to rate differences

Limitations
- Monthly aggregation, no account level bill detail.
- Time range depends on available months in the source.
- Estimates omit taxes, riders, and one time fees.
- Assumes one rate schedule per segment per month.

Next steps
- Add a drill through page by rate_schedule and customer_class.
- Add a tooltip page for driver definitions and calculation notes.
- Add KPI indicators with prior month comparison and arrow icons.
- Publish to Power BI Service and set up a refreshed dataset schedule.