Analyzing the Use of Second Homes in Venice

WPI

An Interactive Qualifying Project submitted to the faculty of
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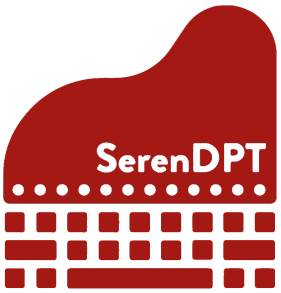

Submitted to Worcester Polytechnic Institute

Acknowledgments

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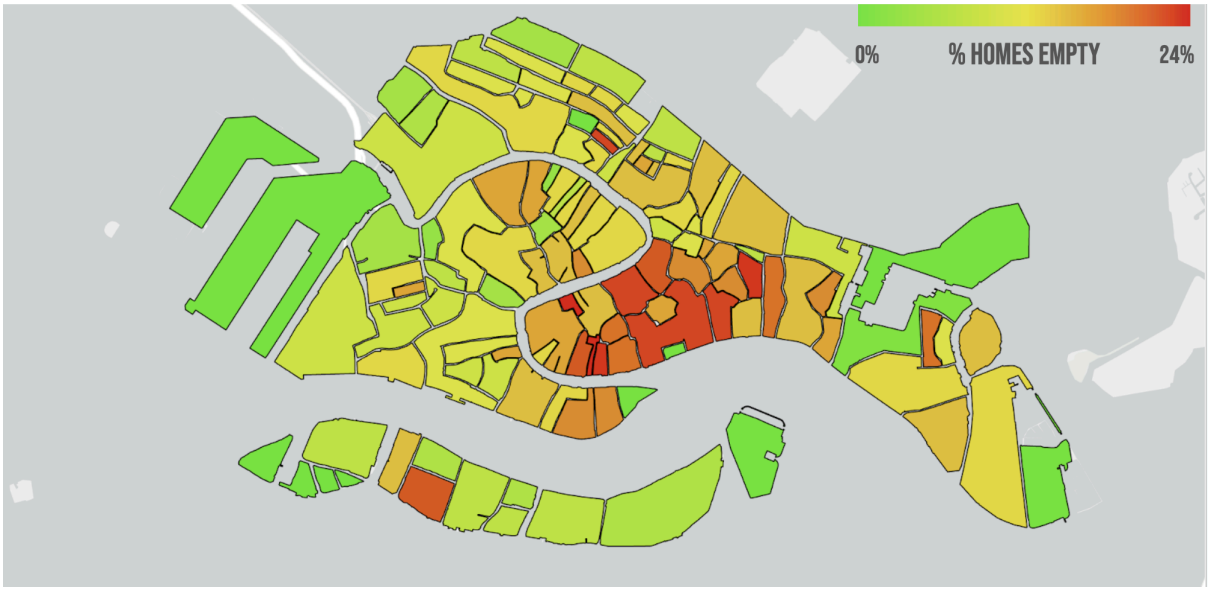
Abstract

With knowledge of the utilization of Venice's housing stock, the city of Venice can understand how the influx of tourists affects available housing for residents. As tourist arrivals in the city increase so does the risk to Venice's cultural and historical significance. One effect of so many tourists in Venice has been the reduction in housing for the city's residents and students. In this project we used data sets derived from water and telecommunications usage to answer three main objectives. Understand the housing stock in Venice. Analyze the intensity of usage of homes in Venice. Determine how homes in the city are being used.

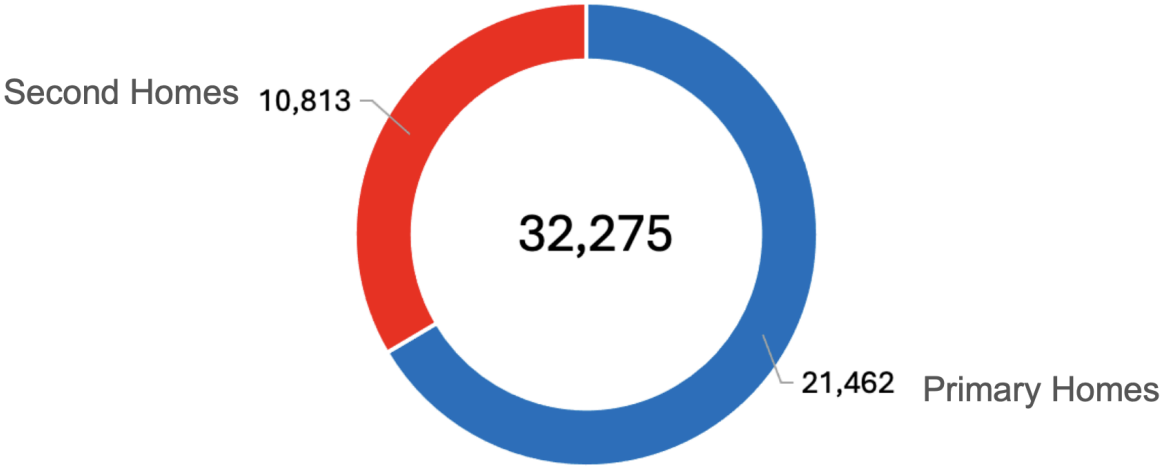
Executive Summary

Venice has a fixed housing stock composed of primary and second homes. Primary homes are owner occupied, whereas second homes are not owner occupied and have many different usages. Venice sees millions of tourists per year, and they all need a place to sleep. With the rise of AirBnB and short term rentals, second homes are becoming scarce for long term renters.

Throughout this analysis, Veritas Water Consumption data, as well as Vodafone Telecommunications data was analyzed to get an understanding of housing occupancy throughout the year. First we extracted the 3,005 empty homes out of our data set, in order to get an accurate average of 2.19m³ and total water consumption per person.



From this, we were able to determine how often homes are occupied for more than 6 months using the water consumption data, compared with Vodafone telecommunications data. There are 24,272 homes in Venice that are occupied for at least 6 months. We established a threshold of 1.46m³ that homes need to consume per month to be occupied by one individual. Using 1.46m³ to determine how many actual second homes there are, we found that 1,961 primary homes act as second homes, totaling to 10,813 second homes in Venice.



From this study, we are able to conclude there are 1,961 (6% of all homes) primary homes that are in fact acting as second homes based on their low water consumption. We were then able to calculate how often some second homes are used based on their water consumption per month. Almost half of second homes are occupied throughout the year, whether used by students, tourists, residents, or seasonal workers.

	Personal Vacation Homes			Tourist, Seasonal Workers	Tourist Rentals,Seasonal Workers, students	Tourist, Resident	Tourist, Resident	Tourist, Resident
SECOND HOMES	EMPTY $0m^3$ - $0.1m^3$ 3,005 Second homes	OCCUPIED FOR 0-2 MONTHS 0.1 - 0.5 1,626 Second Homes	OCCUPIED FOR 2-4 MONTHS 0.5 - 1 1,513 Second Homes	OCCUPIED FOR 4-6 MONTHS 1 - 1.5 1,282 Second Homes	OCCUPIED FOR 6-8 MONTHS 1.5 - 2 580 Second Homes	OCCUPIED FOR 8-10 MONTHS 2 - 2.5 498 Second Homes	OCCUPIED FOR 10-12 MONTHS 2.5 - 3 457 Second Homes	FULLY OCCUPIED 3+ 4,867 Second Homes
PRIMARY	EMPTY $0m^3$ - $0.1m^3$	OCCUPIED FOR 0-2 MONTHS 0.1 - 0.5	OCCUPIED FOR 2-4 MONTHS 0.5 - 1	OCCUPIED FOR 4-6 MONTHS 1 - 1.5	OCCUPIED FOR 6-8 MONTHS 1.5 - 2 547 Primary Homes	OCCUPIED FOR 8-10 MONTHS 2 - 2.5 689 Primary Homes	OCCUPIED FOR 10-12 MONTHS 2.5 - 3 811 Primary Homes	FULLY OCCUPIED 3+ 19,405 Primary Homes

21% of all homes are used for personal vacation homes, meaning that they are occupied for 1-6 months out of the year. Only 14% of all second homes are occupied year round, possibly by residents, or a popular tourist rental. Out of all homes, 55% of them are primary homes and occupied throughout the year. Thus, we can conclude that there are many

homes in Venice that are left unoccupied for half of the year. Through our research we conclude that there are 10,813 second homes in Venice.

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1 Introduction

More and more tourists travel the world every year. Even in the wake of the COVID-19 pandemic, tourism has quickly rebounded (World Tourism Organization, 2024). Overtourism can simultaneously damage multiple physical and cultural aspects of a location. Overcrowding, damage to historic and artistic sites, and exclusion of residents are a few of the negative effects overtourism can bring (Good Tourism Institute, 2022).

Venice has been burdened with overtourism, with increasing numbers of visitors entering the city each year (Sistema Statistico Regionale, 2024). As roomshare services like AirBnB increase in popularity, tourists are using more and more of Venice's homes (Campaign for a Living Venice, 2018). In addition to more tourists, the resident population of Venice has been declining for the past 70 years (Sistema Statistico Regionale, 2024).

How much of Venice's housing stock is used by tourists? A 2022 WPI research team found that 62% of homes available for rental were used by tourists (Housing as a Factor in Social Exclusion: Venice Case Study, 2022. The team came to this number through use of published data from government entities and housing organizations. For this project we sought to further analyze housing in Venice, looking specifically at rental homes, as rental homes are used by residents who do not own their own home, students, seasonal workers, and tourists. To check the accuracy of sources used by the previous team, we elected to use datasets tied to some physical measurement. Both water consumption data and telecommunication SIM card data were used to ensure the accuracy of this project.

Our aim is to examine the use of primary and second homes in the city of Venice to determine how tourism has impacted the housing stock available to non-tourists in the city. We used the following three questions to guide our research and analysis.

1. **How many second homes are there in Venice?**
2. **How much water is consumed in second homes?**
3. **How are second homes used?**

The following chapters in this report will provide general background and methodological information before addressing each research question in its own chapter.

2 General Background

Global tourism has been rising steadily for the past 70 years. Despite a steep decline in tourism during the COVID-19 pandemic, tourism numbers have quickly recovered in the past two years (World Tourism Organization, 2024).

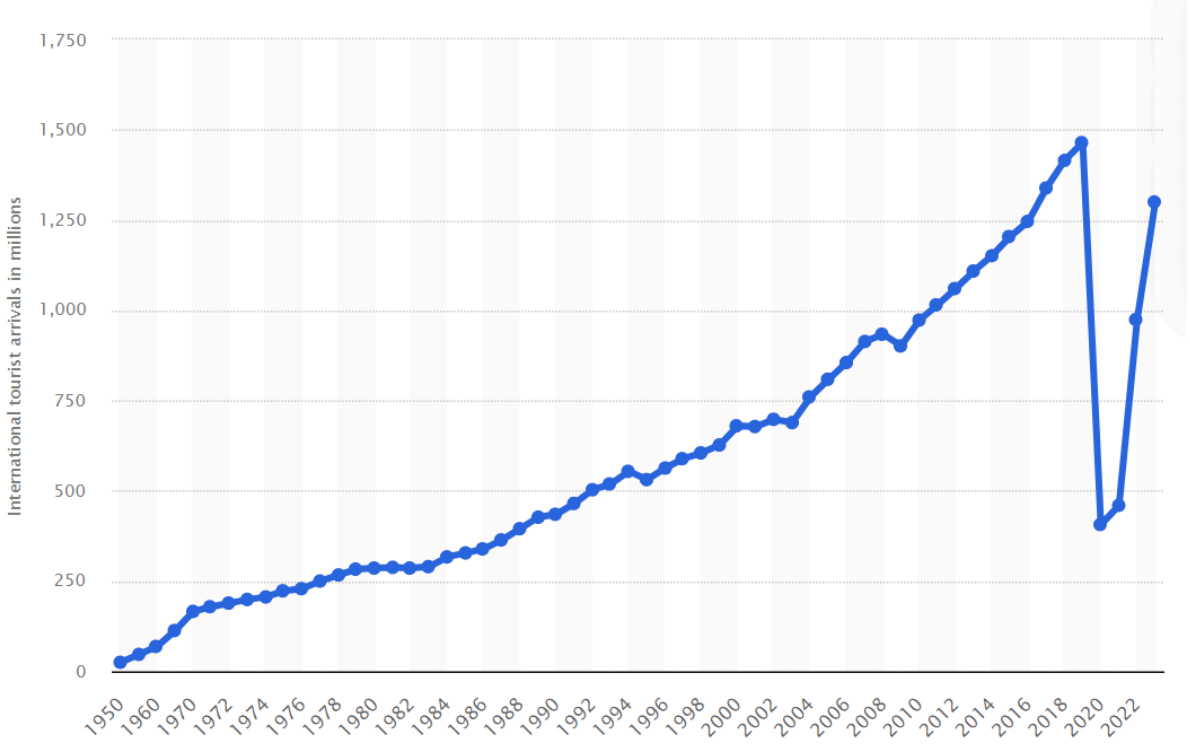

Figure 1: International Tourist Arrivals in Millions (1950-2023)(World Tourism Organization, 2024)

In 1987 Venice, Italy was recognized as a UNESCO world heritage site (UNESCO, 2024). In recent years, UNESCO has threatened to put Venice on their "danger list" for the city's lack of urgency in dealing with threats to its physical and cultural safety. One danger cited by UNESCO has been the strain of tourists on the city (UNESCO, 2023). Increasing numbers of tourists have been flowing into Venice each year (Sistema Statistico Regionale, 2024). As more tourists arrive, the issue of housing becomes increasingly important.

In 1951, Venice's resident population was around 175,000. Today, Venice's resident population is around 48,000 (Comune di Venezia, 2024).

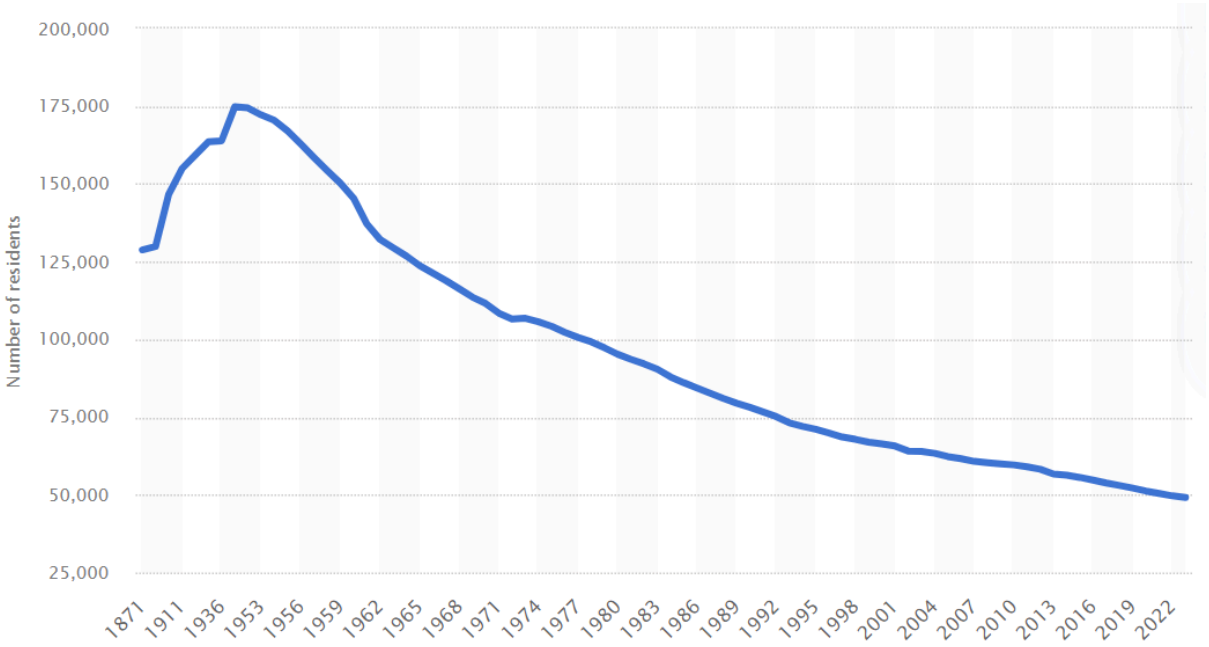

Figure 2: Resident Population of Venice (1871-2023) (Comune di Venezia, 2024)

It would be reasonable for one to assume that given the steep decline in resident population, the question of housing availability would not be an issue. However, as the resident population has declined, the flow of tourists into the city has grown (Sistema Statistico Regionale, 2024).

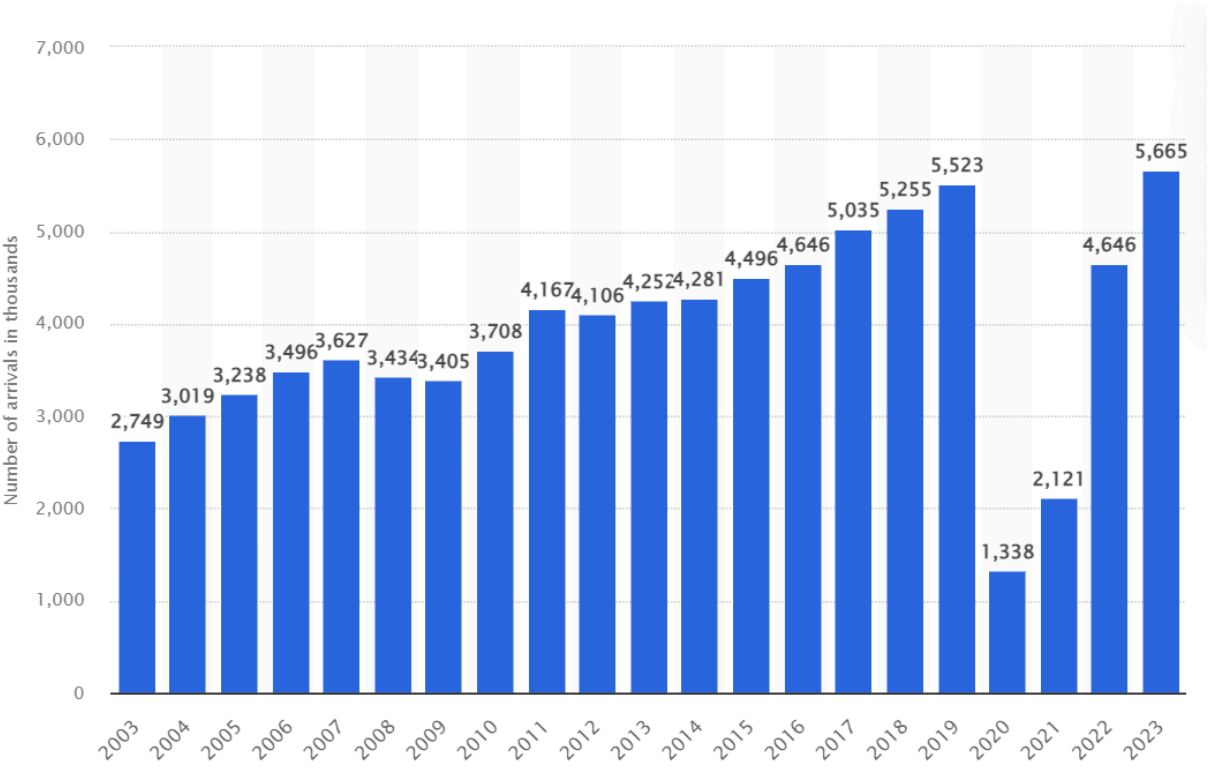

Figure 3: Number of Tourist Arrivals to Venice in Thousands (2003-2023)(Sistema Statistico Regionale, 2024)

When looking at the issue of housing all these tourists, expansion of the city is not a realistic option. Because Venice is made up of islands, lateral expansion is not a viable option for creating more space as doing so would require building new land on the surrounding lagoon, a costly and time consuming process. Vertical expansion is similarly difficult. Venice is composed of buildings dating as far back as the 13th century. UNESCO cites these buildings as one of their reasons for Venice's addition to the World Heritage Site List (UNESCO, 2024). Upward expansion would mean removing much of the history found in Venice. With no options to expand upward or outward, Venice's housing stock is fixed.

With the rise of room-sharing services like AirBnB, increasing numbers of tourists are finding accommodation by renting Venice's apartments and houses (Campaign for a Living Venice, 2018). Of course, tourists are not the only people staying in these homes and apartments. Residents, students, and seasonal workers are competing with tourists to find rental homes in the city. A 2022 WPI research team found that there were around 9,500 homes available for rental in Venice, with 62% of those homes used for tourist rentals (Housing as a Factor in Social Exclusion: Venice Case Study, 2022). This WPI team used tax information and information from various housing organizations to draw their conclusions. But what kinds of homes are used as rentals? To answer this question, we needed a clear picture of what kinds of homes make up Venice's housing stock. The two main categories used in this project were primary and second homes.

2.1 Primary Homes

The 2022 WPI research team found that there were 21,900 primary homes in Venice. This team defined primary homes as homes that were owned and occupied by Venetian residents, and whose address was used as the owner's main address (Housing as a Factor in Social Exclusion: Venice Case Study, 2022). For this project, we refined the criteria for a primary home. For the purpose of this project, primary homes in Venice are owned and occupied by residents. In order for a home to be considered primary, the residents must occupy their home for more than six months out of the year. The primary home address is the one on record for purposes like taxes and government identification. Primary homes have one use, as a residence for the owner.

2.1.1 Public Housing

Public housing is a specific type of housing which is subsidized by the Italian government and provides homes to disadvantaged people and families in Venice (Housing Europe, 2010). These homes are owned primarily by two organizations; ATER, and Comune ERP. While the occupants of these homes do not own them, for the purpose of this project, we will include them in the count of primary homes as public housing is only available to residents.

A map of all 4,710 public homes can be seen below in figure 4 based on information published in the 2018 report *Voids of Normality: Evolutions of the Venetian House in the Era of Global Tourism* by Federica Fava and Laura Fregolent (Fava and Fregolent, 2018).

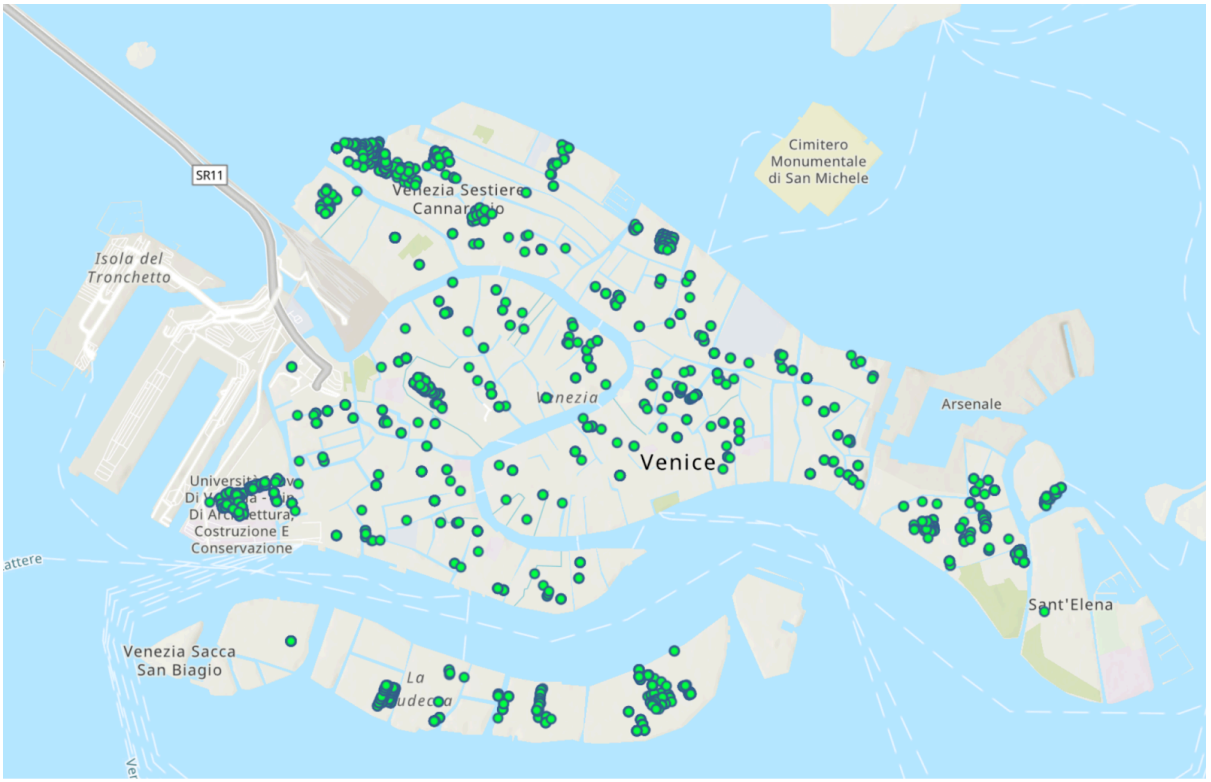

Figure 4: Location of Public Housing Units in Venice (2022)

2.2 Second Homes

Homes that fall outside of the requirements of a primary home are second homes. These homes have myriad uses, but the two broad categories used in this project were vacation homes and rental homes. Vacation homes are obtained by owners for personal use. Rental homes on the other hand, are obtained to be rented to others. It is important to note that these two categories have a great deal of overlap, many vacation homes are rented when not in use by the owner and vice versa.

When looking at rental homes, further categorization was necessary. Rental homes were examined in the following categories. Tourist rentals, rentals for students and seasonal workers, and rentals for residents who do not own their own homes.

3 General Methodology

Our aim is to examine the use of primary and second homes in the city of Venice to determine how tourism has impacted the housing stock available to non-tourists in the city. We used the following three questions to guide our research and analysis.

4. **How many second homes are there in Venice?**
5. **How much water is consumed in second homes?**
6. **How are second homes used?**

This project analyzed the housing stock in Venice's historical center. The area we considered for our analysis is pictured in orange in figure 5.

Figure 5: Venice's Historical Center

Our project began May 7th, 2024 and ended June 20th, 2024. When analyzing data, we looked specifically at domestic dwellings, we did not include data from hotels or other such non-domestic accommodations.

For the purposes of this project, a primary home in Venice is owned and occupied by a resident and their family. In order for a home to be considered primary, the residents must occupy their home for more than six months out of the year. Despite not meeting these

requirements, public homes are considered as primary homes, because they are only available to residents.

A second home is a home that falls outside of the requirements of a primary home (except in the unique case of public homes). Second homes are rented by the owner to tenants, used as a personal vacation home, or both.

In the following sections, we will briefly describe the two primary datasets we used in our analysis.

3.3 Using Water Data to Analyze Levels of Home Usage (Veritas)

Veritas is a multi-utility public service group that covers all of Venice. Veritas provides services like trash pick up, and water to all homes in the historical center of Venice (Veritas 2023). We requested use of Veritas' water meter data, which they use to determine how much a building is billed for its water usage. This data was sent to us by Luigi Torretti, the manager of tax assessment and collection activities at Veritas (L. Torretti, private communication, 2024).

Veritas has the location of each water meter in Venice. These meters are checked manually once or twice a year. Veritas collects the average monthly water consumption for each year. Some water meters read the water consumption of a condominium, which contains multiple homes. In these cases, the number of homes associated with one meter is recorded (L. Torretti, private communication, 2024).

Mr. Torretti also informed us that buildings in Venice are organized into tariff categories to calculate the price of water based on that building's use. Primary homes receive discounted rates on the first X m^3 they use. The level (X) is based on how many people live in that home.

With all of this information, we knew that Veritas had the location of each water meter, the number of homes that the water meter read for, the number of people in those homes, the tariff category of those homes, and the average monthly water consumption read by the meter (L. Torretti, private communication, 2024).

3.4 Using Phone Data to Track City Users (Vodafone)

Vodafone is a leading telecommunications company in Europe and Africa (Vodafone, 2024). A previous study, *Crowding-In and (Temporary) Crowding-Out in Venice*, obtained SIM card data from Vodafone (Crowding-In and (Temporary) Crowding-Out in Venice, 2024). Our collaborator, Professor Dario Bertocchi, was an author on that study and provided us the Vodafone data they received.

The dataset contains the number of residents and tourists in Venice for each day in 2022. The data was collected by tracking SIM cards in the city. If a SIM card was in the city for more than 6 months, the owner of the SIM card was counted as a resident (D. Bertocchi, private communication, 2024).

4. Quantifying Second Homes in Venice

4.1 Background

To answer our first research question, “how many second homes are there in Venice?” we used the water consumption data obtained from Veritas. Water consumption is measured through use of water meters, pictured in figure 6.

Figure 6: Veritas Water Meter

These water meters are read once to twice a year and water is billed monthly using the monthly average (Veritas, 2024). Using the water consumption data, we are able to analyze how often homes are being used. We used water consumption data from 2023 for this project, containing 59,975 buildings, organized by 10 categories. However, 26,912 of those meters were tied to commercial buildings and not homes. We concentrated on domestic uses, totaling 33,063 water meters. We filtered out non-domestic buildings by tariff category. A building’s tariff category describes its use and what kinds of taxes apply to it. The only categories relevant to our project were the USO-Domestico Residente (primary homes) category and the USO-Domestico non-residente category (second homes). Figure 17 below shows a screenshot of the data we received. Column B and C gave us the latitude and longitude of each water meter, Column E gave us the tariff category of each home. Column F provided how many homes are tied to each water meter. Column I showed if the water meter was reading for a condominium or not. Column J provides the amount of people associated with each water meter. Lastly Column Q gave the average monthly water consumption in Cubic Meters.

4.2 Methodology

While there are 33,063 residential water meters in the historical center, this is not an accurate count of homes. The exact number of homes in 2023 was found by using the "Nuclei Domestici" column in figure 7. This column shows the number of houses each water meter reads for. The total number of homes analyzed in this study is 35,289 homes. We have used the coordinates of each water meter to map out all homes in Venice.

B	C	E	F	I	J	Q
latitude	longitude		domestic units	Condo	components	
CoordinateGps		**Cat.Tariffa**	**Nuclei domestici**	**Condominio**	**Componenti**	**Consumo medio 2023**
45.4324152	12.3347584	Uso domestico residente	1		2	49.77
45.4320578	12.3305041	Uso domestico non resident	1			49.54
45.4411713	12.32791	Uso domestico residente	1		2	49.48
45.4397203	12.3348418	Uso domestico non resident	1			
45.4380231	12.3298033	Uso domestico residente	1			49.35
45.4345224	12.3339128	Uso domestico residente	5	X		49.3
45.4438615	12.3322187	Uso domestico residente	1			49.22
45.4242383	12.3334602	Uso domestico non resident	1			49.13
45.4368278	12.347741	Uso domestico residente	1		1	49
45.4388133	12.322732	Uso domestico residente	1		2	48.95
45.4368049	12.3312538	Uso domestico non resident	1			48.92
45.435667	12.3364222	Uso domestico residente	1		1	48.86
45.44273	12.3382189	Uso domestico residente	1		2	48.86
45.4321983	12.3354444	Uso domestico residente	1			48.82
45.4340194	12.3352677	Uso domestico residente	1		3	48.75
45.442695	12.3271665	Uso domestico residente	1		1	48.6
45.4370347	12.3305473	Uso domestico residente	1		1	48.46
45.4367988	12.3397012	Uso domestico non resident	1			48.42
45.4380682	12.3494514	Uso domestico non resident	1			48.26
45.4364333	12.3324616	Uso domestico non resident	1		1	48.2
45.4382911	12.3331629	Uso domestico non resident	1			48.2
45.4325548	12.3354703	Uso domestico non resident	1			47.98
45.4349864	12.3488977	Uso domestico residente	10	X		47.8
45.4378063	12.3422233	Uso domestico non resident	1			47.5
45.4434289	12.3314218	Uso domestico non resident	1			47.44
45.4378237	12.3440658	Uso domestico residente	5	X		47.42
45.4327593	12.3606895	Uso domestico residente	1		2	47.37
45.4375275	12.3462843	Uso domestico residente	9	X		47.36
45.4340252	12.3299058	Uso domestico residente	1			47.2
45.4378254	12.3375067	Uso domestico non resident	1			47.06
45.4305431	12.3319185	Uso domestico residente	8	X		46.84
45.4400155	12.3324047	Uso domestico residente	1		1	46.76
45.4299407	12.3580466	Uso domestico residente	1		1	46.73
45.4395857	12.3274201	Uso domestico non resident	1			46.7

Figure 7: Filtered 2023 Veritas Water Consumption Data.

4.2.1 Coordinate Locations

Column B and C in figure 7 lists the exact latitude and longitude of each water meter. Column E, shows the Tariff Category of each home. Column F tells us how many homes are tied to each water meter. Column J tells us how many people live in each home, this is only for primary homes. Column Q is the monthly average for one year of water consumption in cubic meters.

Figure 8: Locations of All 35,280 Homes in Venice (2023)

4.2.2 Tariff Category

Column E in figure 8 shows the tariff category of each home as described above. We associated the categories to each type of home we analyzed. Uso-Domestico Residente (Primary Home) and Uso-Domestico Non-Residente (Second Home). A map of all 23,180 primary homes in Venice can be seen below in figure 9.

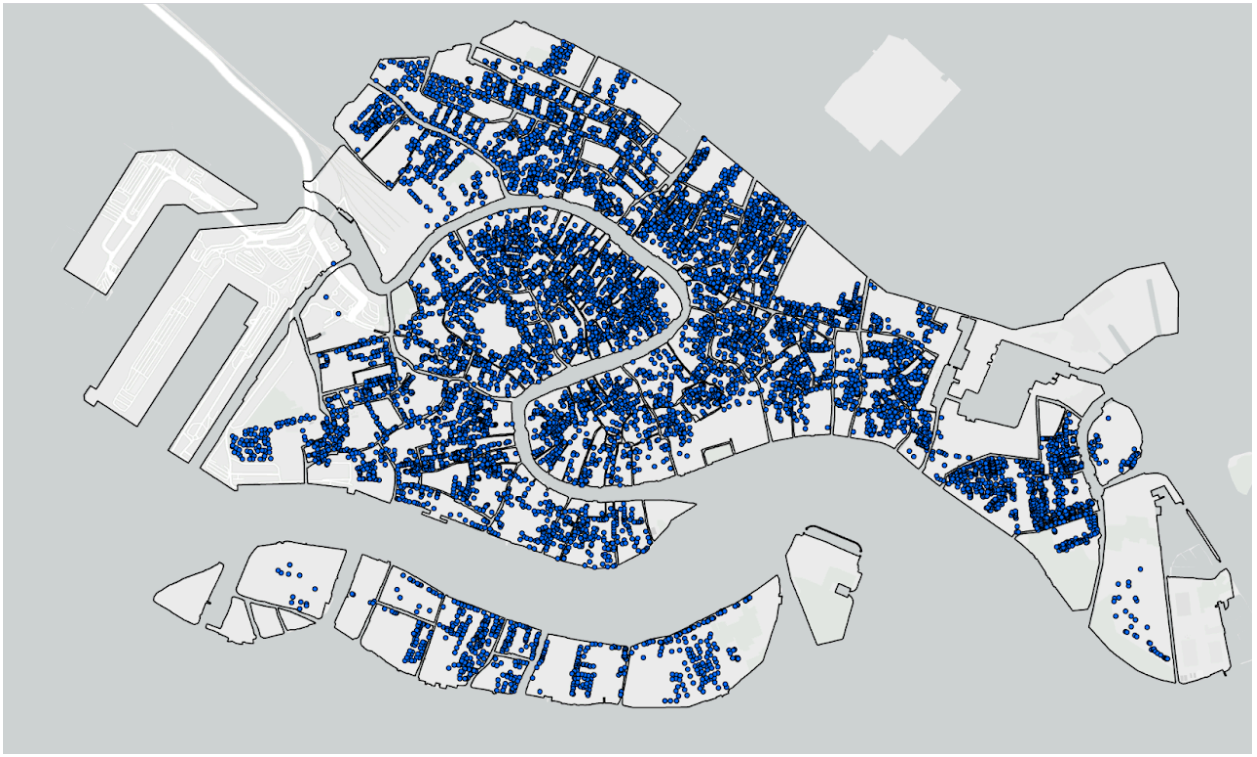

Figure 9: Locations of All Primary Homes in Venice (2023)

A map of all 10,490 second homes in Venice can be seen below in Figure 10.

Figure 10: Locations of All Second Homes in Venice (2023)

Venice has a housing stock of 35,280 homes. The breakdown of homes is 24,799 primary homes, and 10,481 second homes. A figure displaying the ratio can be seen below in Figure 11.

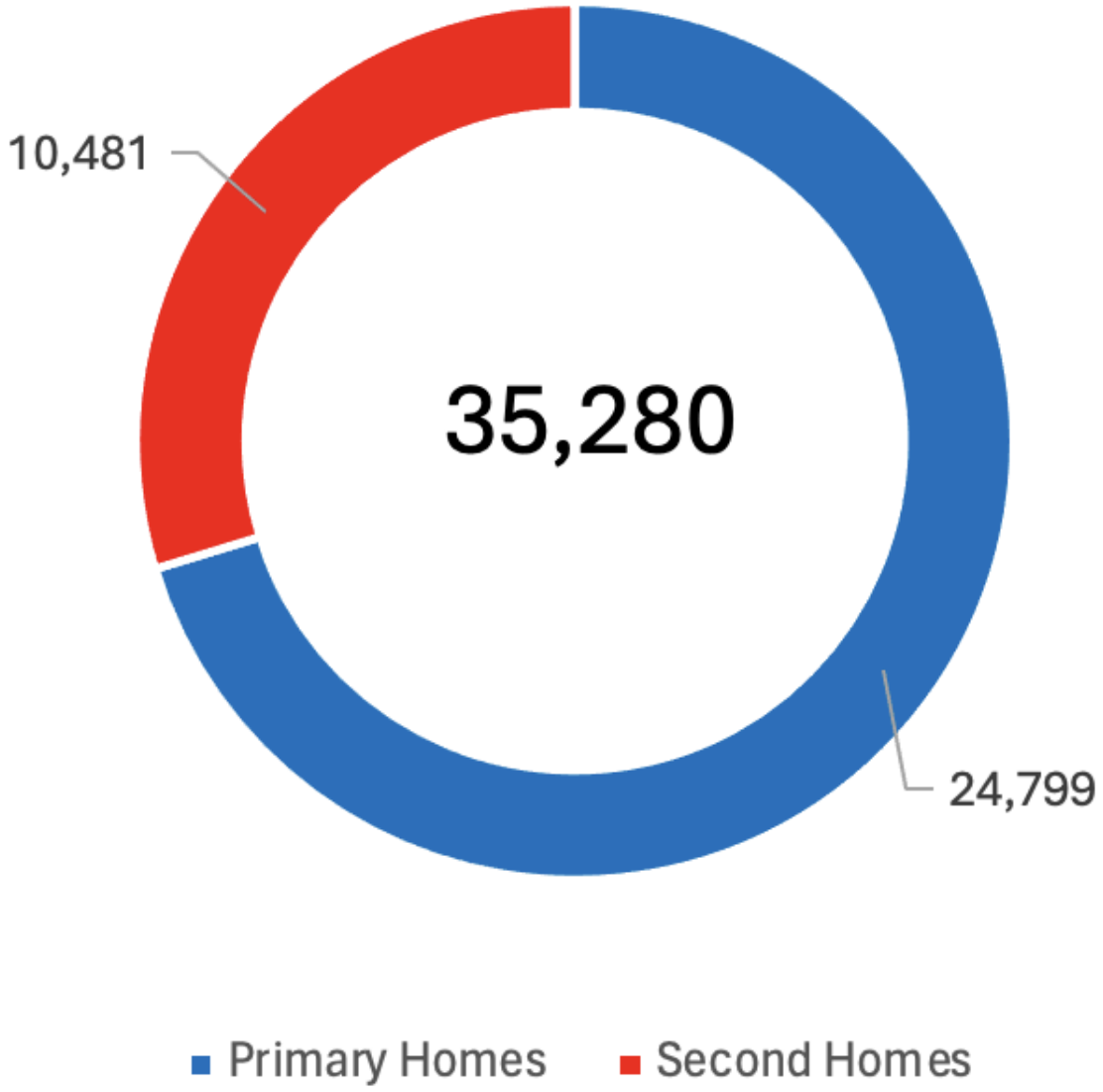

Figure 11: Breakdown of Venice's Housing Stock by Tariff Category (2023)

4.2.3 Houses per Water Meter

Column F in figure 7, represents how many housing units are tied to each water meter, this allowed us to calculate the total number of homes in Venice. Column J in figure 7 represents how many people live in each housing unit, though this is only listed for some homes, for blank homes we used the average number of people per home in Venice, 1.92. This allowed us to calculate an average water consumption per person in each home.

4.2.4 Identifying Empty Homes

To find empty homes we filtered our data by homes that consumed between 0-0.1 m^3 of water monthly. For this project we used 0.1m^3 as our upper limit of consumption for an empty home to account for empty homes that may have leaks or other sources of water

consumption. We divided the number of empty homes on each island by the total number of homes on each island to get what percentage of each island's housing stock was empty. Once the percentage of empty homes by island was calculated, we then used the tariff category of each home and know how many primary and second homes are empty throughout the year. After analyzing the empty homes, we began analysis of occupied homes. We filtered all empty homes out of our data to ensure that further analysis would not take them into account.

4.2.5 Occupancy of the Average Resident

We used the data from Vodafone to find how much of the year the average resident spends in Venice. The Vodafone telecommunications data we used was from 2022. This data is taken from SIM cards used in Venice. One is considered a resident if a sim card stays in Venice for 6 months or more. Because this data set had the number of residents on each day, we could find how much of the year the average resident spends in Venice.

Once we knew how long the average resident is in Venice each year, we then used the Veritas water consumption data to calculate the average water consumption per resident. By knowing how long the average resident is in Venice and how much water they consume, we could calculate how much water the average resident would consume if they stayed in Venice all year. We then found the consumption of the average resident if they only stayed 6 months in Venice. Once we had this number, we determined how much each home would have to consume to be occupied for more than 6 months out of the year. To do this, we multiplied the number of people in a home by the consumption of the average resident if they only stayed in the city for 6 months. This gave us the average monthly consumption each home in Venice needed to meet or exceed to be occupied for more than half of the year.

Once we knew the minimum consumption to occupy a home for more than 6 months, we were able to categorize primary and second homes in three categories: empty homes, homes used for less than 6 months, and homes used for more than 6 months.

4.3 Results

4.3.1 Empty Homes

We found that there are 3,005 (8.5%) empty homes in Venice's historic center. An empty home consumes less than 0.1m^3 of water each month. We used the tariff category of each home and know how many primary and second homes are empty throughout the year, displayed below in figure 12, 13, and 14.

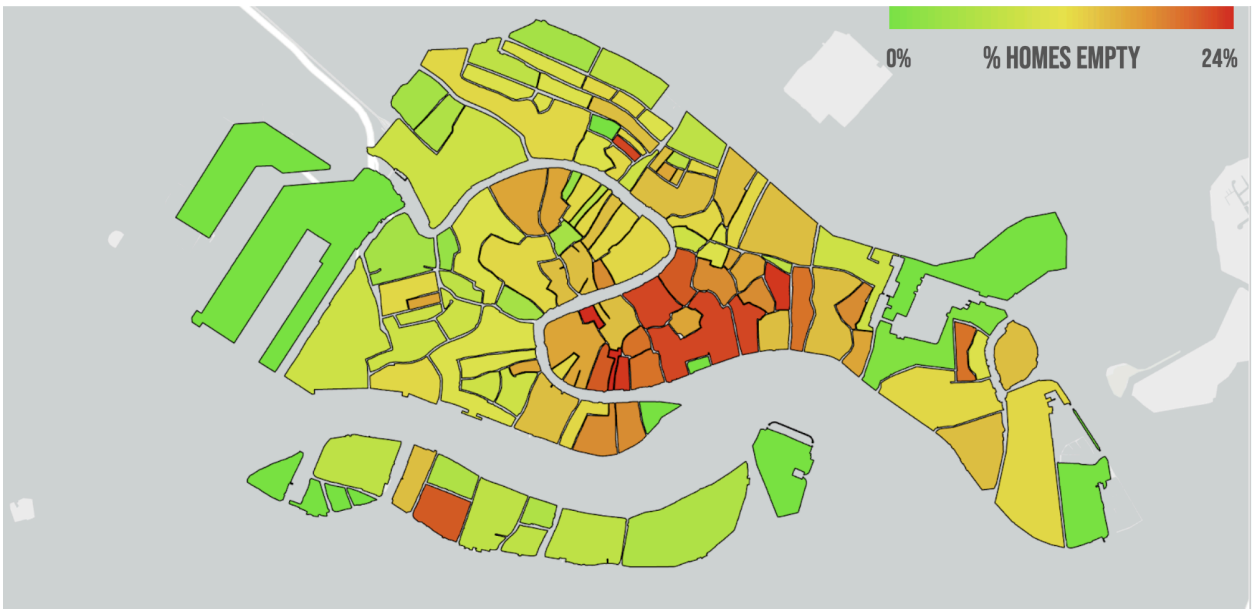

Figure 12: Percentage of Empty Homes Over All Homes Per Island.

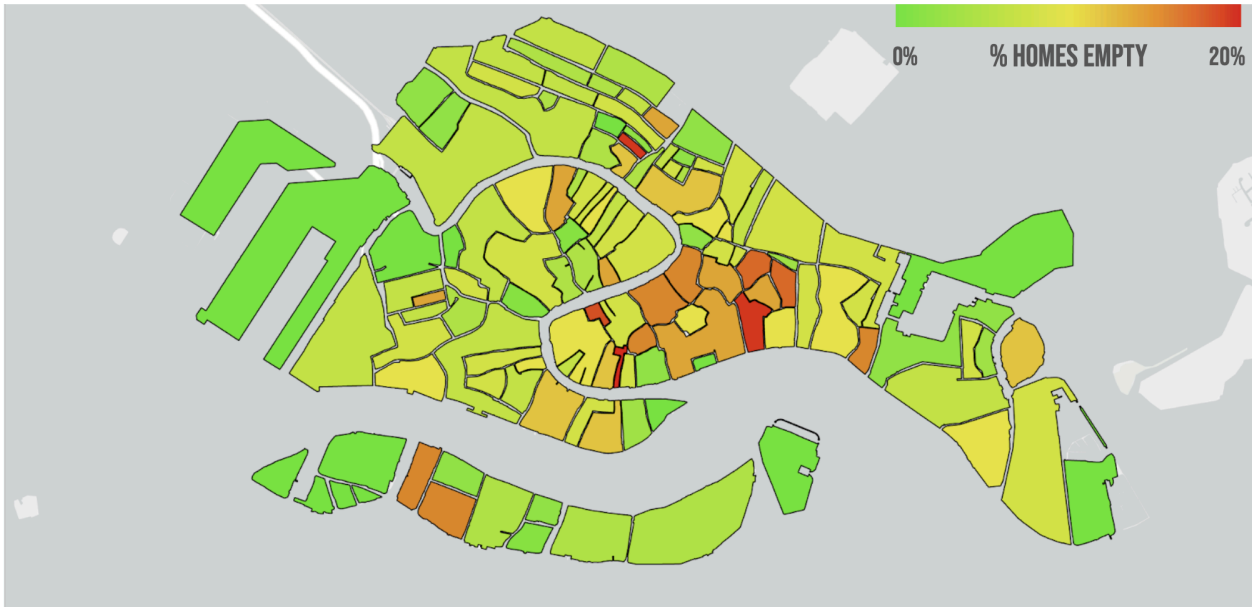

Figure 13: Percentage of Empty Primary Homes Per Island

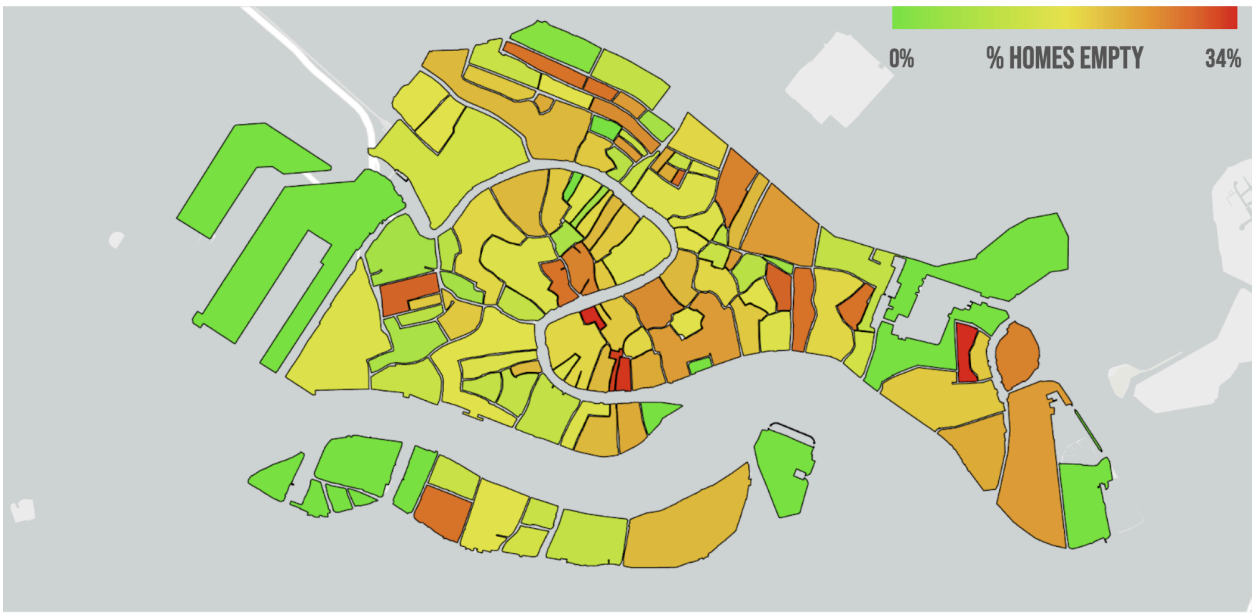

Figure 14: Percentage of Empty Second Homes Per Island

As stated in section 4.2.4, we filtered all empty homes out of our data to ensure that further analysis would not take them into account. The updated totals of occupied primary and secondary homes are shown below in figure 15.

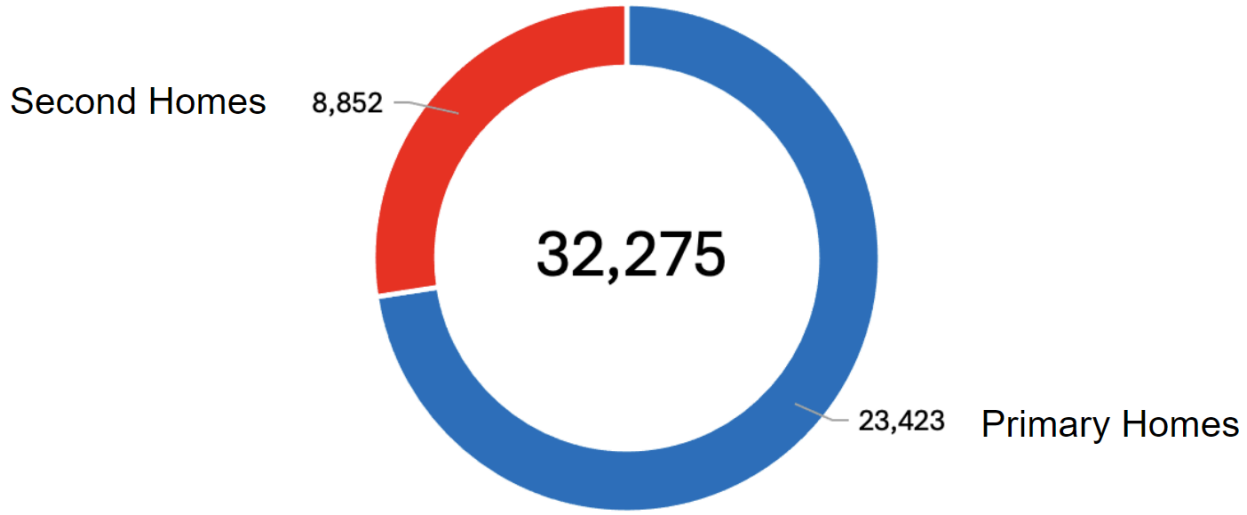

Figure 15: Venice's Housing Stock by Tariff Category Excluding Empty Homes.

4.3.2 Average Resident Occupancy

We found that the average resident occupies their home for 89% of the year or about 10.5 months. A graph of the Vodafone data we used to make this calculation can be seen below in figure 16.

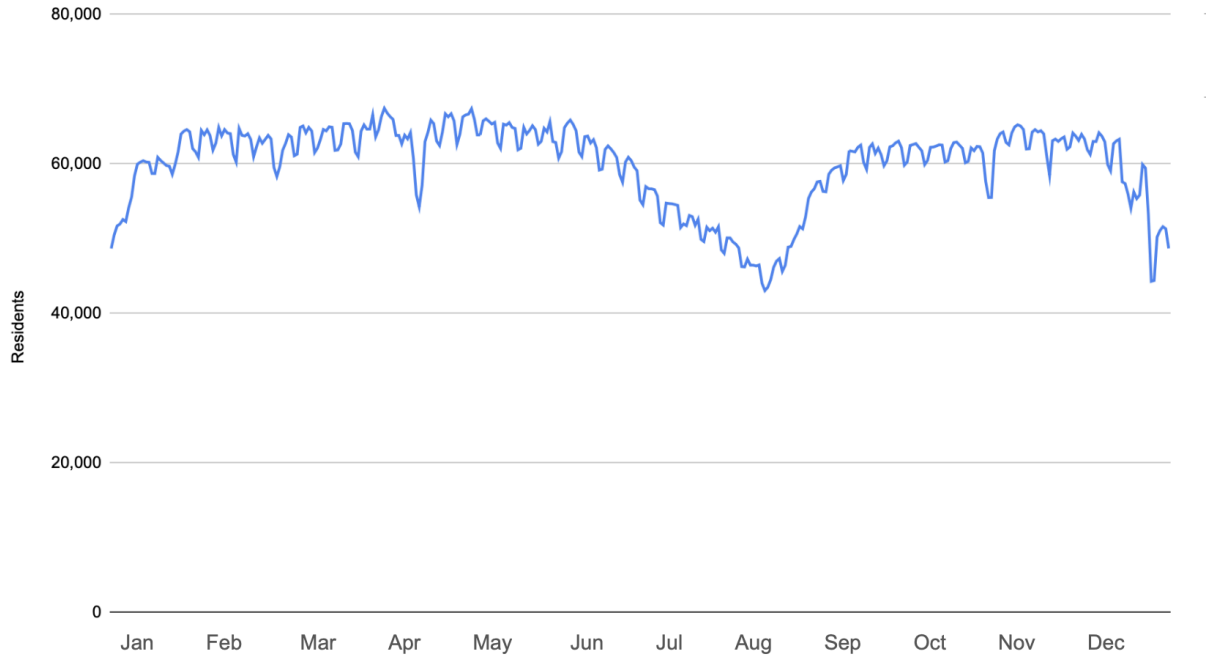

Figure 16: Number of Residents in Venice Each Day in 2022 from Vodafone.

4.3.3 Average water consumption per capita per year

Once we knew that the average resident is in Venice for about 10.5 months out of the year. We then used the Veritas water consumption data to calculate an average water consumption per resident. The average water consumption per person in the city is 2.56 m^3 per month. We found that the average person would consume 2.92 m^3 per month if they stayed in Venice all year. We also found the consumption of the average person if they only stayed 6 months in Venice, 1.46m^3 per month.

Our findings showed that 8.5% (3,005) of all homes are empty no matter their tariff category. 92% (21,462) of primary homes are occupied for more than 6 months, leaving just 8 % (1,961) of primary homes occupied for less than 6 months. 72% (6,407) of second homes are occupied for more than 6 months, leaving 28% (2,445) second homes occupied for less than 6 months.

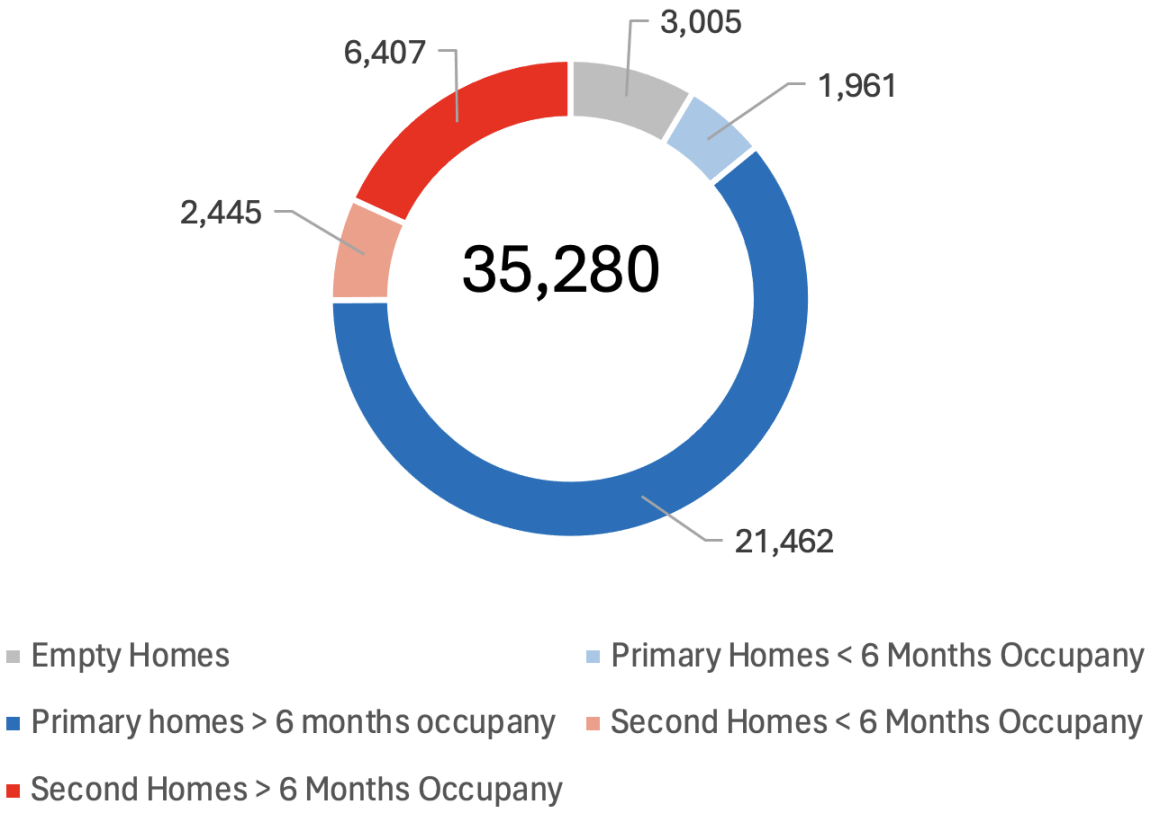

Figure 17: Occupancy Breakdown of Homes in Venice.

4.3.4 Reclassifying Under Consuming Primary Homes

In order for a home to be considered primary, it must be occupied for more than 6 months out of the year (*Polizia di Stato)*. We found 1,961 homes that were listed as primary that did not meet this criterion. We moved these underused primary homes into our total count of second homes giving us a new breakdown of occupied primary and second homes.

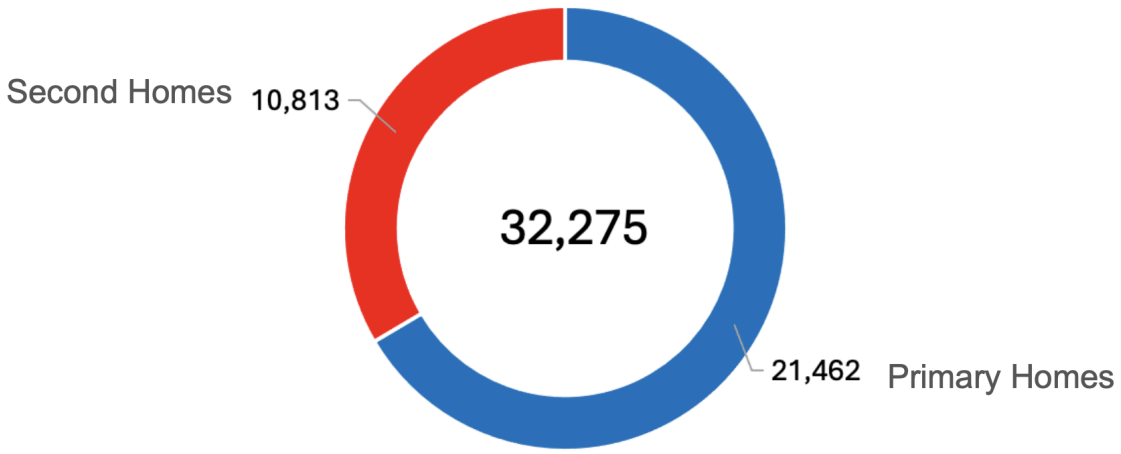

Figure 18: Underused Primary Homes Reclassified as Second Homes (2023).

4.4 Conclusion

We found that there are 10,813 occupied second homes in Venice. Of this total 1,961 were registered originally as primary homes. By looking directly at water consumption data we found that there are more second homes than originally suggested by tariff category alone. This discrepancy may be shared by other housing data sets, such as those used by the previous WPI research team in 2022.

4.5 Recommendations

In future studies, we would recommend groups and organizations take water consumption into account when classifying homes as it may reveal these discrepancies in data sets that are not based on the use of a physical resource.

Veritas has begun collecting data from water meters online by having homeowners take pictures of their water meter throughout the year (Zebra, 2022). To increase the accuracy of these findings, we would recommend using new data collected with this method. This data would be far more precise than the data set we had access to. With more precise readings from different points throughout the year, more conclusions could be drawn about times of peak and low usage throughout the year.

5. Analyzing the Water Consumption of Second Homes

5.1 Methodology

As shown in section 4.3.3 above, the water consumption threshold calculated for a home to be occupied for more than 6 months is 1.46m³. We further divided the average water consumption of a resident staying all year in Venice (2.92m³) using methods described in section 4.2.5. We found how many primary and second homes fell within the occupancy ranges of 0-2 months, 2-4 months 4-6 months, 6-8 months, 8-10 months, 10-12 months, and above 12 months.

5.2 Results

As displayed in figure 19 below, there are 7,426 (69%) second homes that are occupied for less than 6 months, and 3,005 (27%) of those homes are left empty throughout the year. 4,867 (45%) of second homes exceed the average water consumption for a resident staying the full year in Venice.

The primary homes under 6 months of occupancy are crossed out, as those homes were moved into the second homes category in section 4.3.4. Of note is the number of primary homes consuming water above the monthly average for a resident staying in Venice for the whole year. We had expected to see more primary homes above this threshold than secondary homes as primary homes have a higher average consumption per resident (4.45m³) than second homes (2.33m³).

From this analysis, we found that 7,426 (23%) of Venice's total housing stock is left empty for more than 6 months per year.

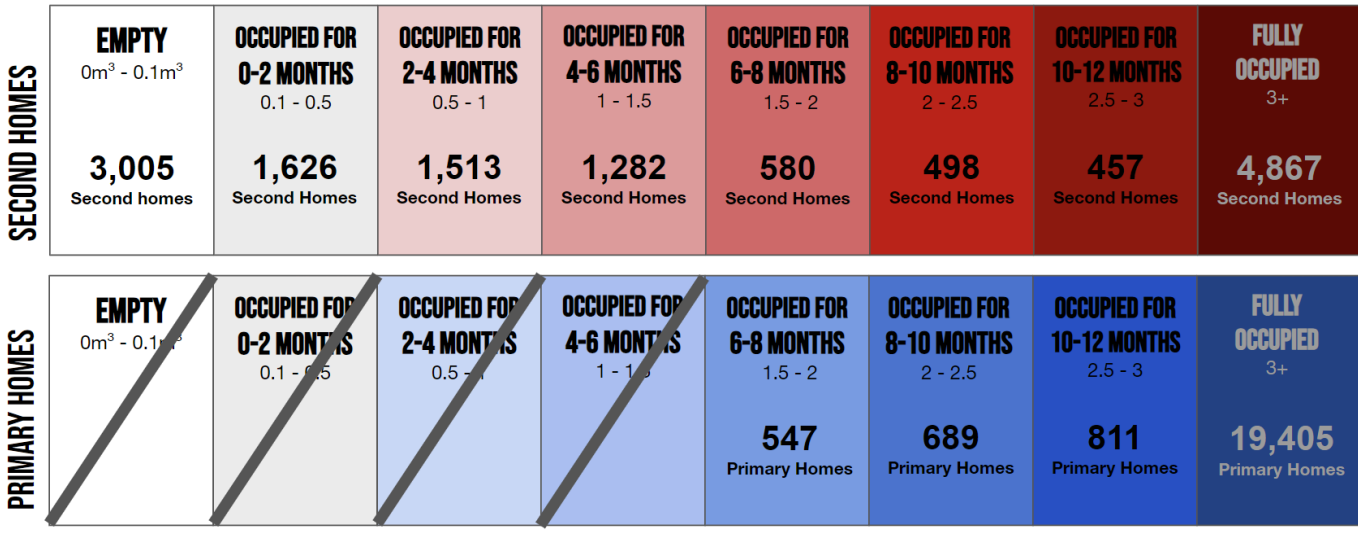

Figure 19: Primary and Second Homes by Number of Months Occupied

5.3 Conclusion

Figure 19 above illustrates the concentration of primary and secondary homes at various levels of yearly occupancy. 69% of second homes fell below 6 months occupancy per year. A majority of second homes being under six months occupancy suggests a minority of second homes are used for non-tourist or non-vacation use.

5.4 Recommendations

We would suggest that future groups further analyze homes found in the “fully occupied” section of figure 19. By examining the upper end of consumption, more can be said about a home’s usage and who it's available to.

As stated section 4.5, a more precise dataset with information from different points throughout the year would allow for more specific analysis throughout the year.

6. Uses of Second Homes

6.1 Background

With the rise of room sharing services like AirBnB, second homes have become a more attractive investment. More and more landlords have shifted their homes to be short term rentals (Campaign for a Living Venice, 2018). Unlike long term rentals for residents, tourist rentals give landlords more flexibility in the usage of their second homes. One of the sponsors for this project, Professor Emanuele Girodano, has conducted numerous interviews with homeowners in Venice. One of Professor Girodano's interviewees stated "I'm a bit worried. When I bought the apartment 3 years ago half of the building was inhabited by residents. Now, out of 8 apartments, I'm the only resident." (E. Giordano, private conversation, 2024). We used data from Geoportale to get the location of all the AirBnBs in Venice. Geoportale is a cartographic database maintained by the Italian government (Geoportale, 2024).

Tourists are not the only non-residents using second homes, students and seasonal workers use rentals while in the city. Because students and seasonal workers do not stay in the city for the whole year, but stay longer than tourists, they occupy a medium rental duration between tourists and residents.

6.2 Methodology

We began by mapping the AirBnBs in Venice using data from Geoportale. We then compared the number of AirBnBs to the total number of second homes in Venice to calculate the percentage of second homes registered as AirBnBs. We then categorized the levels of occupancy found in section 5.2 based on what second homes at each level were most likely used for.

6.3 Results

6.3.1 Percentage of Occupied Second Homes Registered as AirBnBs

By using our updated count of occupied second homes, we determined how much of the second home stock was used as AirBnBs. We found that 4,881 (45%) of occupied second homes were registered as AirBnBs.

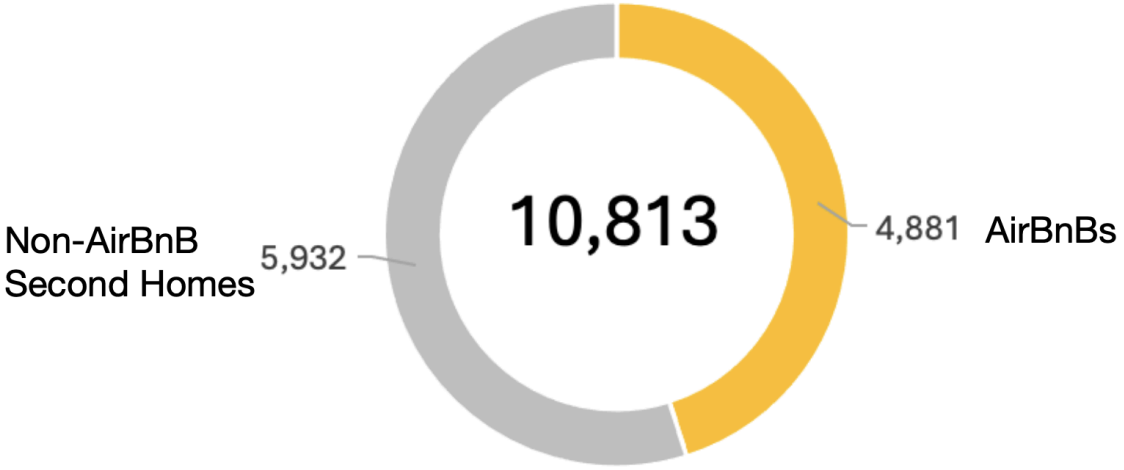

Figure 20: Second Homes Listed on AirBnB.

By mapping the AirBnB data from Geoportale, we created a map based on the AirBnB location within the city. Unsurprisingly, the majority of AirBnBs were clustered around the center of Venice.

Figure 21: Location of AirBnB's Registered in Venice.

6.3.2 Usages of Second Homes at Different Levels of Occupancy

6,144 (44%) second homes were occupied for 0-4 months. We categorized these homes as personal vacation homes based on their low water consumption. 1,282 (9%) second homes were occupied for 4-6 months, these homes were most likely used by tourists or seasonal workers. Because our water consumption data gave us a monthly average, it is not possible to distinguish between a home used by a seasonal worker and one usd by tourists as the water consumption of both is similar. We can however distinguish who is not using these homes. Since students and residents rent for longer than 4-6 months, we could safely say that

they did not fall in this range of occupancy. 580 (4%) of second homes were occupied for 6-8 months out of the year. This was the range where we expected to see student rentals, in addition to tourists and seasonal workers. 5,822 (43%) of second homes were above 8 months of occupancy. This level of occupancy was too high to be used by students or seasonal workers, but made sense for second homes rented to residents or rented year-round to tourists.

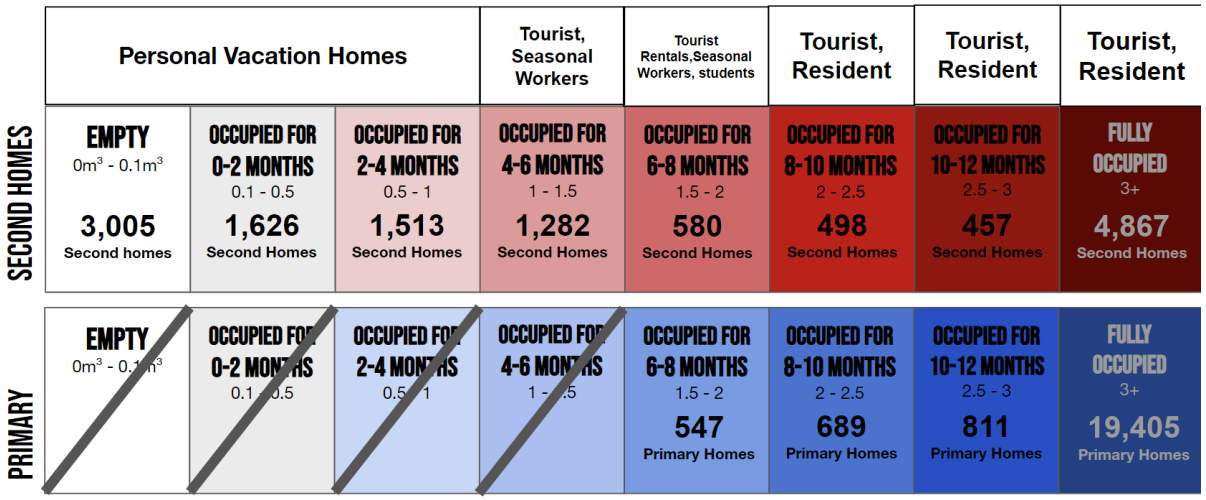

Figure 22: Primary and Second Homes by Number of Months Occupied with Usages for Second Homes at Different Levels of Occupancy

6.4 Conclusions

45% of occupied second homes are AirBnBs, leaving 55% percent of second homes available for students, seasonal workers, and residents to rent. Given that 56% of all second homes could be used for tourists, the true percentage of the second home stock available to non-tourists may be lower than 55%. This analysis demonstrates how small the non-tourist rental housing stock is. This already small stock of homes is competed for by three groups, which is likely a part of the huge resident population decline seen in Venice.

6.5 Recommendations

Future groups should strongly consider conducting interviews with second home owners to understand first hand common motivations of owning second homes. Interviews would allow for more detailed categorization of second home usage.

Using rental contracts registered with the city of Venice would also improve the accuracy of these findings. By knowing where all of the rental homes are, the water consumption data would be a lot more valuable as we would know for certain which homes are rentals.

7 Overall Conclusions and Recommendations

We found that of the 35,280 homes we analyzed, we found 10,813 (30%) of them were second homes. This number was higher than suggested by the tariff categories our water usage data contained. We found that 1,961 homes that were listed as primary did not consume enough water to be occupied for more than six months, a requirement for a home to be considered primary. Many datasets, particularly those not based on any physical measurement are at risk of similar discrepancies. Numbers of primary and second homes used by the city of Venice may be inaccurate and should be assessed.

69% of second homes were occupied for less than 6 months out of the year, showing us that the majority of second homes are not being rented to residents of the city. 56% percent of the second homes in the city could be used by tourists based on their water consumption, shrinking the already small stock of homes that could be used for non-tourist rentals. Of all occupied second homes 45% of them were registered as AirBnBs. Our findings paint a bleak picture of renting for non-tourists, where students, seasonal workers, and residents must compete with each other over a small portion for the available rental stock.

Our findings were based primarily on a water consumption dataset which gave us averages for a whole year. What we have seen from this rough data is worrying, but future groups should seek more precise data sets to create a more accurate picture of how Venice's second homes are utilized. We would also recommend other groups examine other utility data such as electricity to compare with our findings from water usage. Examining the water consumption from 2020 would also yield interesting results due to the COVID-19 pandemic leaving most tourist rentals empty.

Overtourism has damaged the physical and historic aspects of Venice, and the utilization of the city's housing stock has accommodated tourism while leaving non-tourist renters by the wayside. Creating programs and incentives to encourage second home owners to rent to non-tourists would be a good first step on the path to providing housing to the residents of Venice.

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Appendix

Veritas Water Data
Telco Phone Data