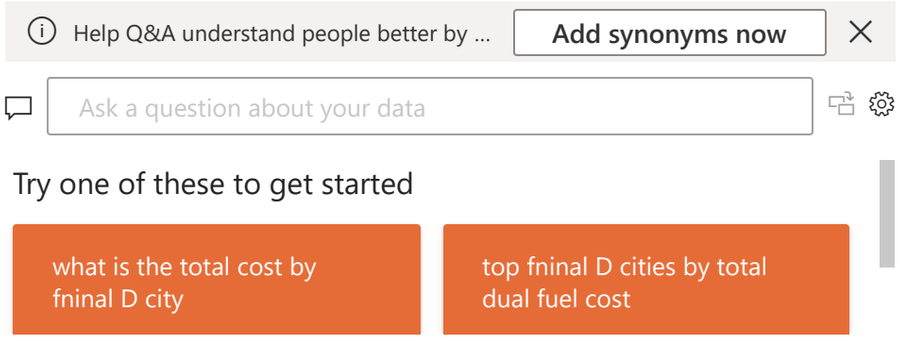
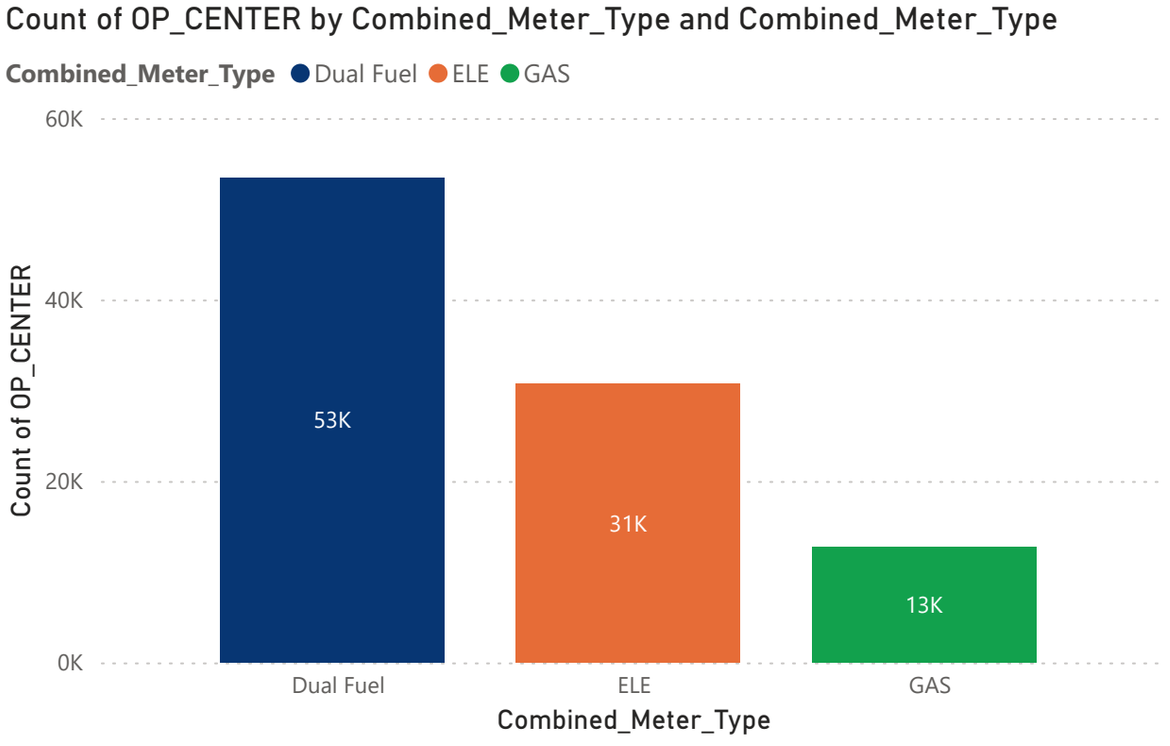
National Grid : Smart Meter Installation Analysis and Operational Optimization

Project Overview: This comprehensive project delves into the deployment of smart meter installations, encompassing both electric and gas modules., as well as a combination of both. The analysis is conducted at the OP Centre and Route levels, offering detailed insights into households that are required to be equipped with these advanced meters. The project addresses the unique categorization of houses based on their energy sources—electric only, gas only, or dual-fuel (both electric and gas). Additionally, a key focus lies on optimizing operational efficiency by mitigating the occurrences of "Unable to Complete" instances, where installation activities face impediments.



Meter Type by OP Centre



Key Objectives:

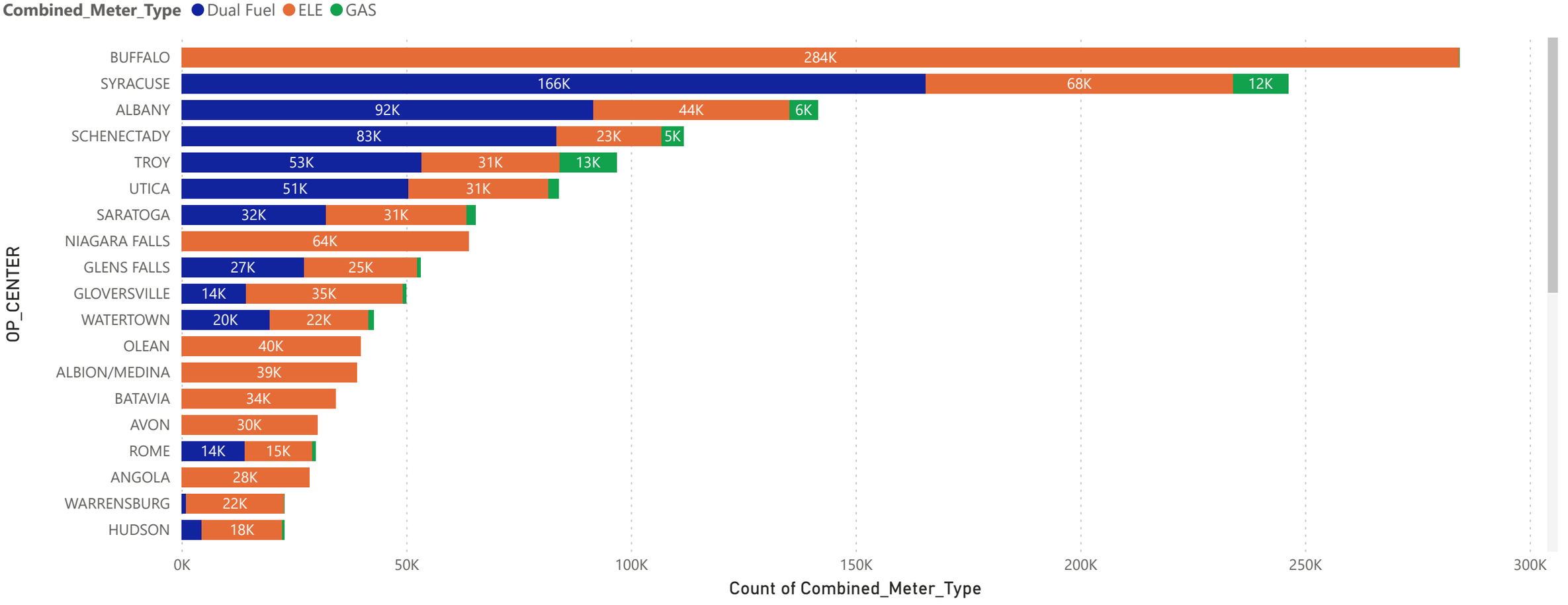
1. Smart Meter Deployment Analysis: Investigate the distribution and installation trends of smart meters, emphasizing variations in meter types across different counties and cities.

2. Household Energy Classification: Classify households into distinct categories based on their energy sources—electric only, gas only, or dual-fuel, facilitating targeted insights into energy consumption patterns.

3. Operational Optimization: Address and minimize instances of "Unable to Complete" scenarios, employing strategies to overcome obstacles that hinder successful installations.

Overall Energy Classification

Count of different meter types by OP Centre



This graphical representation illustrates the meter classification across various OP (Operating) Centres, categorized into three types: Electric Only, Gas Only, and Dual Fuel (houses with both electric and gas meters). This categorization informs our strategic approach to installations at OP Centres. The analysis suggests that prioritizing OP Centres with a predominant number of Electric Only meters may be the optimal starting point for installations. It is important to note that our decision-making process incorporates additional layers of data, particularly related to routes and bill cycles, introducing a nuanced dimension that influences our strategic decisions.

Energy Classification & Cost Estimation - OP Centre/Route/Bill Cycle

OP_CENTER

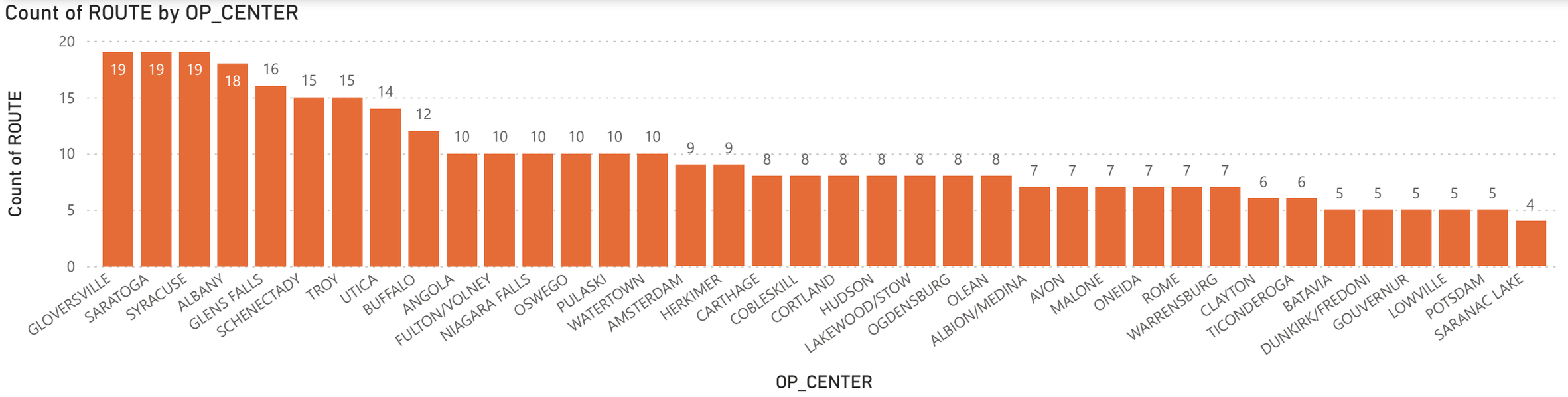
TROY

Select an OP Center to see the Meter Distribution by Route and Bill Cycle

This table represents the number of meters of different types for each Bill Cycle by Route and OP Centre.

ROUTE	1	2	3	4	5	6	7	10	12	13	14	15	17	18	19	20	Total
12																1	**1**
14											1						**1**
41										1							**1**
49											1						**1**
52		1															**1**
55					1											1	**2**
271				9462				8559		7255	6732	647		1	6346	6412	**45414**
272	4731			6061		2315		7987	1508	3207	1551					4721	**32081**
273					7487		1288			2418	5828			1966			**18987**
992	3		16	13	78	1		17	8	7	24	3		6	5	21	**202**
993	2												1				**3**
994			29														**29**
995			39														**39**
996		1								1							**2**
997	2		26	7	2	1		5		3	5			1	3	3	**58**
Total	**4739**	**1**	**110**	**15543**	**7568**	**2317**	**1288**	**16568**	**1516**	**12892**	**14142**	**650**	**1**	**1974**	**6354**	**11159**	**96822**

Route Analysis by OP Centre



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
994	389
42	2
Total	**391**

Routes with GAS modules only

Routes with ELE meters only

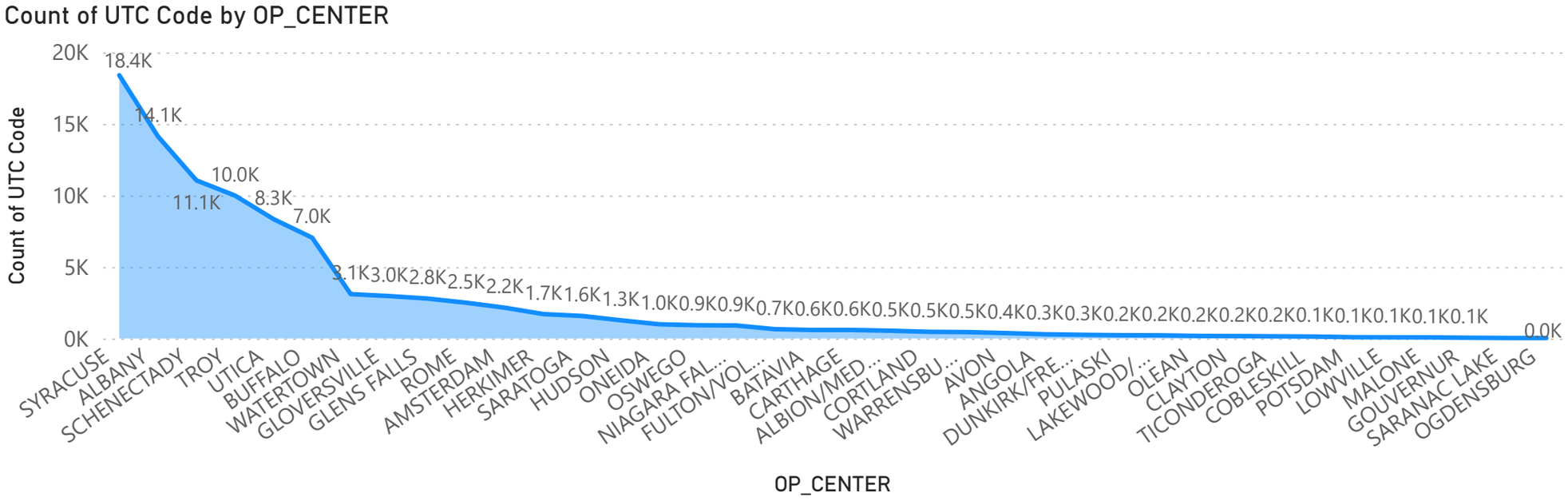
Routes with DUAL FUEL only

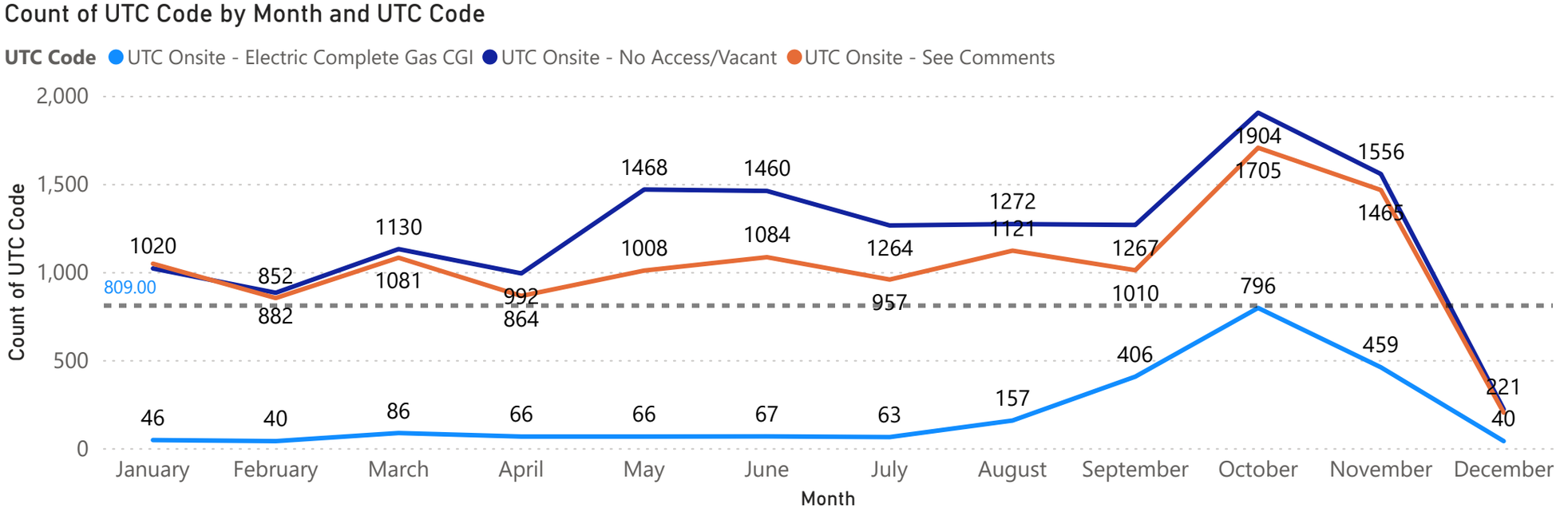
ROUTE	Count of Combined_Meter_Type
56	1
69	1
71	1
Total	**3**

The graph provides a breakdown of routes based on OP Centre, revealing that Syracuse, Saratoga, and Gloversville have the highest route prevalence. In contrast, Saranac Lake, Batavia, Dunkirk/Fredonia, Gouverneur, Lowville, and Potsdam experience the least traffic in terms of routes passing through them.

The presented tables meticulously categorizes routes based on Electric, Dual Fuel, and Gas Only meters. Importantly, this analysis narrows its focus to routes where Electric meter values surpass 100, providing a more refined perspective on meter distribution. Additionally, the table provides the count of each meter type on every route. Routes exclusively featuring Electric meters (exceeding 100) should be prioritized, ensuring an economical approach.

Unable To Complete : Analysis

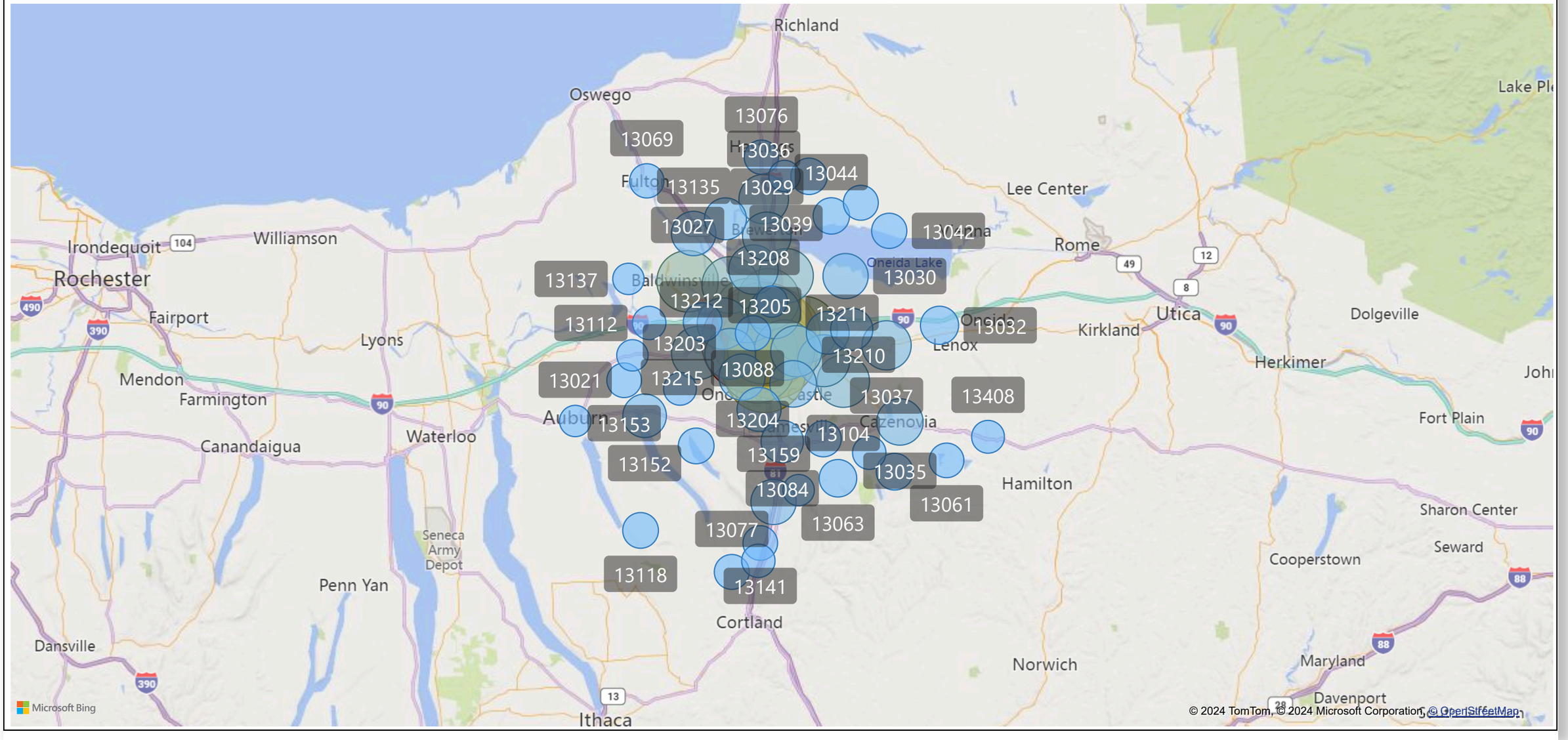




The graph at the top offers a sweeping perspective on the UTC trends across OP Centres, spotlighting Syracuse as the front-runner with the highest UTC count. Simultaneously, the lower line chart provides a granular breakdown, presenting the UTC count based on the top three codes for each OP Centre, categorized by month. Notably, the data for the year 2023 highlights October as the month with the predominant share of reported UTCs.

Unable To Complete : Zip Codes by OP Centre

Count of UTC Code by ZIP



This map shows the distribution of count of UTC codes based on the Zip Codes in an OP Centre.

OP_CENTER	Dual Fuel	ELE	GAS	Total
ALBANY	**12523**	**1266**	**347**	**14136**
ALBANY	**10592**	**874**	**255**	**11721**
12206	2745	139	76	**2960**
12203	1713	76	28	**1817**
12210	1453	112	45	**1610**
12208	1473	79	7	**1559**
12202	1232	126	40	**1398**
12205	697	155	21	**873**
12209	786	17	10	**813**
12207	239	89	16	**344**
12204	223	44	10	**277**
12211	31	36	2	**69**
12222		1		**1**
RENSSELAER	**793**	**60**	**23**	**876**
LATHAM	**302**	**73**	**5**	**380**
DELMAR	**199**	**19**	**4**	**222**
EAST GREENBUSH	**116**	**18**	**4**	**138**
CASTLETON	**78**	**40**	**3**	**121**
LOUDONVILLE	**107**	**11**	**2**	**120**
VOORHEESVILLE	**54**	**27**	**3**	**84**
GLENMONT	**64**	**12**	**4**	**80**
SLINGERLANDS	**39**	**30**	**1**	**70**
Total	**12523**	**1266**	**347**	**14136**

OP_CENTER	Dual Fuel	ELE	GAS	Total
ALBANY	**91669**	**43619**	**6340**	**141628**
ALBANY	**50026**	**18015**	**3639**	**71680**
12203	11404	3251	500	**15155**
12205	8986	2700	590	**12276**
12208	9095	1966	346	**11407**
12206	6290	2226	667	**9183**
12210	3748	2895	466	**7109**
12202	3364	1956	371	**5691**
12209	4297	480	139	**4916**
12204	1469	1328	271	**3068**
12207	787	1024	207	**2018**
12211	586	184	51	**821**
12222		2	21	**23**
12226			6	**6**
12242		1	2	**3**
12288		1	1	**2**
12223		1		**1**
12240			1	**1**
RENSSELAER	**8377**	**2768**	**337**	**11482**
DELMAR	**6808**	**1471**	**147**	**8426**
LATHAM	**5242**	**1482**	**371**	**7095**
EAST GREENBUSH	**2452**	**2051**	**79**	**4582**
Total	**91669**	**43619**	**6340**	**141628**