CMS (customer meter SERVICE) Resource Optimization

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A Lean Six Sigma Project

SCM.755.M001-FALL 2023

EXECUTIVE SUMMARY

The CMS Resource Optimization Project for National Grid is a comprehensive initiative aimed at improving the Advanced Metering Infrastructure (AMI) meter installation process. It addresses critical challenges such as gas module unavailability, frequent customer opt-outs, and 'Unable to Complete' (UTC) scenarios. The project leverages Lean Six Sigma methodologies to enhance efficiency and customer satisfaction. This involves utilizing SIPOC diagrams for process mapping, Affinity Diagrams for categorizing issues, and Stakeholder Analysis for identifying key project influences. The primary goal is to streamline operations, thereby reducing the costs associated with revisits and improving overall service efficiency.

Central to the project's strategy is enhancing communication with customers. This includes developing more impactful messaging to encourage participation in the AMI installation program and to improve awareness about the installation schedule. These efforts aim to reduce UTC rates and opt-outs by making the communication more engaging and informative. The project also employs predictive analytics and targeted customer education to address common concerns and misconceptions about AMI meters, focusing on their benefits and addressing issues related to health, safety, and privacy.

Operational enhancements form another significant aspect of the project. These include the implementation of advanced scheduling software to optimize installation efficiency and comprehensive training programs for technicians to handle on-site issues effectively. A robust feedback loop is established to capture customer insights post-installation, providing valuable data for continuous improvement. The project also introduces policy enhancements and quality control checks to ensure adherence to best practices, further aiming to reduce the need for revisits and enhance the overall quality of service. These measures collectively contribute to a more efficient, customer-centric approach to AMI meter installations, aligning with National Grid's commitment to service excellence and operational efficiency.

ACKNOWLEDGEMENTS

We express our heartfelt gratitude to Professor Gary LaPoint for granting us the invaluable opportunity to put our knowledge of Lean Sigma Principles into practical use within a real-world setting. His expert recommendations and insightful suggestions played a pivotal role in ensuring the success of our project.

Special appreciation goes to James Walter, our dedicated project champion, and Matt Johnson, the Lead Analyst, for their unwavering direction, assistance, and guidance throughout the project and provision of essential data. We also extend our thanks to Molly Grzelka, Lead Analyst, for her invaluable support. Their mentorship has instilled in us a sense of confidence and competence that will undoubtedly influence our future endeavors.

This collaborative journey has equipped us with a deeper understanding of Lean Sigma Principles and their practical applications. The challenges we encountered served as opportunities for growth, fostering teamwork and problem-solving skills among our team members. Embarking on this project has proven to be not only enriching but also a profound learning experience for each member of our team.

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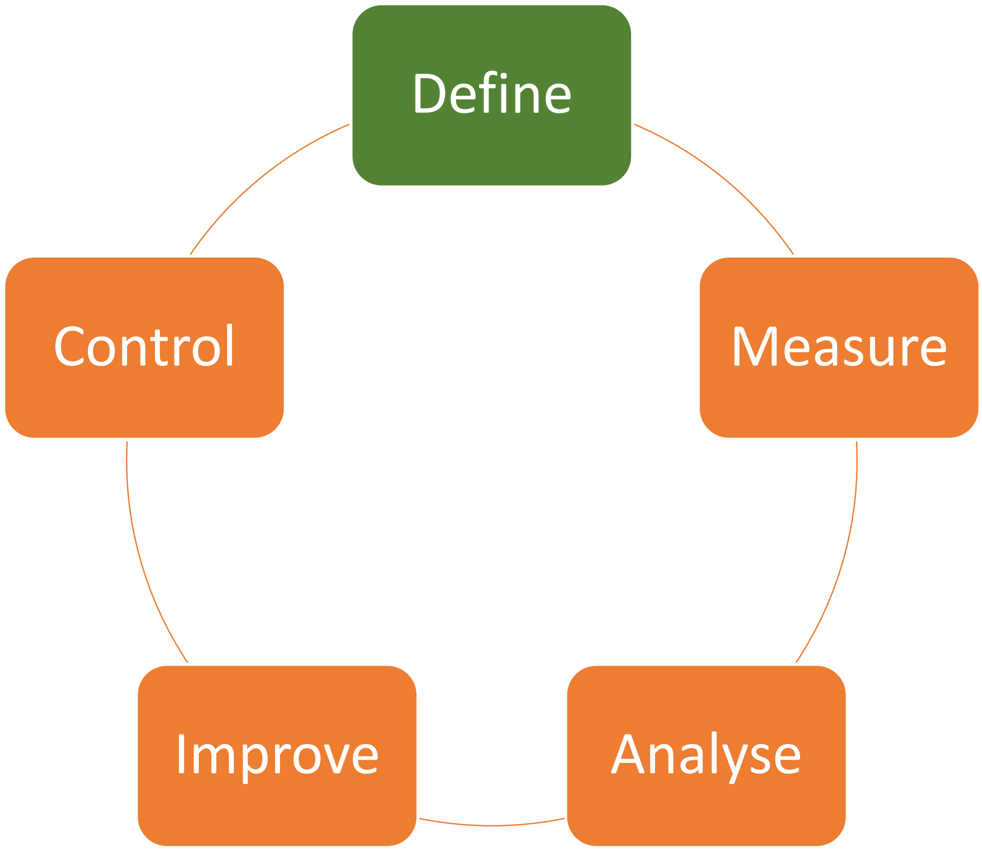
Define
Measure
Analyse
Improve
Control

PROJECT CHARTER

PROJECT CHARTER

Project Name:
CMS (customer meter service)resource optimization

Business/Location
Syracuse ,New york ,United states

Team Leader:
Matt Johnson

Champion:
James Walter

Project Description/Mission:

National Grid and Utility Partners of America (UPA) are initiating a project to install approximately 830,000 electric meters across Central New York from September 2023 to November 2024. Unforeseen delays in Gas Module availability from the supplier, Landis and Gyr, have necessitated return visits to Dual Fuel customers and initial visits to Gas-only customers in close proximity who were initially skipped. This project aims to assess the costs associated with these return visits, considering increased UTC rates and addressing opt-outs from customers despite varied communication efforts. Furthermore, it outlines the necessary resource allocation to manage revisits and new installations efficiently.

Problem Statement:

National Grid and Utility Partners encounter obstacles with delayed Gas Module availability, resulting in costly return visits for Dual Fuel and Gas-only customers. The escalation of UTC rates, in conjunction with an increasing number of customer opt-outs prior to installations, compounds project costs. Balancing installations in overlapping areas becomes critical to optimize resources and enhance operational efficiency from September 2023 to November 2024.

Business Case:

The installation project of 830,000 electric meters in Central New York encounters significant challenges due to unforeseen delays in Gas Module availability from the supplier, Landis and Gyr. This results in the need for return visits to Dual Fuel customers and initial visits to initially skipped Gas-only customers, introducing potential cost overruns and operational inefficiencies. The escalating UTC rates, combined with a rising trend of customer opt-outs despite varied communication efforts, pose financial and logistical risks to the project. The business case highlights the critical importance of assessing the costs associated with these challenges and strategically addressing resource allocation issues. The project aims to navigate these complexities, ensuring prudent financial management and optimizing operational efficiency for a successful meter installation within the designated timeline from September 2023 to November 2024.

Deliverables:

•Analyze expenses for return visits and Gas-only installations, breaking down costs with a focus on delayed Gas Module, escalating UTC rates, and customer opt-outs.

•Develop an efficient strategy for resource distribution, identifying essential personnel and equipment required for both revisits and new installations.

•Provide suggestions to enhance overall meter installation efficiency, including strategies for streamlined processes, minimized delays, and effective management of potential disruptions.

•Evaluate diverse communication approaches, providing recommendations aimed at minimizing customer opt-outs.

Goals/Metrics:

•Cost Management
•Resource Optimization
•Operational Efficiency
•Communication Effectiveness

Project Scope Is:

- Electric Meter Installations and Expenses
- Gas Module Installation (Postponed)
- Return Visits to Dual Fuel Customers and costs of revisits.
- Gas-Only Customer Installations and installation costs.
- Unable to complete (UTC)-costs
- Resource Allocation

Project Scope Is Not:

Manufacturing

Procurement

Key Customers:

National Grid

Customer Expectations:

•Successful Meter Installations
•Cost Containment
•Operational Efficiency Improvement
•Resource Optimization
•Effective Communication Strategies

Milestones:

Project Start: Sep-23

Project Completion:

Completion Dates:

Dec-23

Team Members:

James Walter
Matt Johnson
Molly Grzelka
Robert Mazzatti
Daniel Lang
Nandita Pathardikar
Anjana Sowmya Puvvada
Umang Nainesh Vora
Shweta Krishna Khopde

Expected Resource Needs:

•Communication Platforms
•Marketing Materials
•UTC Data And Opt outs data
•Transportation costs (truck rolls)
•Coordination with Utility Partners
•Legal Support

Prepared By:

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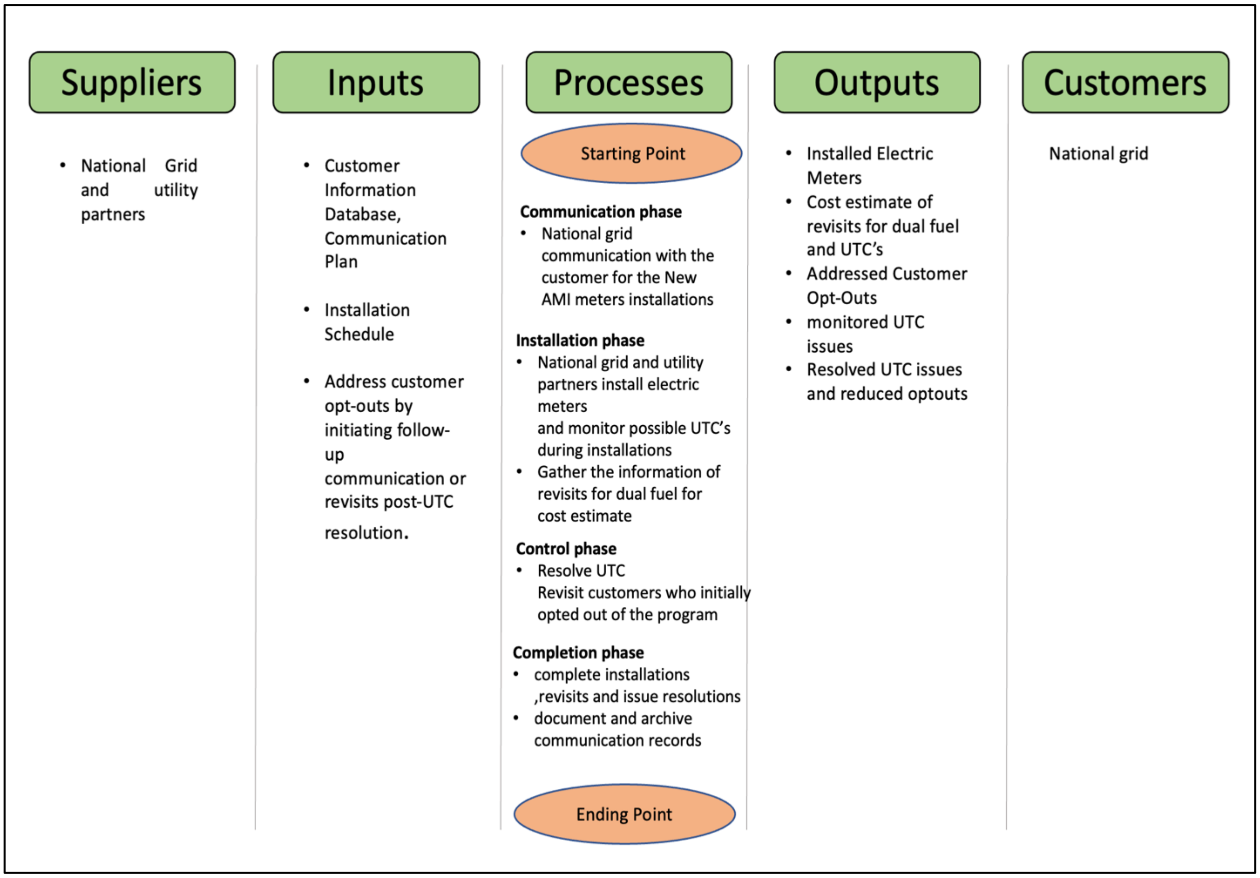
Date (Last Revision):

11/7/23

SIPOC DIAGRAM



A SIPOC diagram is typically created before the detailed process mapping begins. It helps everyone involved to understand the scope and purpose of the process improvement project and provides a clear snapshot of what the process entails without getting bogged down in the minute details. It's particularly useful for defining roles and responsibilities, setting project boundaries, and ensuring a common understanding among all participants.

The diagram is a process map for a utility meter installation project. It shows the flow from suppliers (National Grid and partners) providing the inputs (customer data and installation schedules) to various phases of the process (communication, installation, control, and completion). The main goal is to install electric meters and address any issues, such as customer opt-outs or installation challenges (referred to as UTCs). The outputs are the installed meters, managed customer opt-outs, and resolved issues. The end customers in this process are identified as the National Grid.

COMMUNICATION PLAN

Audience	Media	Purpose	Owner	Frequency	Notes
Jim Walter	Weekly in person meeting, email updates, invite to tollgates	Updates related to project	Team 8	Weekly meeting and email	participate in all events
Molly Grzelka	Weekly in person meeting, email updates, invite to tollgates	Helps with scheduling of the visit to the consumer and Unable to complete setup	Team 8	Weekly meeting and email	participate in all events
Matt Johnson	Weekly in person meeting, email updates, invite to tollgates	Helps with scheduling of the visit to the consumer and data and meta data extraction	Team 8	weekly meeting	participate in all events
Daneil Lang	Scheduled meeting, email updates, invite to tollgates	Resource cost, Cost per truck roll	Team 8	As needed and during tollgates	NA
Robert Mazzatti	Scheduled meeting, email updates, invite to tollgates	Stay aligned with electric meter/gas modules installation plans and updates in Central NY	Team 8	As needed and during tollgates	NA

The communication plan is designed to manage interactions with specific individuals by Team 8. It involves scheduled weekly in-person meetings, emails, and invites to tailgate events. While the specific purposes for these communications vary—ranging from scheduling visits to addressing setup issues—the overarching goal is to maintain clear and regular contact, coordinate activities, and ensure involvement in events. The frequency of communication is primarily weekly, with some as needed. Some details in the plan are not visible or are abbreviated, but the notes indicate an expectation for the individuals to participate in all events. This structured approach facilitates organized and effective communication within the team and with its stakeholders.

AFFINITY DIAGRAM

Affinity diagram below breaks down the project into phases like Communication, Installation, Control, and Completion, aligning each with relevant stakeholders, inputs, outputs, challenges, and resources. The Communication Phase involves the National Grid and a customer information database, aiming to install electric meters. Challenges like gas module delays and customer opt-outs are noted, with resources like communication platforms available to assist. The timeline column indicates a 5-month duration for certain project components. This structured approach aids in visualizing the project lifecycle, identifying potential issues, and organizing the resources necessary for successful completion.

Process Phases	Stakeholders	Inputs	Outputs	Challenges	Timeline	Resources
Communication Phase	National Grid	Customer Information Database	Installed Electric Meters	Gas Module Delays	5 months	Communication Platforms
Installation Phase	Utility Partners	Communication Plan	Resolved UTC Issues	Customer Opt-Outs		UTC data and opt outs data
control Phase	Communication Team	Electric Meters	Addressed Customer Opt-Outs	UTC Issues		customer house key data base
Completion Phase		Community Education Materials	Communication Records	Dual Fuel Customer Revisits		Transportation costs (truck rolls)
		customer optouts data	Reduced opt outs			Coordination with Utility Partners
		Recommended changes	Customer satisfaction			Marketing Materials
						Legal Support

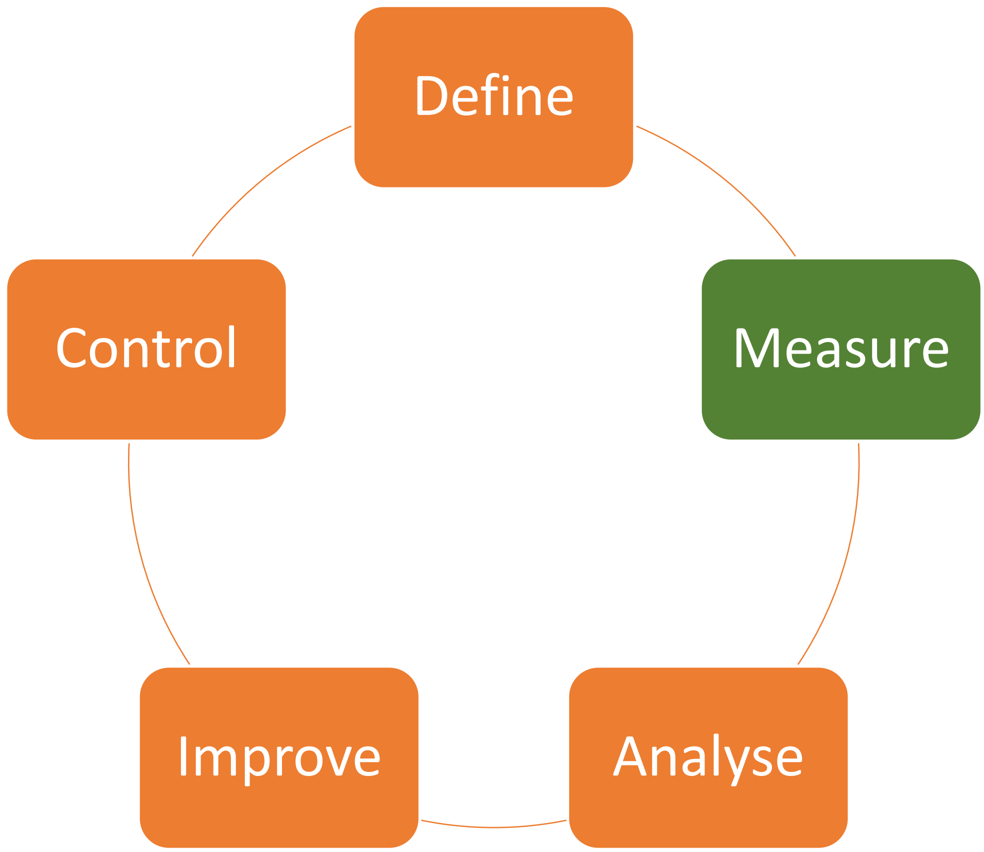
CTQC (CRITICAL TO QUALITY CHARACTERISTICS) TABLE

Customer	Need	Driver	CTQC
National grid customers	Well-Informed and Prepared Customers	Effective Communication	Community Education Initiatives (135 Days Prior)
National grid and utility partners	Smooth Installation Process	Efficient Project Execution	Installation by National Grid and Utility Partners
National grid	Resolved Concerns and Issues	Effective Communication and Support	Resolution of UTC Issues
National grid	Flexible and Customer-Centric Approach	Adaptability	Addressing Customer Opt-Outs
National grid	Informed and Prepared Dual Fuel Customers	Effective Communication	Initial Revisits (Once Gas Meters are Available)

The CTQC (Critical to Quality Characteristics) table is a framework that outlines the relationship between customer groups, their needs, the drivers for those needs, and the quality characteristics critical to fulfilling those needs in the context of AMI meter installations by National Grid.

- For National Grid customers, the need is to be well-informed and prepared for the installation process. The driver for this need is effective communication, and the corresponding CTQC is the community education initiatives that should start 135 days prior to installation.
- National Grid and its utility partners need a smooth installation process, driven by efficient project execution. The CTQC here is the actual installation conducted by both National Grid and its partners.
- For the National Grid itself, resolving any concerns and issues (UTC issues) is a need driven by the necessity for effective communication and support, with the resolution of these UTC issues being the CTQC.

- Additionally, National Grid aims for a flexible and customer-centric approach to address the need for adaptability, with addressing customer opt-outs as the CTQC.
- Lastly, for the dual fuel customers of National Grid, the need is to be informed and prepared, which is again driven by effective communication. The CTQC for this group is the initial revisits that are to be conducted once the gas meters become available.
- Overall, this table serves as a guide to ensure that customer needs and expectations are met through well-defined drivers and measurable quality characteristics.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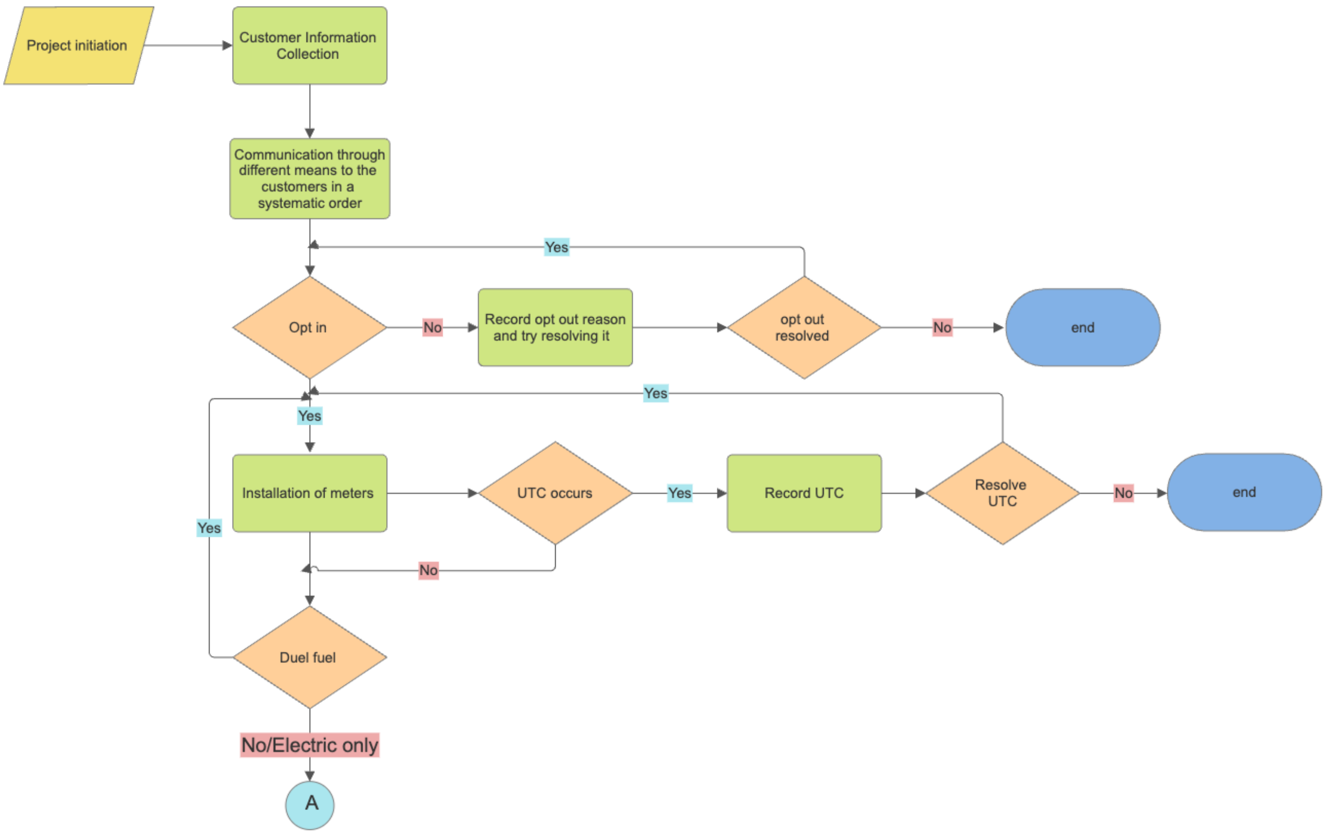
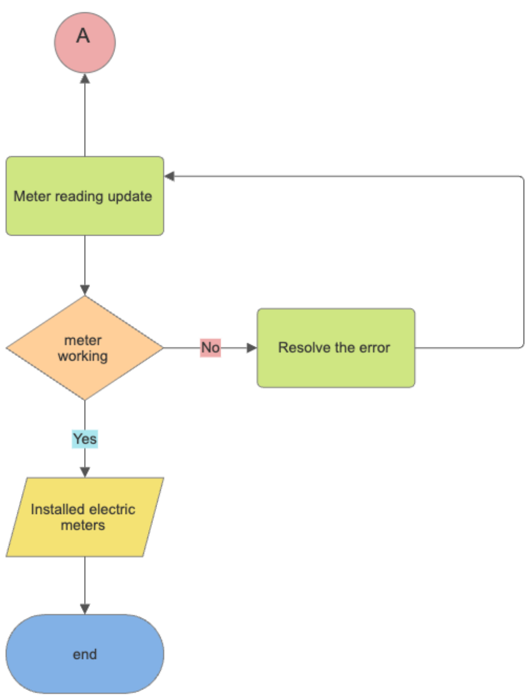
PROCESS FLOW DIAGRAM





The process flow diagram describes the sequence of operations for a project involving customer meter installation. The process begins with project initiation, followed by collecting customer information. Communication is then initiated to manage customer opt-in; if a customer opts out, the reason is recorded, and an attempt is made to resolve it. If the customer opts in, meter installation proceeds. If an 'Unable to Complete' (UTC) issue occurs, it is recorded and must be resolved. After successful installation, the type of meter (dual fuel or electric only) dictates the next steps. For electric-only meters, a meter reading update is conducted. If the meter is not working, the error is resolved. Once the meter is confirmed to be working, the installed electric meters mark the end of the process. This flow ensures systematic engagement with customers and the successful installation and functioning of meters.

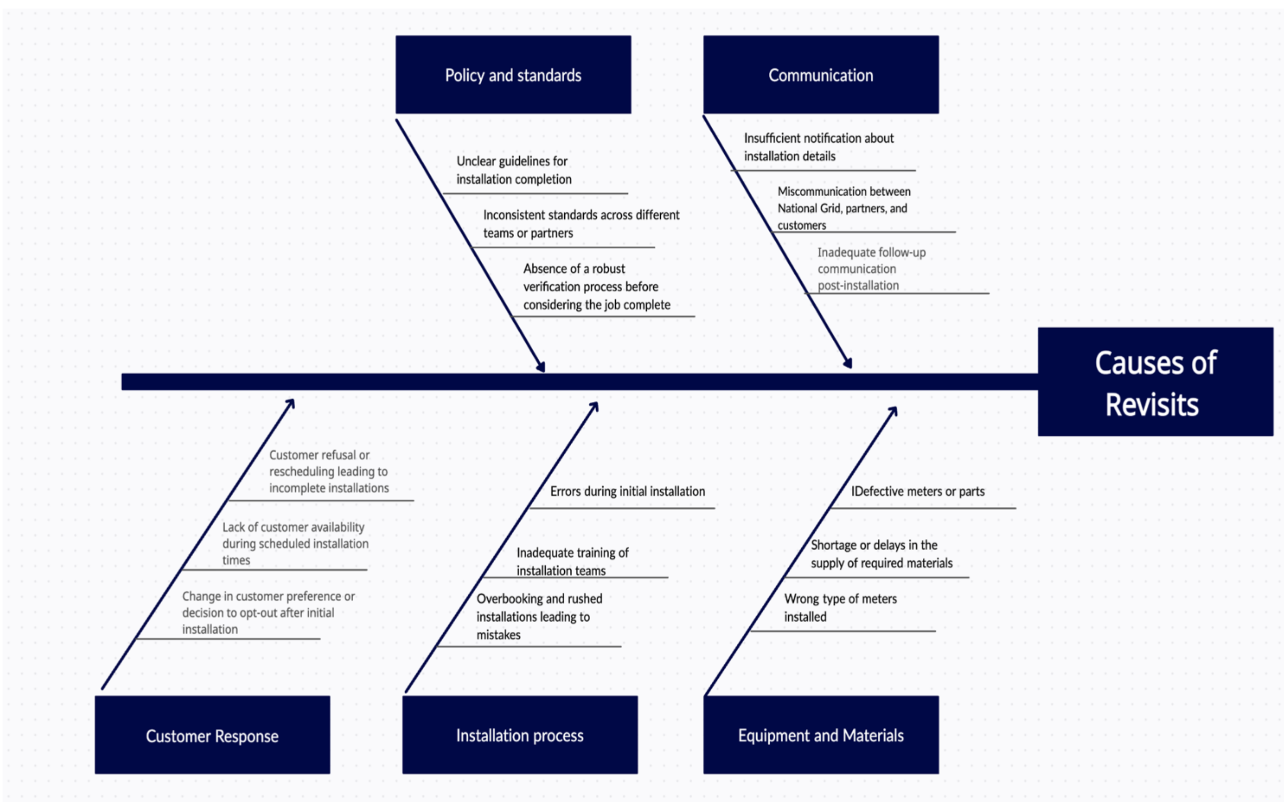
DATA COLLECTION PLAN

Performance Measure	Data Source / Location	How Data will be Collected	Who will Collect Data	When will Data be Collected	Sample Size
Customer House Database	National Grid Customer Database	Data extraction	IT Department	Monthly updates	All
UTC Occurrences	System logs, incident reports	Automated monitoring, manual review	Installation Team	Real-time monitoring, quarterly reviews	All
Opt-Outs	Opt-Out Records database	Data extraction, manual updates	Customer Service Team	Bi-weekly updates, post-communication phases	All
Customer Interface Platform Interactions	Customer Interface Platform logs	Data extraction, analysis	Analytics team	Post-interaction, monthly reviews	Representative sample based on interaction types
Installation Completion Rate	Installation records, field reports	Data analysis, field reports	Installation Team	Monthly updates, project completion	All
Customer Satisfaction	Surveys, customer service records	Surveys, customer service interactions	Customer Service Team	Post-installation, ongoing	Representative sample based on installation
Project Budget Variance	Financial records, project reports	Data analysis, financial reports	Project Management Team	Monthly updates, project completion	All
Project Timeline Variance	Project management	Data analysis, project management reports	Project Management Team	Monthly updates, project completion	All

The data collection plan is a comprehensive strategy designed to monitor the performance of the AMI meter installation process. Key performance metrics such as the state of the customer database, installation success rates, customer opt-outs, interaction quality, and project budget and timeline adherence are meticulously tracked. Data sources range from the National Grid's own databases to customer surveys and project reports, ensuring a wide net is cast to capture all relevant information.

Collection methods include automated systems for real-time data, regular data extraction, and manual reviews, with responsibilities divided among various teams such as IT, installation, customer service, and project management. The frequency of data collection is tailored to each metric, with some being updated monthly or quarterly, and others on a real-time or bi-weekly basis. The sample size for data collection varies, with some metrics requiring comprehensive data from all cases, while others rely on representative samples to gauge performance effectively. This structured approach allows for a detailed oversight of the entire installation process, ensuring efficiency, customer satisfaction, and operational compliance.

CAUSE AND EFFECT DIAGRAM



HOUSE OF QUALITY

Show Correlations here

Minimize or Maximize

House Of Quality

			Technical Specifications (How)									Competitive Assessment		
			Community education initiative	Mailing and follow-up communi	Robust scheduling system	Skilled and trained installation t	Quality control checks	Responsive customer service	Flexible rescheduling policy	Efficient process for handling op	System for tracking and managir			
	Customer Requirements (What)	**Importance**	A	B	C	D	E	F	G	H	I	1	2	3
1	1. Clear communication	9	9	9	3			3				8	6	7
2	2. Timely installation	8			9	9	3			3	3	7	8	6
3	3. Quality installation	10				9	9				9	9	7	8
4	4. Flexibility in scheduling	7			9				9			6	5	7
5	5. Minimized disruption	6		3		3	3					7	6	7
6	6. Quick issue resolution	8					3	9		9	9	8	9	7
7	7. Opt out / change dates	5			3				9	9		5	7	6

Relationships:
Strong= 9
Medium= 3
Weak= 1

The House of Quality (HoQ) matrix presented illustrates how customer requirements for the AMI meter installation process are translated into specific technical specifications. It demonstrates the importance assigned to each customer requirement and shows the relationship between these requirements and various aspects of the service provided. The strongest relationships are denoted by a '9', indicating a high correlation between customer needs and the technical steps taken to satisfy them, such as the clear communication being strongly linked to community education initiatives and follow-up communication. The competitive assessment section compares the performance of the company against two competitors across different technical specifications. The company appears to perform well in community education initiatives and quality control checks, while there is room for improvement in areas like the robustness of the scheduling system and the flexibility of rescheduling policies. This visual tool facilitates a clear understanding of where the company stands in meeting customer needs and how it compares to the competition, guiding strategic decisions to enhance service quality and customer satisfaction.

KEY PERFORMANCE INDICATOR

UTC Rate (Unable to Complete Rate):

Definition: The proportion of installation attempts that could not be completed as planned.

Calculation:

$$UTC\ Rate = Number\ of\ UTCs / Total\ number\ of\ installation\ attempts\ \times\ 100$$

Purpose: Measures the efficiency of the installation process and the accuracy of pre-installation assessments.

Opt-Out Rate:

Definition: The percentage of customers who choose not to participate in the program after initially agreeing to the installation.

Calculation:

$$Opt - Out\ Rat = Number\ of\ Opt - Outs / Total\ number\ of\ agreed\ installations\ \times\ 100$$

Purpose: Assesses customer buy-in and satisfaction with the pre-installation communication and the service offered.

Revisit Rate:

Definition: The frequency at which technicians need to revisit installations.

Calculation:

$$Revisit\ Rate = Number\ of\ revisits / Total\ number\ of\ initial\ visits\ \times\ 100$$

Purpose: Indicates the quality of the initial installation and the effectiveness of the installation teams.

DATA SETS AND META DATA

METER TYPE DATA SET

A	B	C	D	E	F	G	H	I	J	K	L	M
OP_CENTER	HOUSE_KEY	METER_ID	METER_TYPE	ROUTE	BILL_CYCLE	CITY	ZIP	STATE_COUN	COUNTY_NA	CENSUS_TRA	CENSUS_BLC	STATE
OLEAN	9991	679	ELE	237	1	OLEAN	14760	36009	Cattaraugus	3.601E+10	3.601E+14	NY
OLEAN	9992	680	ELE	237	1	OLEAN	14760	36009	Cattaraugus	3.601E+10	3.601E+14	NY
OLEAN	9993	681	ELE	237	1	OLEAN	14760	36009	Cattaraugus	3.601E+10	3.601E+14	NY
LAKEWOOD/	9994	682	ELE	234	1	CLYMER	14724	36013	Chautauqua	3.6013E+10	3.6013E+14	NY
DUNKIRK/FR	9995	683	ELE	234	1	RIPLEY	14775	36013	Chautauqua	3.6013E+10	3.6013E+14	NY
DUNKIRK/FR	9996	684	ELE	234	1	RIPLEY	14775	36013	Chautauqua	3.6013E+10	3.6013E+14	NY
HUDSON	9997	685	ELE	277	4	HUDSON	12534	36021	Columbia	3.6021E+10	3.6021E+14	NY

This dataset is a structured collection of records pertaining to the installation of electric meters across various locations, managed by an operational center.

A. OP_CENTER: Operational center or location responsible for the installation or maintenance of the meter.

B. HOUSE_KEY: A unique identifier for the house or property where the meter is installed.

C. METER_ID: The identification number of the meter installed at the location.

D. METER_TYPE: Indicates the type of meter, which in this case is "ELE" likely referring to an electric meter.

E. ROUTE: The route number or code that might be used for organizing service visits or meter reading schedules.

F. BILL_CYCLE: A number indicating the billing cycle for the customer, which could correspond to specific dates or months when the billing occurs.

G. CITY: The city where the meter is installed.

H. ZIP: The postal ZIP code for the meter location.

I. STATE_COUNTY: The county within the state where the meter is installed.

J. NA_CENSUS_TRA: This could refer to the North American Census Tract, which is a geographic region defined for the purpose of taking a census.

K. CENSUS_BLC: Likely stands for Census Block Code, which is a further subdivision of census tract regions used for demographic data.

L. STATE: The U.S. state where the installation is located.

UTC DATA SETS

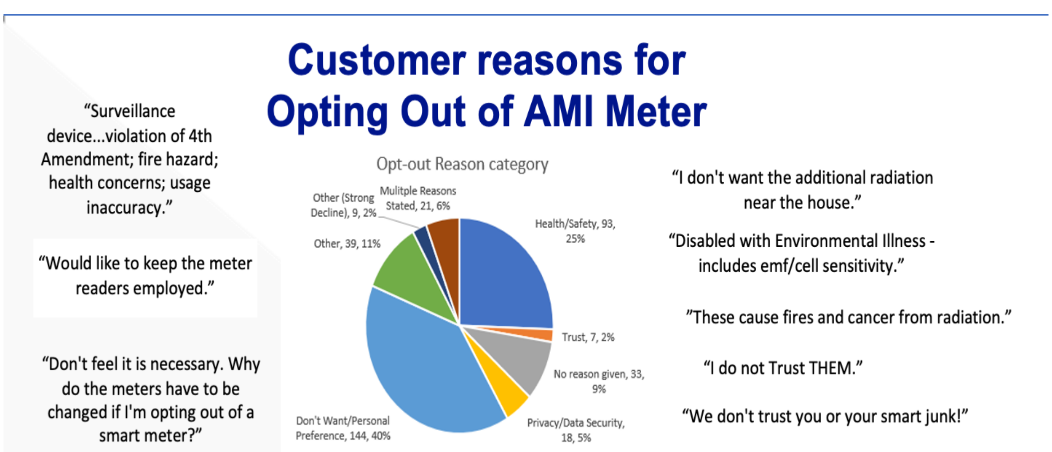
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
HOUSE_KEY	OP_CENTER	ROUTE	BILL_CYCLE	CITY	ZIP	STATE_COUN	COUNTY_NA	CENSUS_TRAC	CENSUS_BLO	Order Type	Jurisdiction	Service Territ	UTC Code	Case Comme	Comments	Completion Date	Time	AM/PM
1565322	SYRACUSE	241	4	NEDROW	13120	36067	Onondaga	36067016200	3.61E+14	Meter Off Nc	UNY	SYR-C	UTC Onsite - Electric Complete Gas CGI			9/25/23 0:00	12:19:00	PM
282862	WATERTOWI	262	2	WATERTOWI	13601	36045	Jefferson	36045062200	3.60E+14	Meter Off Nc	UNY	WAT-C	UTC by Phone - No Access			8/22/23 0:00	8:43:00	AM
1642404	BATAVIA	231	11	ATTICA	14011	36121	Wyoming	36121970202	3.61E+14	Read - Meter	UNY	BAT-C	UTC Onsite -	JG	No access to	7/1/21 0:00	12:44:00	PM
574764	ALBION/MED	231	6	ALBION	14411	36073	Orleans	36073040702	3.61E+14	Read - Meter	UNY	BAT-B	UTC Onsite -	PLEASE PROV	Meter in base	7/6/21 0:00	10:58:00	AM
791287	BUFFALO	227	19	NORTH TONA	14120	36063	Niagara	36063022713	3.61E+14	Read - Meter	UNY	NIA-B	UTC Onsite -	PLEASE PROV	Unable to loc	7/12/21 0:00	10:15:00	AM

This UTC data set is related to utility services, possibly for an electricity provider.

1. HOUSE_KEY (Column A): Likely serves as a unique identifier for individual customer properties or accounts.
2. OP_CENTER (Column B): The operational center or branch responsible for the service area or customer account.
3. ROUTE (Column C): The specific route that a service technician would take, possibly for meter reading or maintenance visits.

4. BILL_CYCLE (Column D): Indicates the billing cycle associated with the account, which may determine when a customer is billed.
5. CITY (Column E): The city in which the service is provided.
6. ZIP (Column F): The ZIP code for the service location, which is part of the postal address.
7. STATE_COUNTY (Column G): The county within the state where the service is located.
8. NA_CENSUS_TRA (Column H) & CENSUS_BLC (Column I): These columns seem to contain codes related to census tracts and blocks, used for statistical purposes by the census bureau.
9. Order Type (Column J): Describes the type of order or service request. For example, "Meter Off CNY" could indicate a service order to turn off a meter in the Central New York region.
10. Jurisdiction (Column K): The authority or jurisdictional area that oversees the service location.
11. Service (Column L): The type of service provided, such as "SRC," which might be a code for a particular service or service request.
12. UTC Code (Column M): Indicates codes for "Unable to Complete" scenarios, detailing why a service could not be completed, such as "No Access" or "IG" (which would need further context to understand).
13. Case Comments (Column N): Additional comments or notes about the service case, often providing context for the UTC code or order type.
14. Completion Date (Column O): The date when the service order was completed or when the case was last updated.
15. Time (Column P): The specific time of day when the service was completed or the case was updated.
16. AM/PM (Column Q): This specifies whether the time listed in Column P is AM or PM.

CUSTOMERS OPT OUT DATA

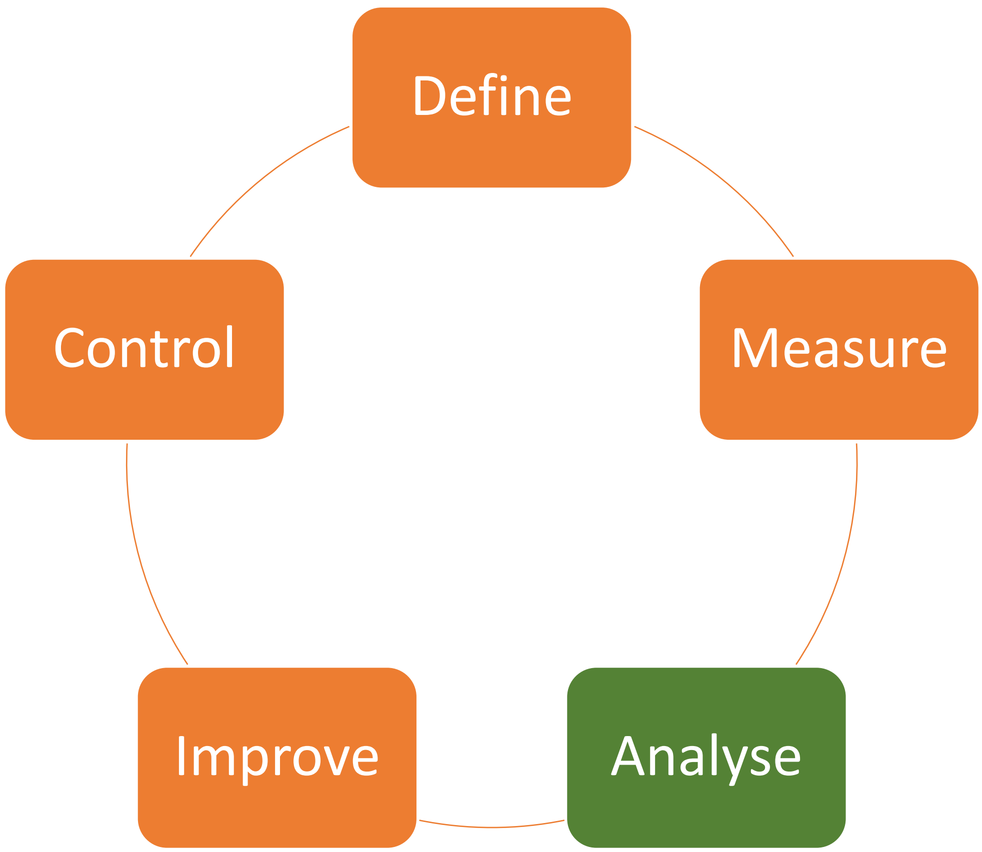


A graphical representation of customer reasons for opting out of AMI (Advanced Metering Infrastructure) Meter installations. It likely shows a pie chart with various categories of reasons why customers have chosen not to have AMI meters installed at their property.

The pie chart categories and their corresponding percentages likely break down as follows:

1. Don't Want/Personal Preference - The largest segment, representing customers who do not want the smart meter for personal reasons.
2. Health/Safety - A significant portion of customers are concerned about health and safety issues.
3. Trust Issues - A smaller segment where customers express a lack of trust as their reason for opting out.
4. No Reason Given - A segment of customers chose not to provide a reason for opting out.
5. Privacy/Data Security - Concerns about privacy and data security are the smallest segment represented in the chart.

Accompanying quotes from customers provide specific examples of concerns within these categories, ranging from health fears like radiation and its supposed effects, to privacy issues, to a desire to maintain traditional meter reading jobs. Terms like "Surveillance device," "violation of 4th Amendment," and "health concerns" suggest deep-seated apprehensions about the implications of having an AMI meter. Additionally, there is a strong element of distrust, as seen in comments like "I do not Trust THEM" and "We don't trust you or your smart junk!"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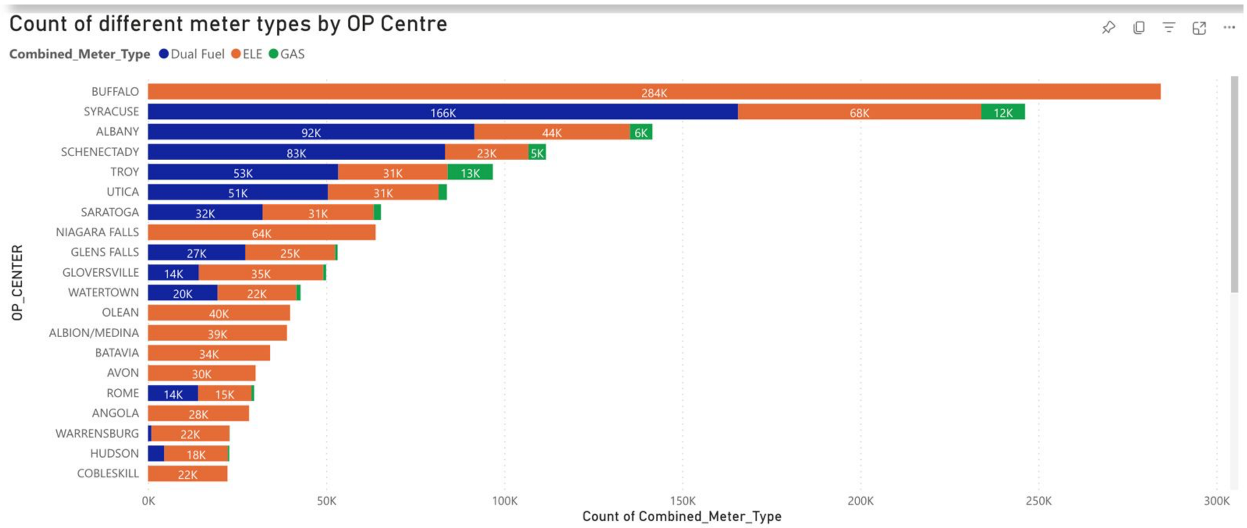
OPERATIONAL CENTER METER TYPE DISTRIBUTION ANALYSIS

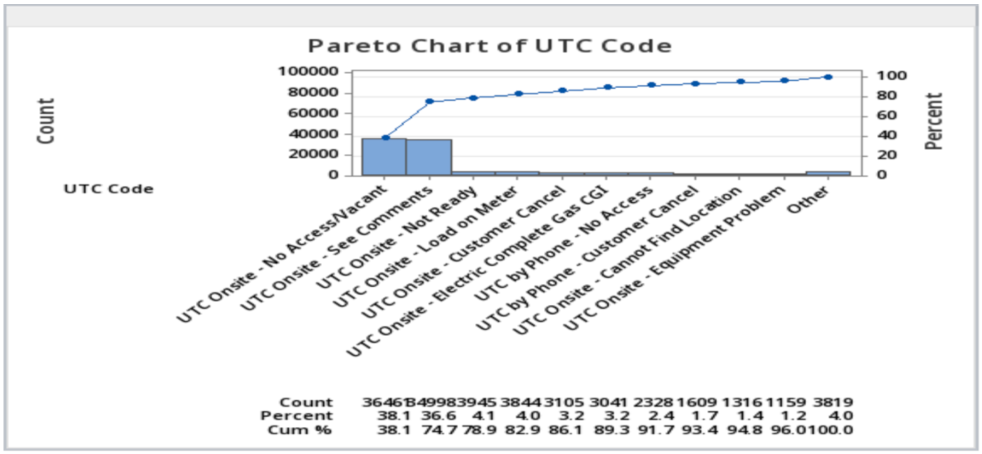
A Power BI visualization, specifically a stacked horizontal bar chart, displaying the count of different meter types by Operational Center (OP CENTER). These meter types are categorized into "Dual Fuel," "ELE" (which likely stands for Electric), and "GAS."



- Each horizontal bar represents an OP CENTER, with different colors indicating the proportion of each type of meter installed in that center's jurisdiction.
- The length of each colored segment within the bar corresponds to the quantity of that meter type.
- The "ELE" category (presumably Electric meters) seems to dominate in most of the OP CENTERS, indicated by the larger segments in the bars.
- "Dual Fuel" and "GAS" meters are also represented but to a lesser extent, as shown by the shorter segments.
- Numeric labels on the bars indicate the exact count of meters for each type within each OP CENTER.
- The OP CENTER with the highest count of meters is placed at the top, indicating it might be Buffalo, and the one with the lowest count is at the bottom.
- This visualization helps in quickly assessing the distribution and prevalence of different meter types across various operational centers, which can be crucial for resource allocation, maintenance scheduling, and future planning for infrastructure upgrades or rollouts.

UTC RATE ANALYSIS

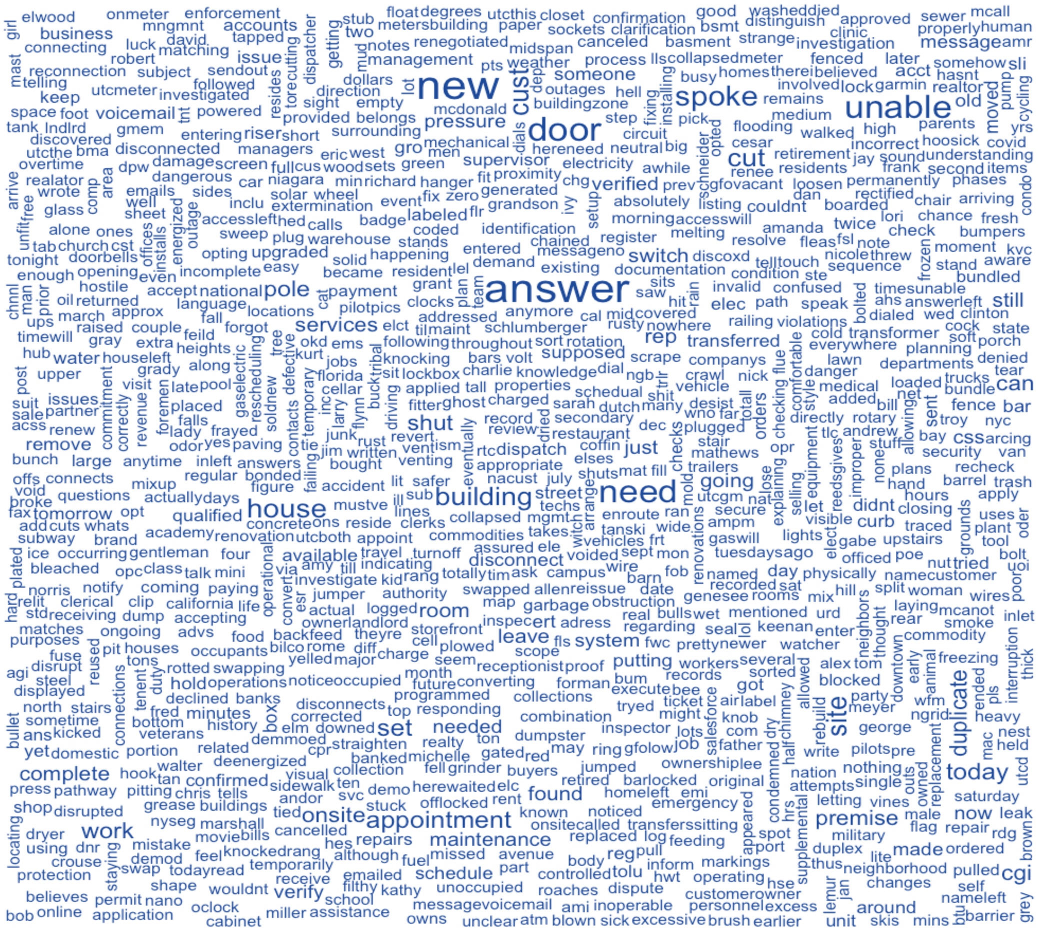
UTC COUNT BASED ON UTC CODE



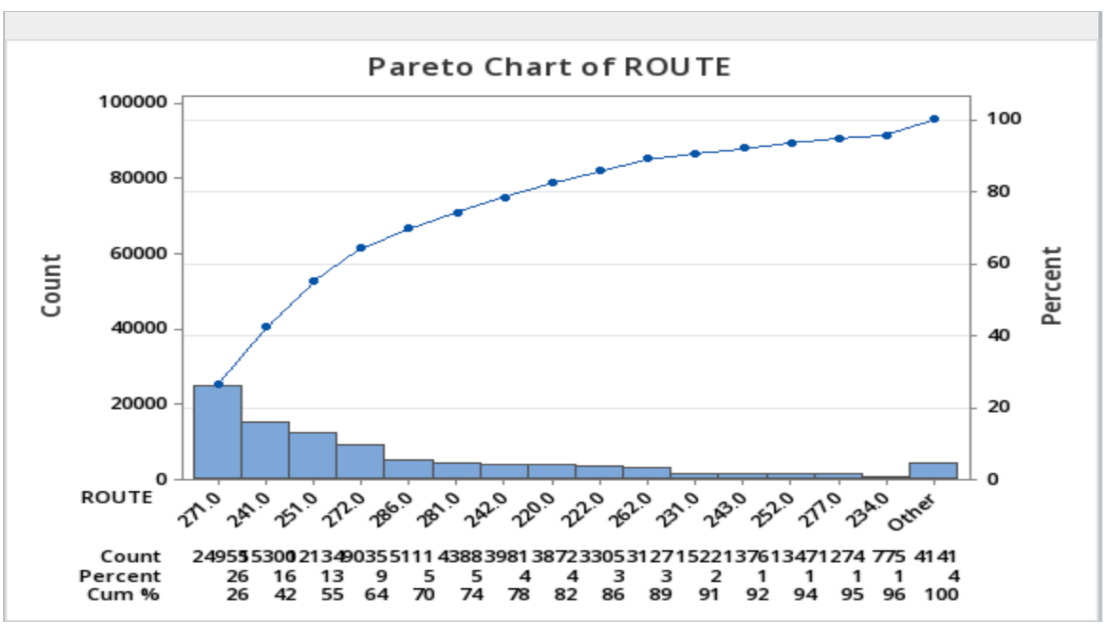
Pareto chart applied to analyze unsuccessful service or installation calls, categorized by various UTC codes that indicate specific issues. The vertical bars, ordered from highest to lowest from left to right, represent the frequency of each issue, with the tallest bar corresponding to the most common problem. This visual arrangement supports the Pareto principle, suggesting that addressing a few critical issues could potentially resolve most problems. The accompanying line graph elegantly demonstrates the cumulative impact of addressing these issues in sequence, with each point on the line representing the aggregate percentage when considering each issue in turn. Below the chart, a data table lists the precise counts and cumulative percentages for each UTC code, providing a clear numerical reference to complement the visual data representation.

UTC ONSITE -SEE COMMENTS ANALYSIS

The word cloud generated from the UTC onsite comments is a visual representation of the frequency of words used in customer feedback or incident reports. Commonly occurring terms are displayed in larger fonts, indicating key themes or issues that are most prevalent in the data. Words like "answer," "door," "unable," and "house" suggest focal points for customer concerns or operational challenges. The prominence of certain terms can guide the identification of areas for improvement, such as the need for clearer communication ("answer"), issues with access ("door"), customer service challenges ("unable"), and potentially property-related matters ("house"). This word cloud serves as a tool for quickly identifying the most significant patterns in the feedback, which can inform targeted strategies to address UTC incidents.



UTC COUNT BASED ON ROUTE



The Pareto chart provided appears to analyze service or operational issues by route, a method commonly used to prioritize problem-solving efforts by identifying the most significant contributors to a set of issues. In this chart, the x-axis lists different route codes, while the y-axis represents the frequency of issues associated with each route. The bars, displayed in descending order of frequency from left to right, show that a few routes contribute to most of the problems, as demonstrated by the first few bars being significantly taller than the rest. This aligns with the Pareto principle, often summarized as "80% of problems are caused by 20% of the causes." The line graph overlays the bar chart to display the cumulative percentage of issues. Starting at the first bar, it climbs steeply, indicating that addressing the issues on the first few routes could substantially reduce the overall number of problems. By the time the line reaches the right side of the chart, it levels off, signifying that additional routes contribute minimally to the total count. The data table below the chart offers exact figures for count and cumulative percentage, reinforcing the visual data and helping to pinpoint specific routes that may require more attention to improve service efficiency.

ROUTE-WISE DISTRIBUTION OF METER TYPES

ROUTE	Count of Combined_Meter_Type
220	150386
231	103465
234	70904
227	44671
237	39834
265	35880
267	25063
256	3938
257	1923
199	752
197	145
993	138
198	109
Total	**477310**

ROUTE	Count of Combined_Meter_Type
271	116815
241	97632
Total	**605111**

Routes with GAS modules only

Routes with ELE meters only

Routes with DUAL FUEL only

ROUTE	Count of Combined_Meter_Type
56	1
69	1
71	1
Total	**3**

This Power BI dashboard or report showing two separate sets of data related to meter types by route.

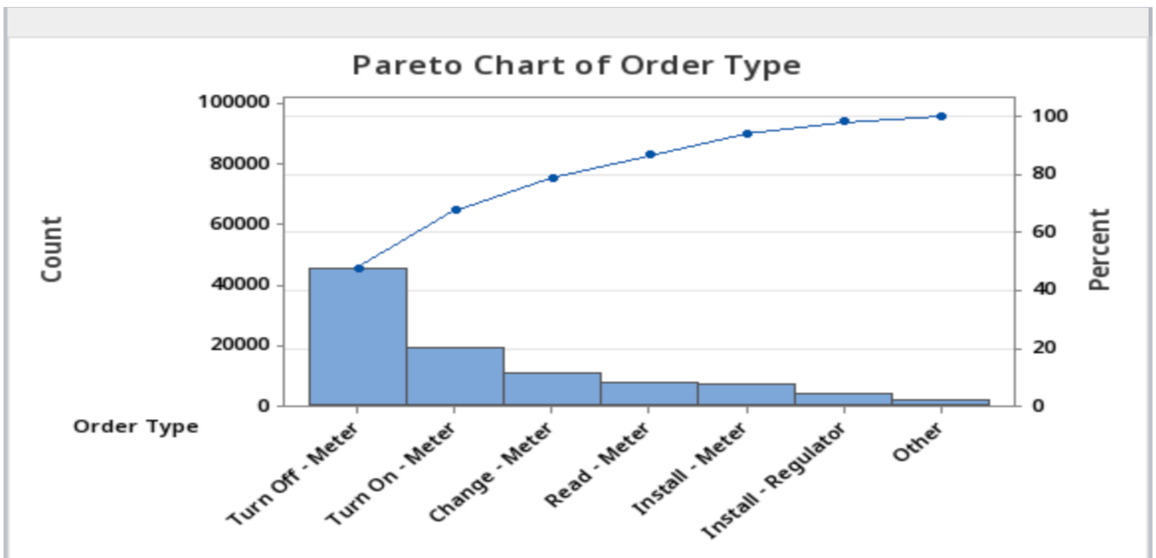
On the left side of the image, there's a table listing different ROUTES with their corresponding "Count of Combined_Meter_Type." The routes are labeled numerically (e.g., 220, 231, 234) and are sorted in descending order based on the count of meters. The route at the top, 220, has the highest count of meters, with a total of 150,386, while the counts decrease as you move down the table. The total count of all the routes combined is 477,310.

On the right side, there's another table, but with a much smaller dataset. It lists three routes (271, 241, and Total), each with their count of a different combined meter type. Here, the routes seem to be categorized by the type of meters they include GAS modules only, ELE (Electric) meters only, and routes with DUAL FUEL meters only. The count for each of these routes is provided next to the route number, with the route 271 having 116,815 and route 241 having 97,632. The total count for these three routes is significantly lower at 605,111, and it also includes a note on the side indicating that there are only three routes in this category.

Below this table, there are three more rows indicating single instances (a count of 1) for routes labeled 56, 69, and 71, with a total count of 3 for a certain combined meter type, possibly indicating routes with DUAL FUEL meters only.

The arrows and the layout suggest a breakdown of specific routes with only one type of meter installed, contrasting with the broader data on the left, which may include routes with multiple types of meters. This data could be used to analyze service delivery, plan maintenance schedules, or assess infrastructure needs across different service routes.

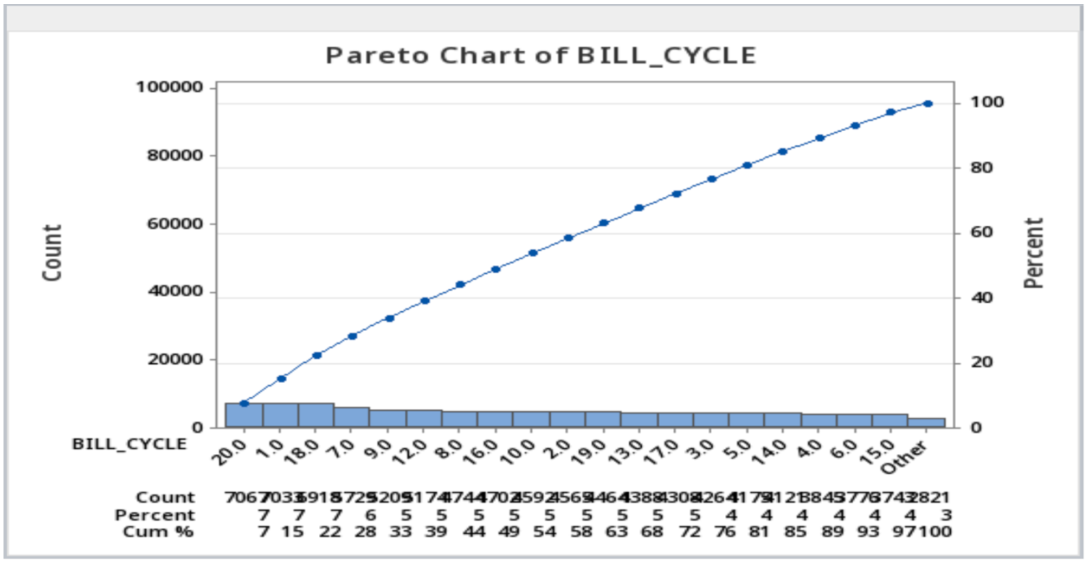
UTC COUNT BASED ON ORDER TYPE



Count	45260	19330	10559	7699	7125	3806	1857
Percent	47.3	20.2	11.0	8.1	7.5	4.0	1.9
Cum %	47.3	67.5	78.6	86.6	94.1	98.1	100.0

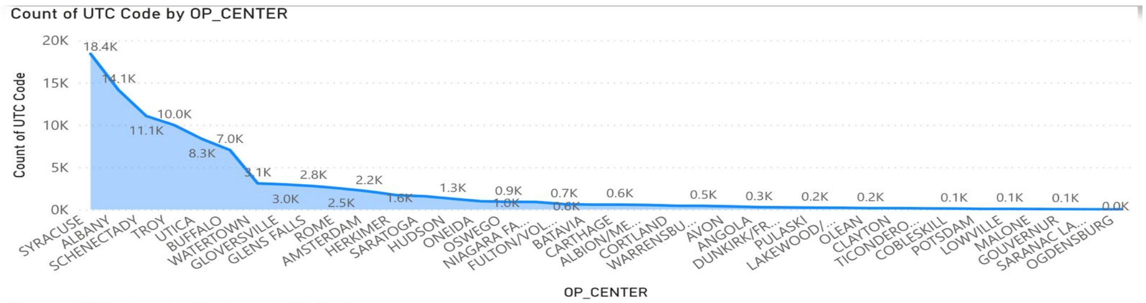
The Pareto chart shown likely illustrates the distribution of various types of work orders or service requests within a utility or service provider environment. The x-axis categorizes the order types, such as "Turn Off Meter" and "Turn On Meter," while the y-axis measures the count of each order type. The chart demonstrates that "Turn Off Meter" orders are the most frequent, followed by "Turn On Meter," with a steep decline in frequency for subsequent categories. This pattern is characteristic of the Pareto principle, where a small number of causes (order types, in this case) are responsible for a large percentage of the outcome (service requests). The cumulative percentage line shows a rapid ascent and begins to plateau as it moves through the categories, indicating that focusing on the most common order types could significantly impact overall operational efficiency. The data table below provides exact counts and the cumulative percentage, underscoring the chart's findings and suggesting areas for targeted improvement.

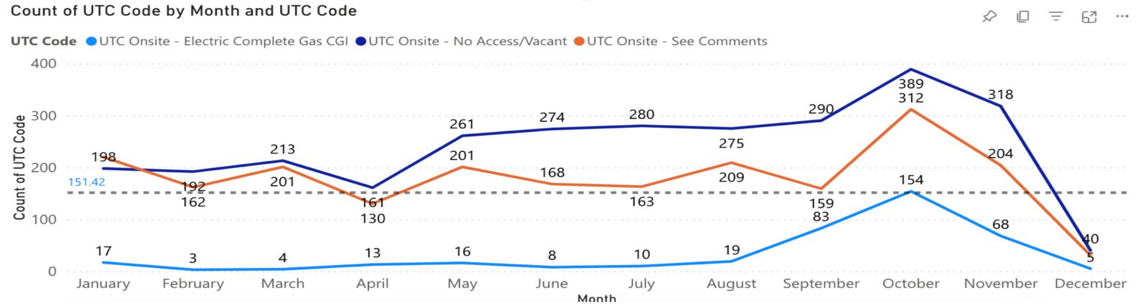
UTC COUNT BASED ON BILL CYCLE



The Pareto chart illustrates the distribution of service-related occurrences across different billing cycles. The horizontal axis lists the billing cycles, while the vertical axis represents the number of occurrences for each cycle. The chart shows a clear descending pattern, with the initial billing cycles on the left having the highest number of occurrences, signifying a majority of the activities or issues are concentrated in these cycles. The cumulative percentage line, plotted alongside the bars, rapidly ascends with the initial billing cycles, indicating that addressing the issues in these few cycles could significantly reduce the overall count. The data table below the chart provides exact figures for the count and cumulative percentage, ensuring precise identification of the billing cycles that contribute most to service issues and guiding efforts for targeted improvements.

OPERATIONAL CENTER AND MONTHLY TRENDS IN UTC





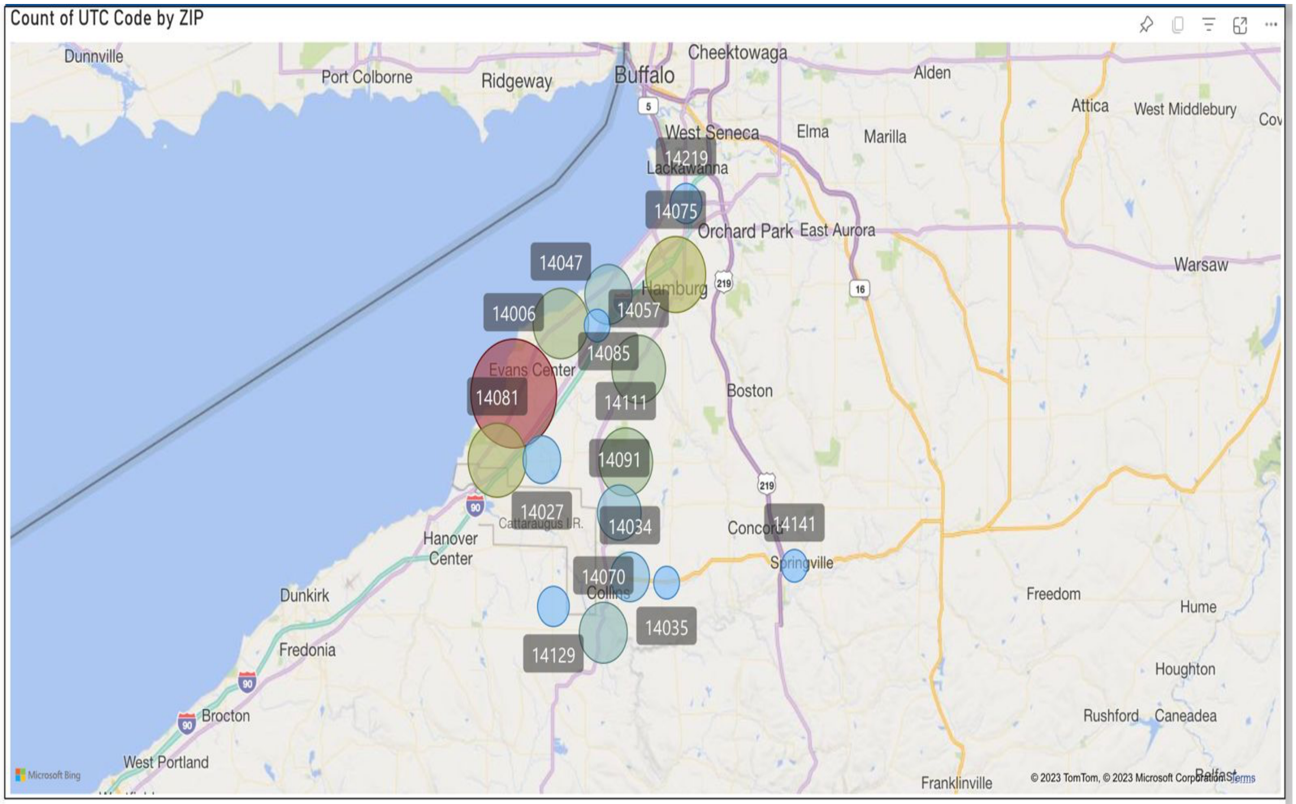
A dashboard designed to analyze service issues categorized by "Unable to Complete" (UTC) codes across various operational centers (OP_CENTER) and over time.

The top chart appears to be a descending bar chart showing the count of UTC codes by OP_CENTER. Each bar represents an operational center, with the length of the bar proportional to the count of UTC incidents reported from that center. The operational centers are sorted from left to right, starting with the center with the highest number of UTC codes. The chart seems to include interactive elements like tooltips showing the exact count when hovered over, as indicated by the numbers above each bar (e.g., 18.4K, 11.1K).

The bottom chart is a line graph displaying the count of different UTC code occurrences over the months of the year. There are multiple lines, each representing a different UTC code category, such as "UTC Onsite - Electric Complete Gas C/I," "UTC Onsite - No Access/Vacant," and "UTC Onsite - See Comments," with data points plotted for each month. The lines are color-coded, and the numbers above each data point represent the count of incidents for that month and UTC code. This graph shows trends or patterns in the frequency of these issues over time, which could be seasonal or related to specific operational changes or challenges.

Together, these visualizations can help managers and analysts pinpoint problem areas, both geographically and temporally, to allocate resources, plan interventions, and ultimately reduce the frequency of service issues.

GEOGRAPHICAL DISTRIBUTION OF UTC BY ZIP CODE



A Geographic map overlaid with bubbles or circles representing the count of UTC (Unable to Complete) codes by ZIP code. Each bubble is typically sized proportionally to the count of UTC incidents within the ZIP code area it represents, allowing for a quick visual assessment of where the most service completion challenges are occurring.

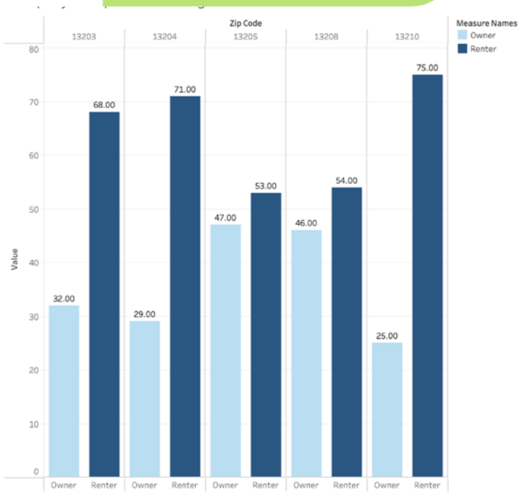
The map probably shows a specific region, with different ZIP codes clearly labeled. The larger the bubble, the higher the number of reported UTC incidents in that area, suggesting a higher concentration of service issues. This type of visualization is effective for identifying geographic patterns and hotspots where operational issues are most prevalent.

If color-coded, the bubbles might also represent different types of UTC codes, indicating various reasons for the inability to complete service. This can help in pinpointing not just where problems are occurring, but also what kinds of issues are most common in different locations.

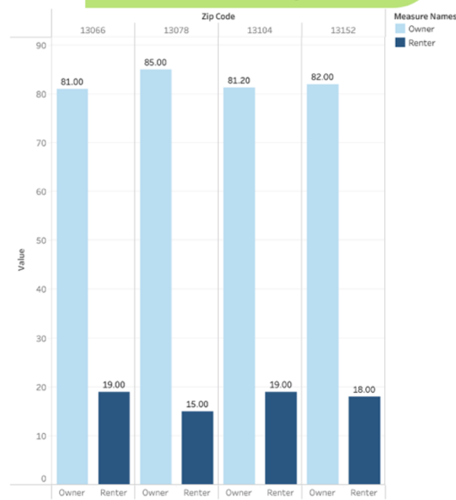
This geographic representation is useful for operational planning, resource allocation, and targeted interventions to address the service challenges in the areas most affected. It can also be a valuable tool for reporting to stakeholders about the geographic distribution of service issues.

CENSUS DATA ANALYSIS

Occupancy: High UTCs Zip code

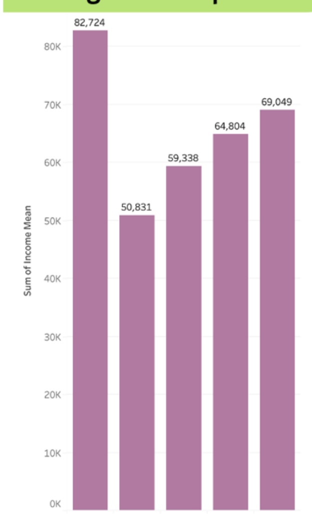


Occupancy: Low UTCs Zip code

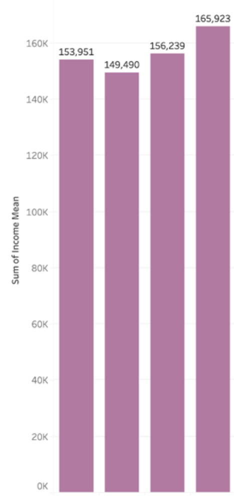


In areas with High UTCs, a greater percentage of residences are occupied by renters as opposed to property owners. There is a correlation between the occupancy status and the challenges associated with accessing meters. This dynamic may impact meter accessibility, as absentee owners, may not be in close proximity.

Mean Income: High UTCs Zip code

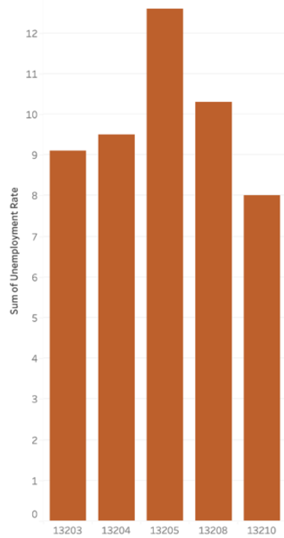


Mean Income: Low UTCs Zip code

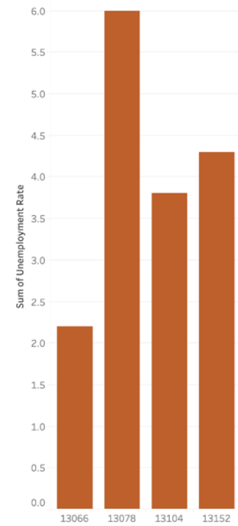


There is a higher incidence of UTCs in lower-income areas. This could be indicative of residents opting out, possibly due to concerns about incurring an additional financial burden.

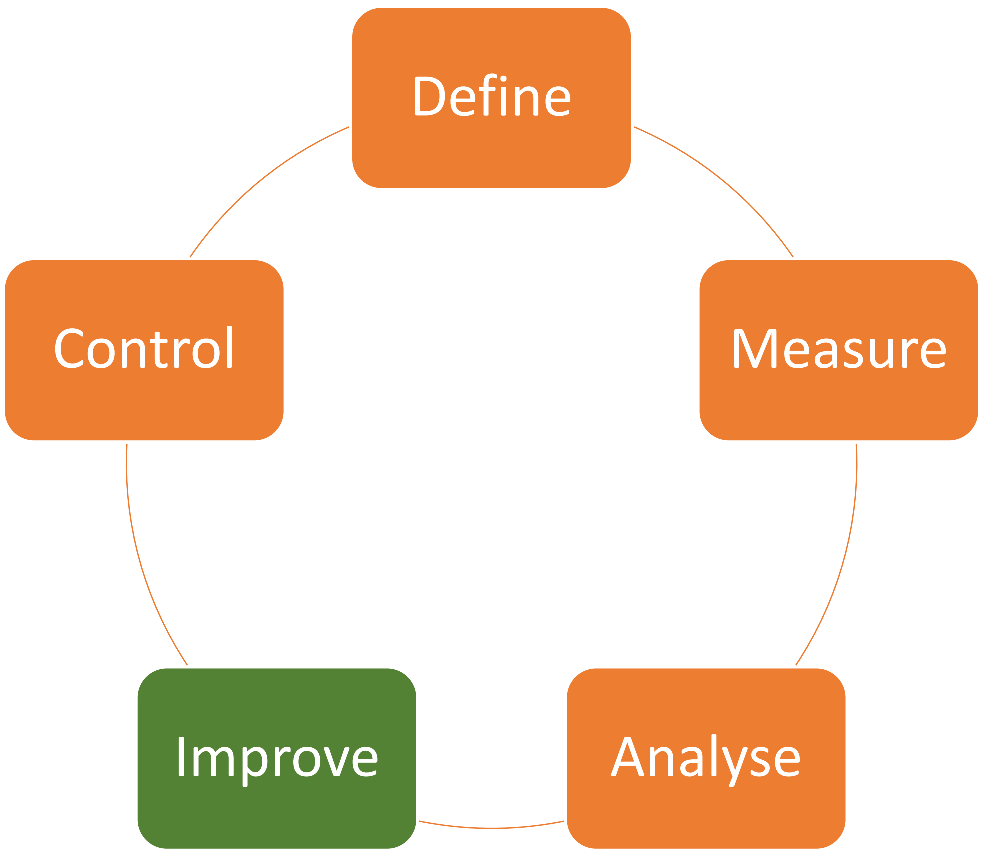
Unemployment Rate: High UTCs Zip code



Unemployment Rate : Low UTCs Zip code



Residents in the zip codes with high employment rate may worry about potential costs associated with changing meters.
However, effective communication with customers becomes pivotal in this scenario.
Highlighting the potential for monetary savings can shift the perspective to engage residents positively.


Define
Measure
Analyse
Improve
Control

SOLUTION EVALUATION MATRIX

A Solution Evaluation Table could be structured to assess various potential solutions based on relevant criteria.

Solution Option	Cost (1-10)	Impact on Efficiency (1-10)	Impact on Customer Satisfaction (1-10)	Feasibility (1-10)	Risk Level (1-10)	Total Score (Max 50)
Enhanced scheduling system	7	8	9	7	4	35
Improved training for installers	5	7	8	9	3	32
Customer education program	7	9	9	8	4	36
Real-time feedback app	8	7	9	6	5	35
Automated reminder system	4	8	8	9	2	31
Streamline material supply chain	6	9	7	7	3	32

The table presents a solution evaluation model that ranks proposed solutions based on critical factors such as cost, efficiency, customer satisfaction, feasibility, and risk on a scale from 1 to 10, with 10 indicating the highest impact or level and 1 the lowest. The total score for each solution, out of a maximum of 50, helps prioritize which solutions to implement. Solutions scoring closer to 50 are considered more favorable, striking an optimal balance between cost-effectiveness, efficiency gains, customer impact, practicality, and low risk. This scoring system allows decision-makers to objectively compare different solutions, ensuring that the selected ones align with organizational goals and stakeholder needs. The higher the score, the more attractive the solution is considered for implementation.

IMPLEMENTATION PLAN TABLE TO CONTROL UTCS

An implementation plan for controlling "Unable to Complete" (UTC) incidents in the context of AMI meter installations might involve several strategic actions.

The table is a strategic tool used for managing and tracking the implementation of tasks necessary for a project, in this case, aimed at controlling "Unable to Complete" (UTC) incidents. It lists specific action items along with a detailed description and assigns responsibility to individuals or departments. Each task has a deadline and a list of required resources for completion. The effectiveness of each action is measured by predefined success indicators, and the table tracks the progress status of each item. This actionable document is not static; it is periodically reviewed and updated to ensure it adapts to the project's evolving needs and to accurately reflect the current status of tasks in the drive to mitigate UTC incidents. It acts as a comprehensive guide for execution and a monitoring mechanism for the project's advancement.

Action Item	Description	Responsible Party	Deadline	Resources Needed	Indicators of Success	Status
Develop Standard Operating Procedures (SOPs)	Create detailed SOPs for installation to minimize errors leading to UTCs.	Operations Manager	Q2 2023	SOP templates, process maps	Reduction in installation-related UTCs	In Progress
Improve Scheduling System	Upgrade scheduling software to optimize routes and times.	IT Department	Q4 2023	Software, IT support	Fewer scheduling-related UTCs	Planned
Customer Pre-Installation Engagement	Initiate a pre-installation engagement process to ensure readiness.	Customer Service Team	Q2 2023	CRM system, communication materials	Decrease in customer-related UTCs	In Progress
Equip Field Technicians	Provide necessary tools and resources to technicians to avoid equipment-related UTCs.	Logistics Manager	Q3 2023	Tools, inventory management system	No UTCs due to lack of equipment	Planned
Implement Real-time Feedback Loop	Set up a system for technicians to report issues immediately.	Quality Assurance	Q4 2023	Mobile devices, feedback software	Real-time resolution of emerging issues	Not Started
Strengthen Customer Communication	Regular updates and reminders to customers about installations.	Marketing & Communications	Q2 2023	Automated messaging system, customer database	Increased customer preparedness and cooperation	In Progress
Data Analysis and Review	Monthly review of UTC incidents to identify trends and take corrective actions.	Data Analyst	Monthly, starting Q2 2023	Data analytics tools, access to service records	Trend analysis, reduction in repeat UTC causes	Not Started

COST-BENEFIT ANALYSIS TABLE

A simplified Cost-Benefit Analysis Table for an AMI meter installation project

Solution or Improvement	Costs (USD)	Benefits (USD)	Net Benefit (USD)
Enhanced Communication Plan	10,000	30,000	20,000
Advanced Scheduling Tools	15,000	50,000	35,000
Staff Training Programs	8,000	25,000	17,000
Process Streamlining Initiatives	5,000	20,000	15,000
New Meter Technology Implementation	50,000	150,000	100,000
Total	88,000	275,000	187,000

The explanation provided outlines the rationale for implementing various improvement strategies as part of a project to enhance AMI meter installations. By adopting a more effective communication strategy, the project expects to lower customer confusion and decrease the number of service revisits, ultimately saving costs. Introducing advanced scheduling tools is aimed at boosting resource efficiency and reducing technicians' travel time. Enhancing staff training is projected to cut down on installation errors, which should decrease the necessity for follow-up visits and boost customer satisfaction. Streamlining the installation process is anticipated to expedite each installation, increasing the daily capacity for installations. The overall success of these improvements will be measured by the net benefit, which is the total expected benefits minus the total costs associated with implementing these strategies.

COMMUNICATION IMPROVEMENT

The National Grid is communicating with customers about the transition to new smart meters, emphasizing the benefits such as greater control over energy consumption, potential for cost savings, faster access to energy data, and improved response times for outages. The message also mentions ongoing efforts to enhance community service and environmental commitments. It directs customers to the National Grid website for further information about the new meters and the installation process. There's a clear call to action for customers to visit the website to learn more, and the communication is available in Spanish as well.

nationalgrid

Dear Green Street Mgmt Llc,

As part of our ongoing commitment to empowering our customers, we are in the process of replacing existing meters with new "smart meters."

Your new smart meter will provide:

- **MORE CUSTOMER CONTROL, MORE WAYS TO SAVE:** continuous, secure access to yourenergy data means more insight into how and when you use energy—which could help you lower your bill.
- **FASTER, NEAR REAL-TIME ENERGY READINGS:** available within minutes, through your *My Account* portal.
- **FASTER RESPONSE:** enhanced outage monitoring and storm response.
- **AND MORE FEATURES,** still to come.

It's all part of National Grid's ongoing commitment to supporting the communities we serve with smarter tools to manage energy consumption and costs—while working to build a more reliable, robust and climate-friendly energy grid for the future.

You can learn more details about your new smart meter and the installation process at **ngrid.com/smartmeter**

For more information, visit
ngrid.com/smartmeter

Esta comunicación puede consultarse en español en **ngrid.com/smartmeter**
本通讯提供中文版 : **ngrid.com/smartmeter**

To reorganize this communication effectively and to reduce the number of "Unable to Complete" (UTC) incidents and opt-outs, consider the following steps:

1. **Clarity and Benefits Highlighting**:
    - Ensure the benefits of smart meters are clearly highlighted at the beginning of the communication.
    - Use bullet points for easy readability and quick understanding.
2. **Addressing Concerns Proactively**:
    - Include a section that addresses common concerns or misconceptions about smart meters, such as health and safety, privacy, and what the change means for the customer.
    - Provide assurance regarding the safety, reliability, and privacy of the new technology.
3. **Personalized Communication**:
    - Personalize the mailers as much as possible, using the customer's name and any relevant account information.
    - Explain how the smart meter will specifically benefit them, perhaps by referencing their past usage patterns or preferences.
4. **Visual Engagement**:
    - Use engaging visuals or infographics to explain how smart meters work and the improvements they bring to energy management and billing.
    - Incorporate a clear and scannable design that guides the reader through the information.
5. **Accessibility and Inclusion**:
    - Offer translations in multiple languages prominently.
    - Provide a clear call to action, such as a QR code or a simple URL that leads directly to a user-friendly information page.
6. **FAQs and Support**:

- Include a list of Frequently Asked Questions (FAQs) that directly address common reasons for UTCs and opt-outs.
- Offer multiple ways to get in touch with customer support, including phone numbers, email, and live chat options.

7. **Follow-up Strategy**:
    - Plan for a series of communications instead of a single mailer, with each message designed to build upon the last.
    - Consider follow-up via different channels, like email or SMS, to reinforce the message.
8. **Feedback Loop**:
    - Encourage feedback and provide a simple method for customers to express concerns or ask questions about the transition.
    - Use the feedback to adjust the communication strategy and address specific customer issues.

The updated approach for notifying customers about smart meter installations has been refined to ensure messages are more personalized and clearly convey the benefits. The communication is crafted to be straightforward and engaging, with a focus on the convenience and cost-saving potential of the new meters. Customers will receive timely alerts about installer visits to minimize no-shows and a simplified opt-in process is introduced for easy enrollment. This updated strategy should be pilot-tested to ensure its effectiveness before being implemented on a larger scale.

THE NEW COMMUNICATION FLYER

ATTENTION !

nationalgrid

HERE WITH YOU. HERE FOR YOU.

Dear customer,

We're upgrading your meters to **SMART METERS** as part of our commitment to empower YOU!

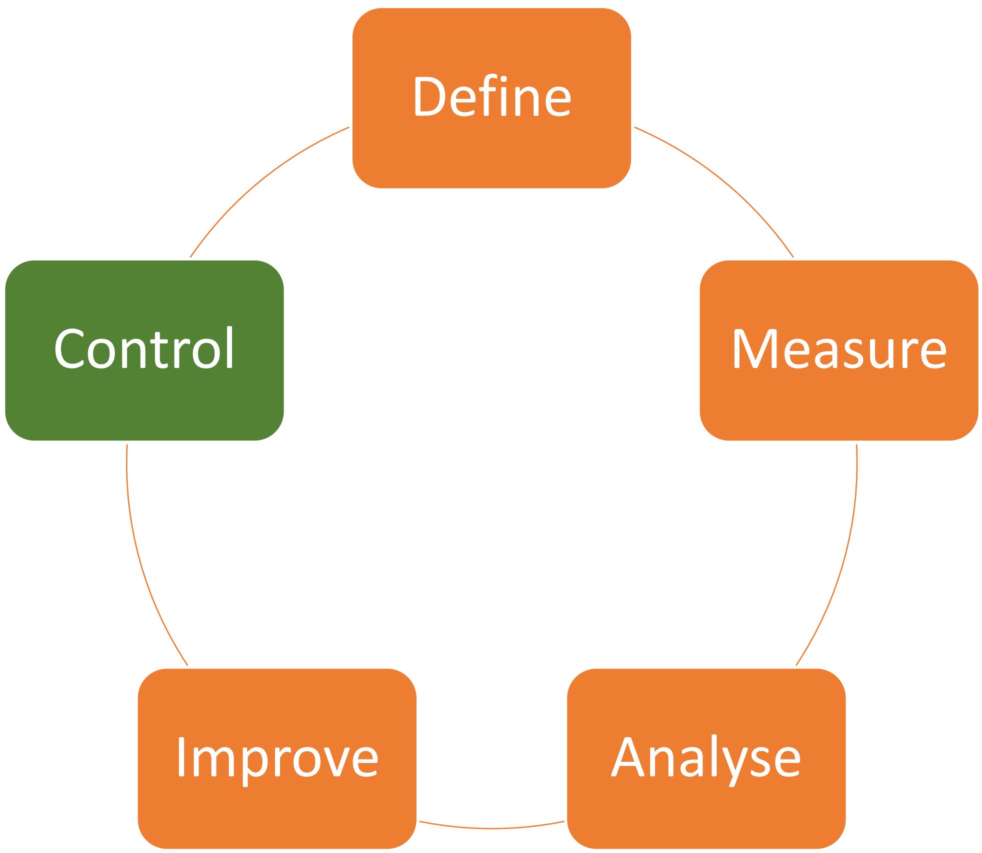
"Elevate Efficiency, Lower Bills: Opt for AMI meters and save more."

	New AMI meter	Your old meter
Enrollment fee for manually read meter service	None	$44.63 (Electric) $61.19 (Gas) $89.03 (Both)
Monthly fee for manual meter reads	None	$11.64 (Electric or Gas) $17.71 (Both)

Switch to a new AMI meter and save **$139.68** per year on electric or gas, and **$212.52** for both services

For more information, visit **ngrid.com/smartmeter**

National Grid is committed to empowering communities with advanced tools for efficient energy use, striving for a sustainable and resilient energy system


Define
Measure
Analyse
Improve
Control

COST ANALYSIS OF SINGLE-VISIT METER INSTALLATIONS

Energy Classification & Cost E

OP_CENTER

ALBANY | ALBION/MEDINA | AMSTERDAM

ROUTE	TotalDualFuelMeters	TotalGasMeters	TotalElectricMeters	TotalCost
272	91583	8484	48476	1633973
273	8516	5438	10555	269599
277	4565	422	17743	250030
281	57555	2701	45145	1159411
282	2900	88	45508	533456
286	23736	1404	43087	750497
287	112	1	21434	237017
311			3	33
413			1	11
712			2	22
812			2	22
821			1	11
992	11579	7	4445	176341
993			138	1518
994		389		4279
995		679	1	7480
996		1	14	165
997	1		1675	18436
999			9	99
Total	**605111**	**52846**	**1136768**	**19741975**

In a scenario where each meter installation by National Grid is accomplished in a single visit, the financial implications are substantial but efficient. The costs incurred for dual fuel meter installations reach approximately $6.66 million, with electric meter installations contributing an additional $12.5 million, and gas meter installations totaling around $581,000. This results in an aggregate truck roll cost of nearly $19.74 million for the project. This estimate assumes a seamless process with no need for revisits or additional customer engagement, representing an ideal cost baseline for the installation of dual fuel, electric, and gas meters.

FINANCIAL IMPACT OF REVISITS ON DUAL FUEL METER INSTALLATIONS

ROUTE	TotalDualFuelMeters	TotalDualFuelCosts
12	1	22
14	1	22
56	1	22
69	1	22
71	1	22
87	1	22
241	97632	2147904
242	69236	1523192
243	18682	411004
251	68084	1497848
252	12175	267850
261	3787	83314
262	18147	399234
271	116815	2569930
272	91583	2014826
273	8516	187352
277	4565	100430
281	57555	1266210
282	2900	63800
286	23736	522192
287	112	2464
992	11579	254738
997	1	22
Total	**605111**	**13312442**

The necessity of revisits for dual fuel meter installations, primarily due to the unavailability of gas modules, significantly elevates the project's costs. With each of the 605,111 dual fuel installations necessitating a second visit, the additional expense amounts to $13.31 million. This figure is derived by doubling the initial cost of truck rolls. When these added costs are combined with the unchanged expenses for electric and gas meter installations, the total project expenditure rises to $33.05 million. This substantial increase underscores the financial impact of revisits in the project's budget, highlighting the importance of efficient resource management and planning in large-scale utility projects.

ENHANCED PROJECT COSTS DUE TO UTCS AND OPT-OUTS

Integrating the additional expenses incurred from UTCs and customer opt-outs, which necessitate further revisits, amplifies the overall financial burden of the AMI meter installation project. These factors contribute to an escalation in project costs, as each instance of a UTC or opt-out demands a subsequent visit, incurring extra charges. This situation underlines the critical need for efficient operational planning and enhanced customer communication strategies to mitigate such revisits, thereby aiming to keep the project within a manageable budget framework.

STRATEGIES TO MINIMIZE REVISITS AND OPTIMIZE PROJECT COSTS

To curtail revisits and control costs in the AMI meter installation project, a multifaceted approach is recommended. Key strategies include:

1. **Enhanced Inventory Management**: By improving supply chain and inventory systems, the availability of gas modules is ensured, preventing installation delays and revisits.
2. **Robust Customer Communication**: Clear, multi-channel communication about installation processes and schedules aims to reduce customer-related UTCs and no-shows.
3. **Utilization of Predictive Analytics**: Leveraging data analytics helps anticipate and address potential UTC causes proactively.
4. **Focused Customer Education**: Educating customers about AMI meters, addressing health, safety, and privacy concerns, aims to decrease opt-out rates.
5. **Optimized Scheduling**: Implementing advanced scheduling software enhances efficiency, considering various logistical factors.
6. **Comprehensive Technician Training**: Equipping technicians with the necessary skills and tools ensures they can handle on-site issues effectively, reducing UTCs.
7. **Establishing a Feedback Loop**: A real-time feedback mechanism post-installation helps understand and immediately rectify causes of UTCs.
8. **Incentives for Compliance**: Offering rewards encourages customers to adhere to scheduled appointments.
9. **Policy Review and Enhancement**: Modifying policies that inadvertently increase UTC rates, like rigid scheduling or unclear instructions, can be beneficial.
10. **Stringent Quality Control Checks**: A checklist for technicians ensures all potential issues are addressed, reducing the need for revisits.

These recommendations, when implemented, are expected to significantly diminish the frequency of revisits, thus reducing the overall project costs. Each strategy should be evaluated for practicality and cost efficiency before execution.