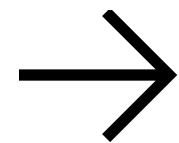


VENICE SOCIO-ECONOMIC DATA REPOSITORY



A COLLECTION OF
DATA AND
VISUALIZATIONS
CREATED FOR
RESEARCHERS AND
RESIDENTS
THROUGHOUT
VENICE.



ADVISORS

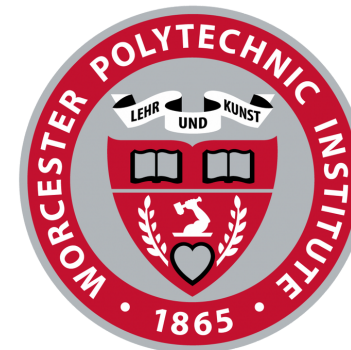
Professor Fabio Carrera
Professor William Michalson
Professor Ingrid Shockey

COLLABORATORS

Filippo Rossi
Dario Bertocchi
MIT Overtourism Team

Throughout this booklet you will find QR codes that, when scanned, bring you to the specific pages on our online data repository that display an interactive version of the specific graph or graphs that you are currently looking at in the booklet.

SMARTDEST



WPI

ABOUT THIS BOOKLET

This booklet summarizes the results of research conducted in the fall of 2021 on the root causes of depopulation in the historic city of Venice. An analysis of a variety of datasets from different sectors of Venetian life allowed us to identify different trends and draw conclusions to explain Venice's loss of population.



SMARTDEST PROJECT

THE GOALS



Identify **social exclusions** and mobilities due to **over-tourism** by conducting research and gathering relevant data



Study the possible **causes** of **exclusion** and **hypothesize** possible **solutions**



Propose shared **corrective policies** to mitigate the impact

8

Case study cities founded by an EU Horizon grant

Amsterdam

Lisbon

Barcelona

Ljubljana

Edinburgh

Turin

Jerusalem

Venice



This project has received funding from the EU's programme HORIZON 2020 under the Grant Agreement no. 870753.

SMARTDEST



CITIES AS MOBILITY HUBS:
TACKLING SOCIAL EXCLUSION THROUGH
'SMART' CITIZEN ENGAGEMENT

SerenDPT: A VENICE CASE STUDY

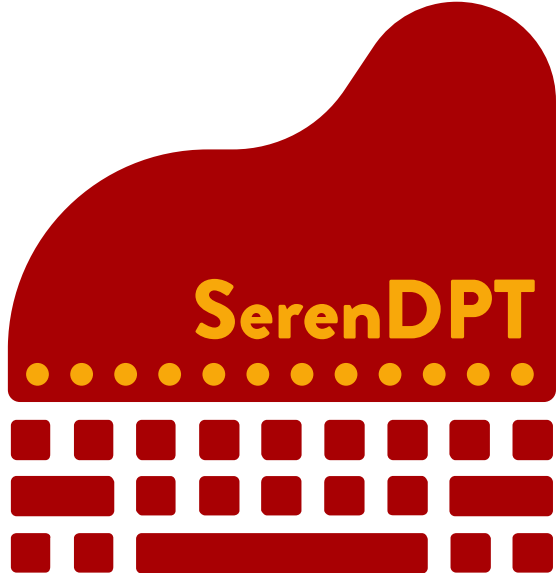


SerenDPT leads SmartDest's Venice case study focusing on resident exclusion.



Focusing on exclusion of residents due to

-  **Job diversity**
-  **Housing**
-  **Mobility**



SerenDPT, is a "benefit corporation" that focuses on developing Venice through **research, technology,** and creating technology related **jobs** in Venice.





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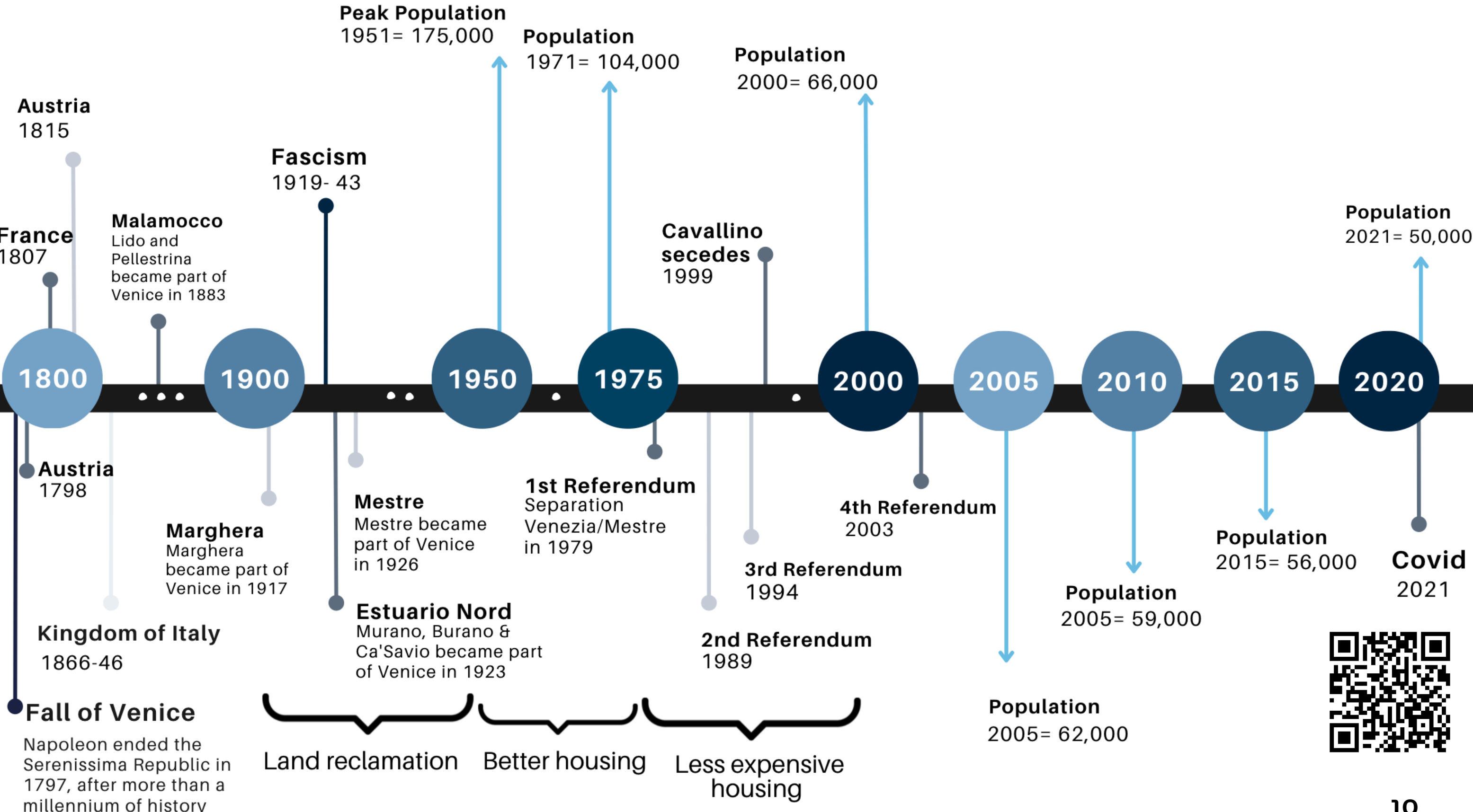
35 Mobility





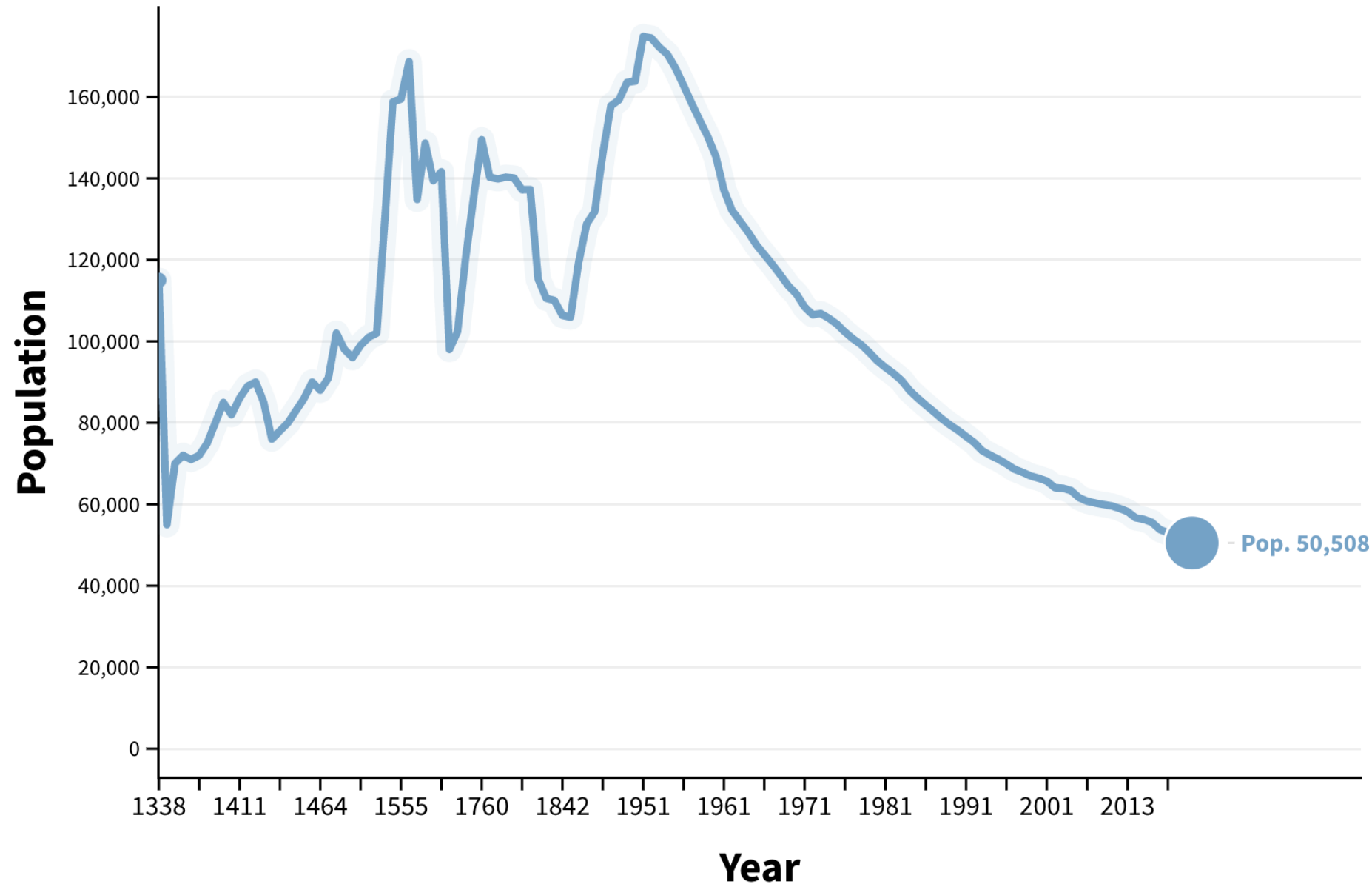
DEPOPULATION

POPULATION OF VENICE HAS BEEN AFFECTED BY MAJOR HISTORIC EVENTS



POPULATION DECREASE IN THE HISTORIC CITY OF VENICE

The population of Venice has fluctuated greatly throughout history with numerous peaks and sharp declines. The most recent of these fluctuations started over 70 years ago when the population peaked in 1951 at 175,000 residents. Since then over **two-thirds of Venice's residential population has left the historic city**. There are many factors at play that have influenced residents and their decisions to leave the city. To further understand these factors we had to first understand the elastic nature of Venice's residential population.



In the past, the **population has rebounded after each major decline**, so the main question is whether the population **will rebound after decreasing** so steadily for so long.

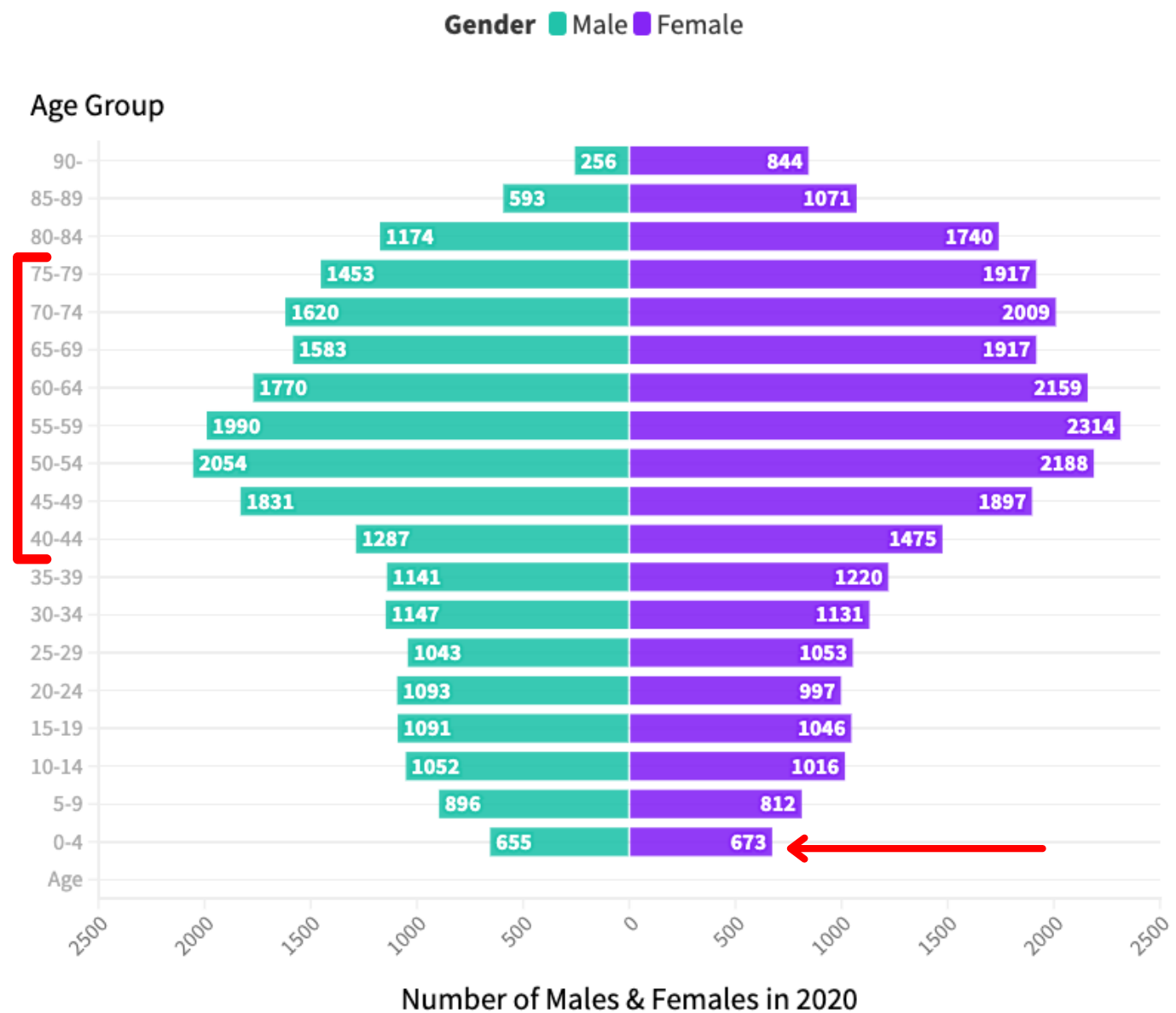
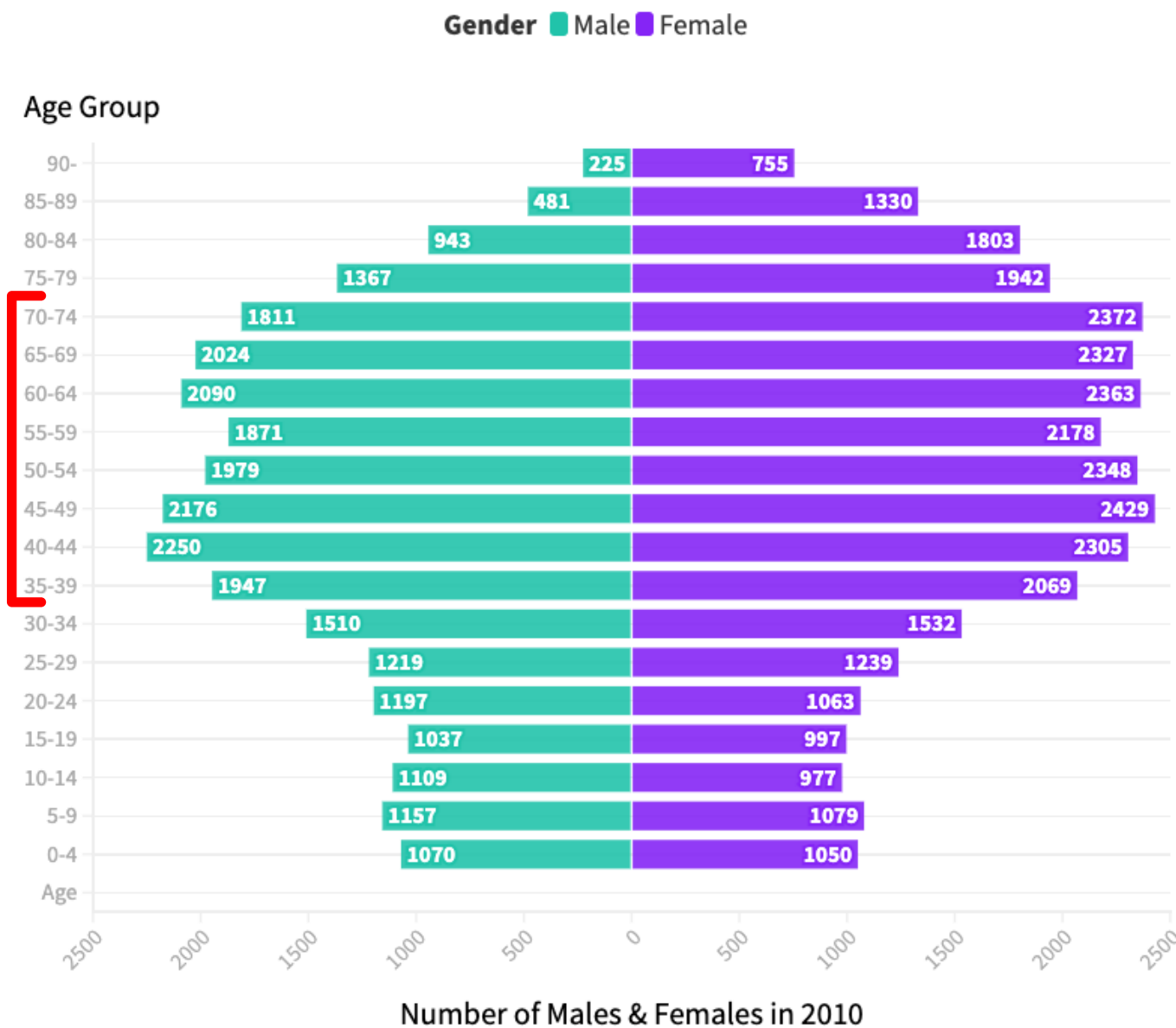
Each of the sharp declines in population in depicted in the graph to the left came as a result of some major event. Whether it be a **plague**, or a **regime change** there has always been an event associated with these declines. The timeline on the previous page shows major historic events that have resulted in variations of the population

However, this is where this population decline is different. There **does not appear to be any major catalyzing event** that resulted in the mass exodus of people from the city. The absence of such an event indicates that there are a **number of smaller factors** that are driving people away.



VENICE'S POPULATION IS AGING AND NOT REPLENISHING

The population pyramids below depict a **constrictive population** in the historic city. It shows a population that is **increasingly elderly** and **lacking in youth**. When comparing the graphs from 2010 and 2020 it is clear that the population is **getting older** and that the **birth rate on the city is declining**. If this continues, the **population in the city will continue to decline** as the **older residents die** and there are **not enough births to replace them**. According to these graphs it appears that Venice is **not on track for a natural population rebound**.

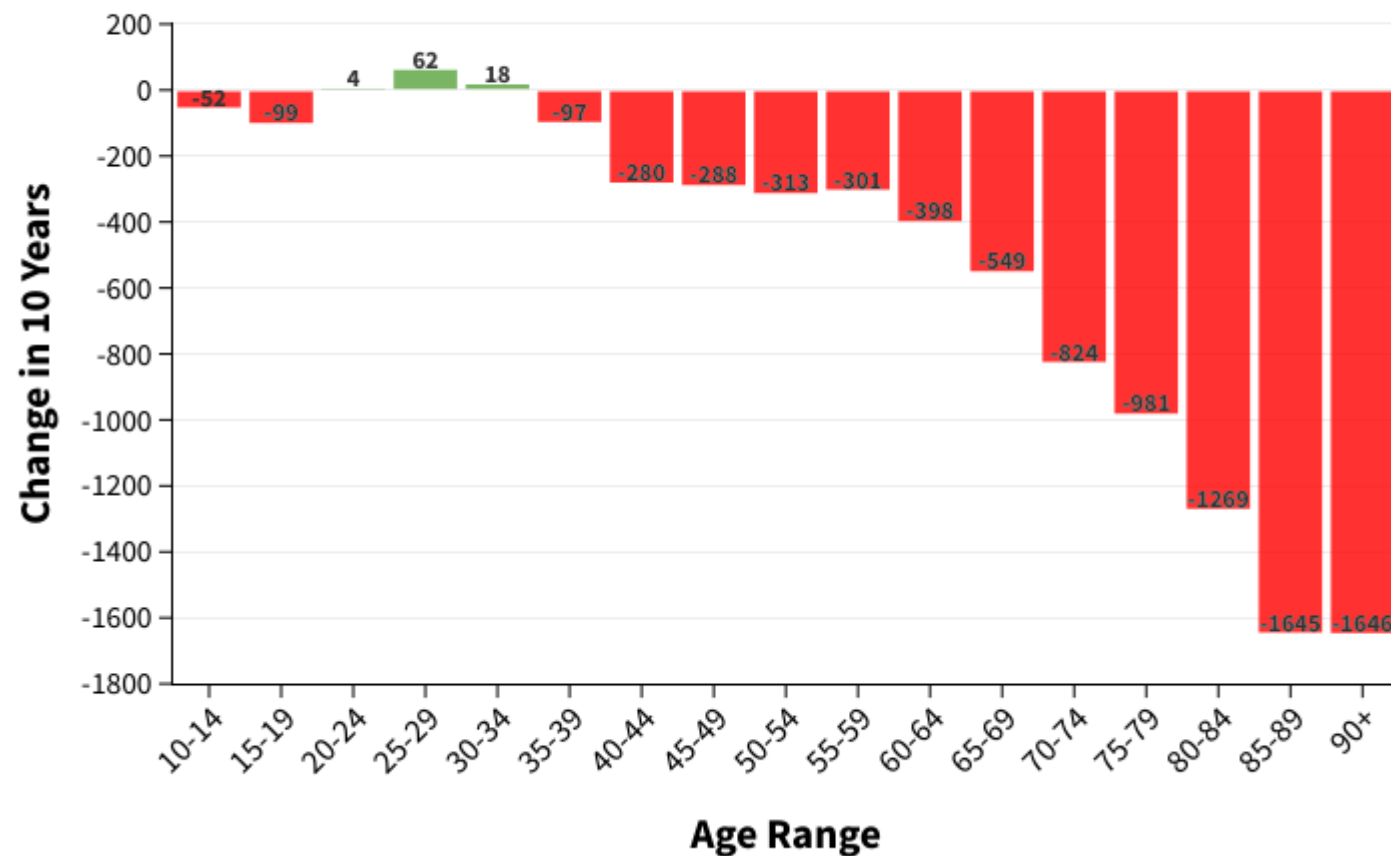


VENICE IS ATTRACTIVE FOR COLLEGE-AGE OUTSIDERS BUT UNSUSTAINABLE FOR WORKING-AGE ADULTS

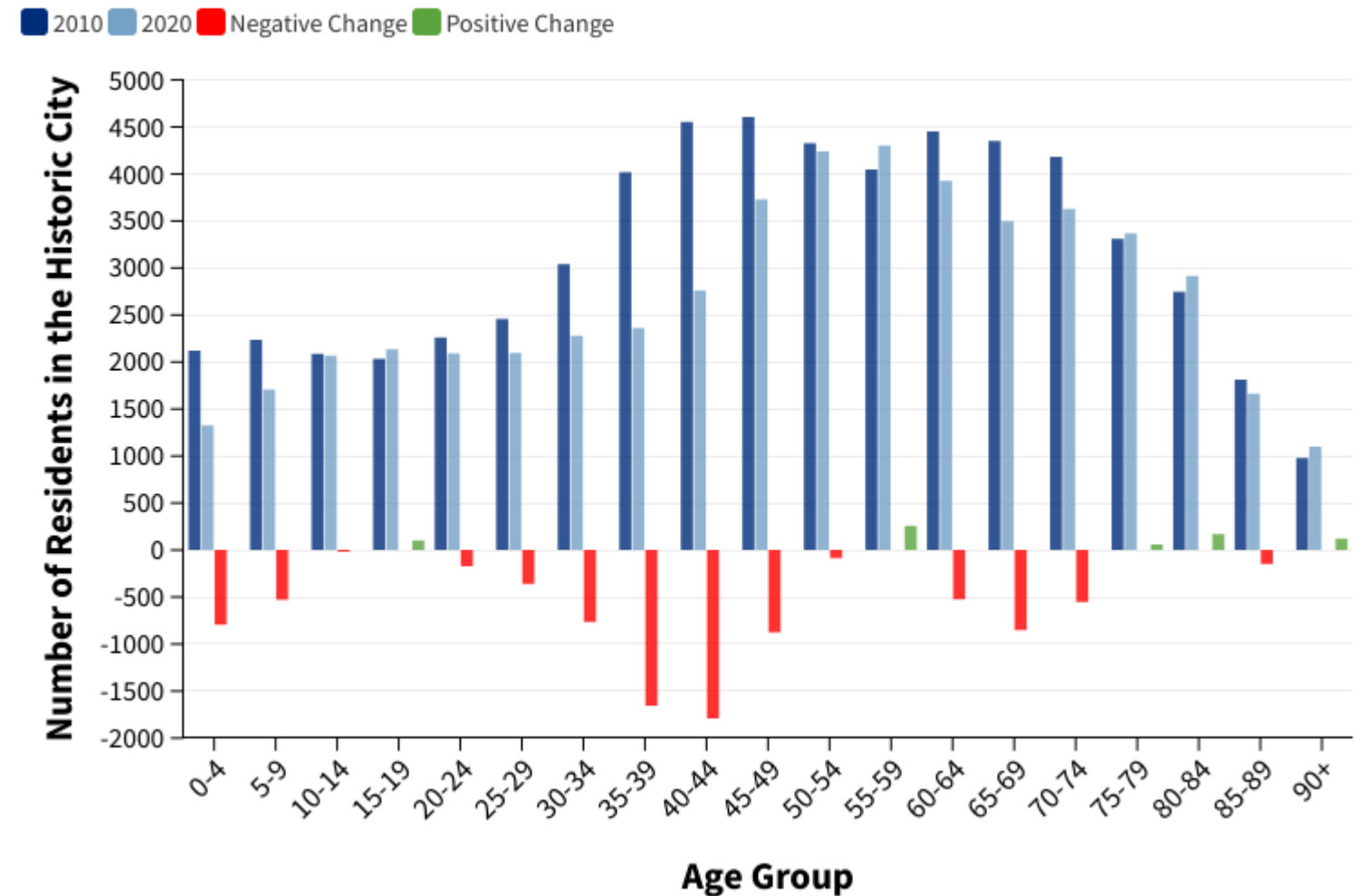
The chart above shows, that the only **age groups that grew** between **2010 and 2020**, were the **20–35 year olds**, who were the 10–15 year olds in 2010. This positive change demonstrates the attractiveness of Venice for college-age students. The largest **positive change** has a peak of **62 young adults**, aged 25–30. These may be former students who managed to remain in the Historic city and move their official residence to Venice.

The other end of the chart shows that would-be residents in their 20's find it hard to remain in Venice since the exodus starts again by the time they are in their mid-30's and reaches a steady-state between 40 and 60 years of age, with an **average loss of over 300 residents in each age group**.

Generation Dynamics 2010-2020
Residential change in same-age groups after 10 years



Number of Residents by Age Group
With Percent Change(2010-2020)



Comparing the age groups at the distance of a decade allows the problem areas and defining times in life to really shine through. **Young professional graduates** are more likely to **find high paying jobs outside of Venice** and while they may commute for a while, the problems with transportation may eventually push them out of the city, closer to their job.

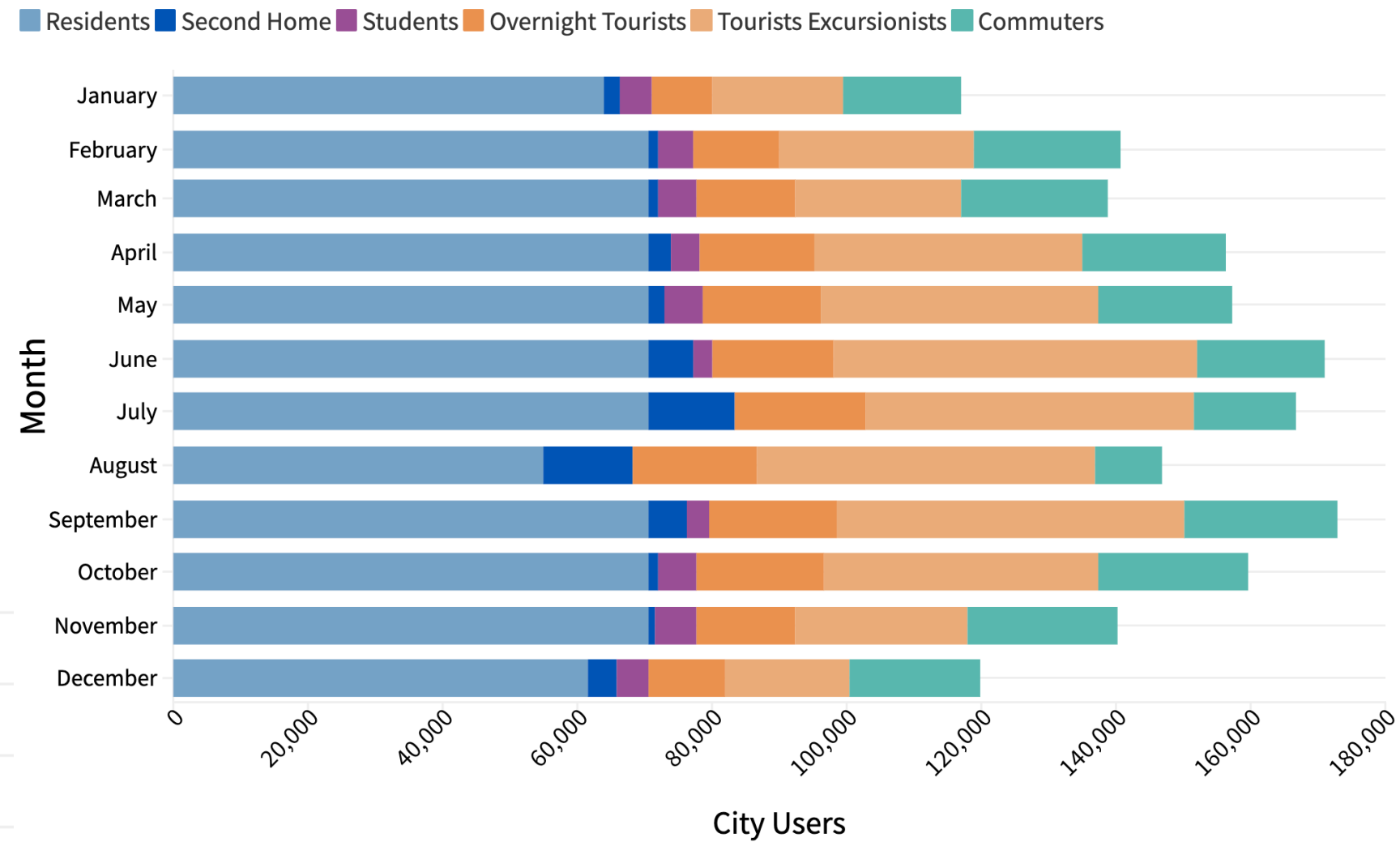
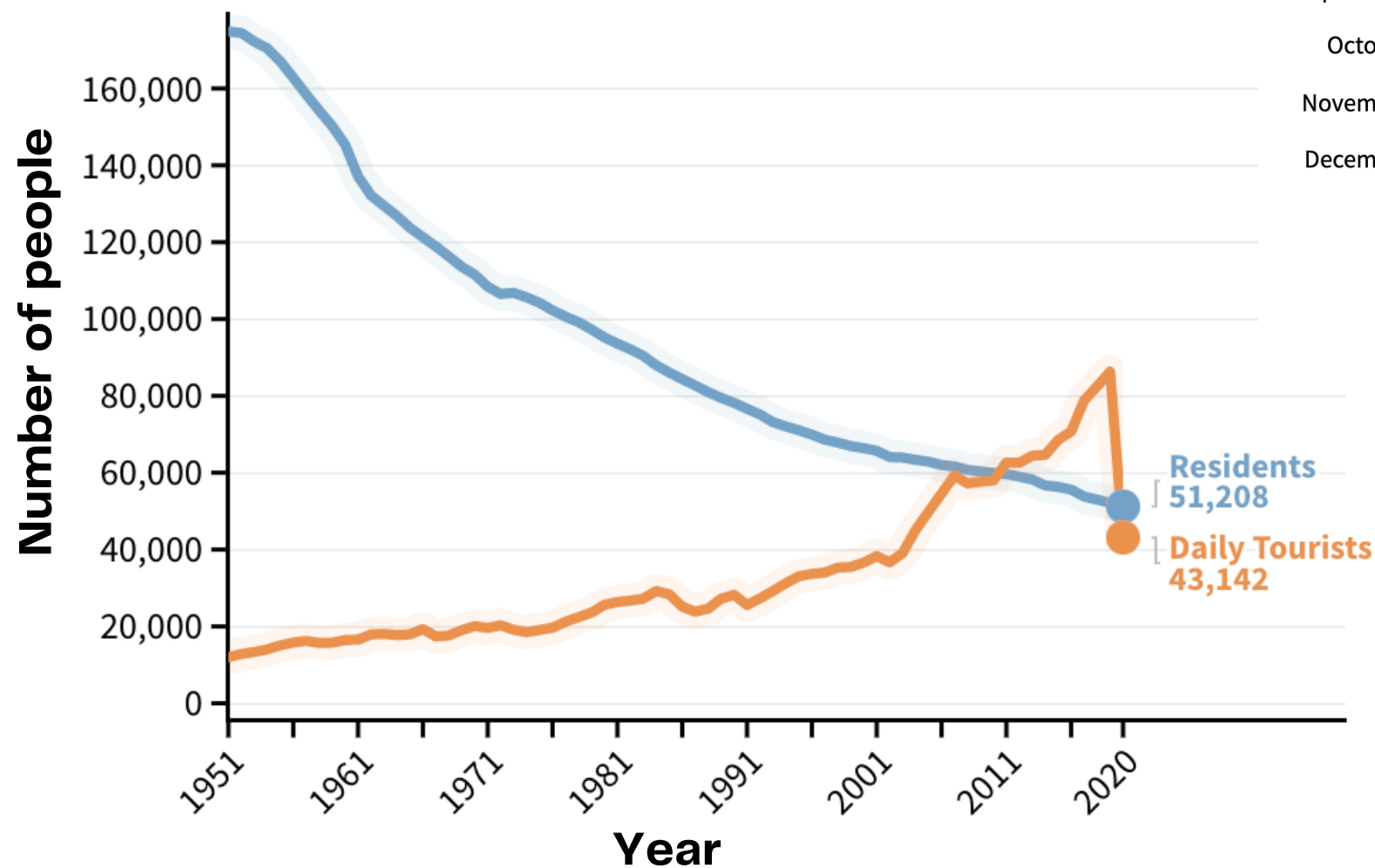
Additionally, changing family dynamics and the **need for better and larger homes** may also push residents to move off the island to cheaper accommodations on the mainland. All of these factors together allow us to explain the mass emigration.



TOURISM HAS INCREASED AS THE POPULATION DECREASED

Tourism is one of the world's largest economic sectors, creating jobs and opportunities in cities all over the world. However, left unmanaged, **tourism can grow unsustainably** and cause more harm than good to the visitors and residents.

Since the population peaked in 1951 it has **declined** steadily while tourism has been on the rise, more than doubling from 1999 to 2019. Before the COVID-19 pandemic put a halt to tourism growth, **daily tourists had surpassed the residents** and looked on track to continue to overwhelm the city.

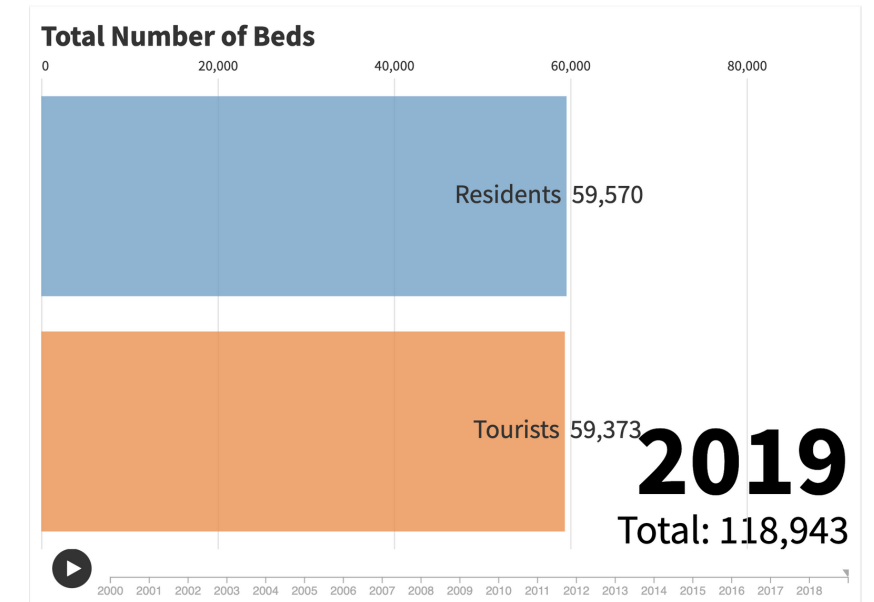
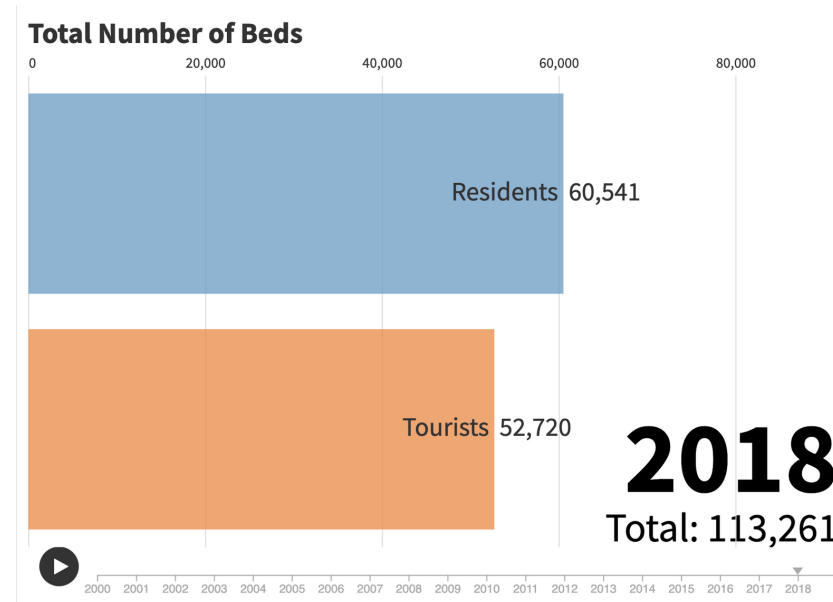
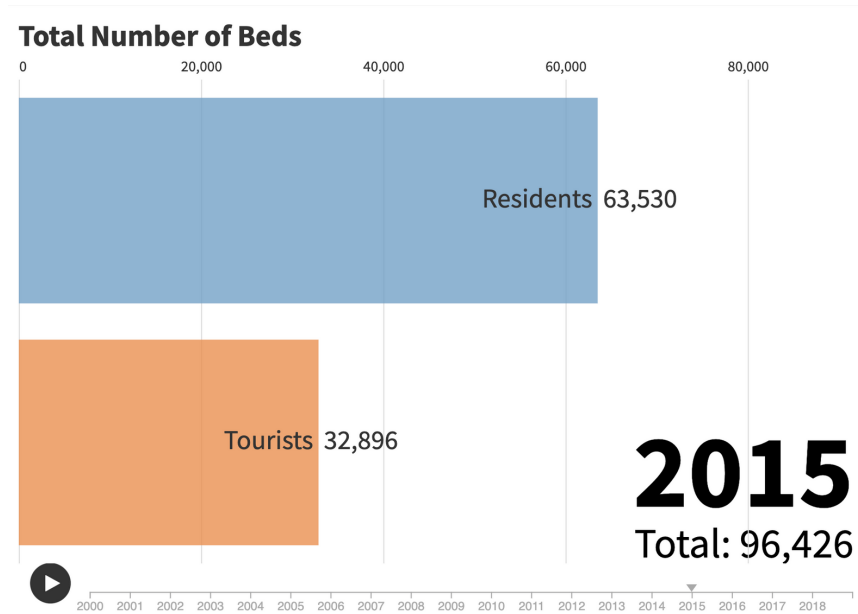
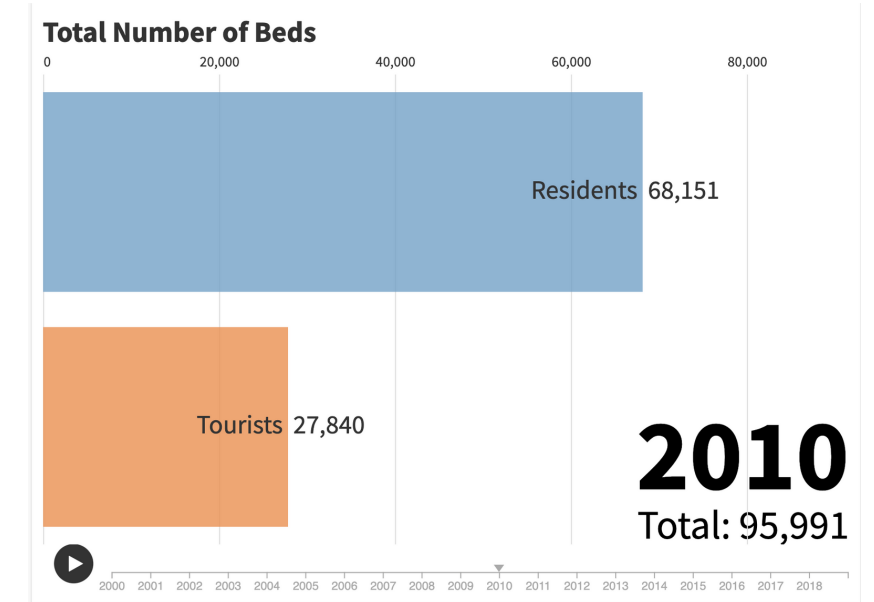
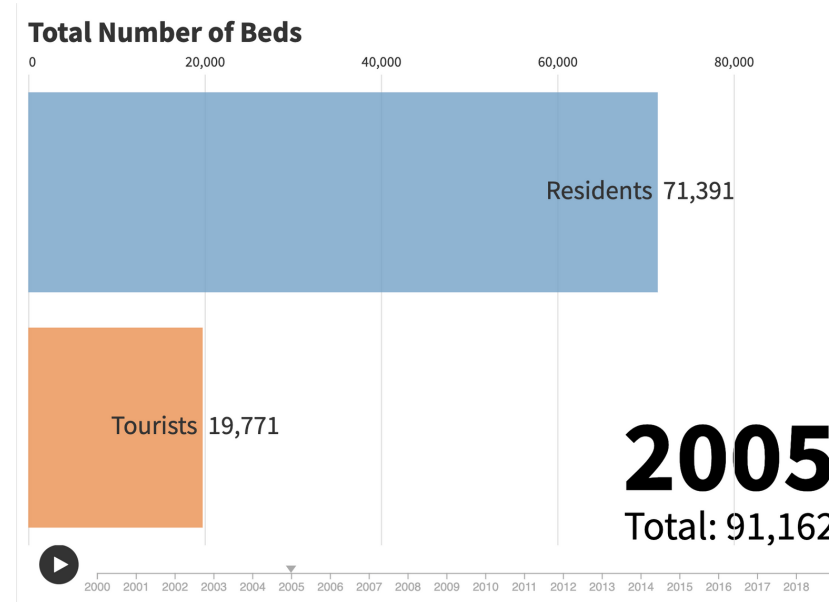
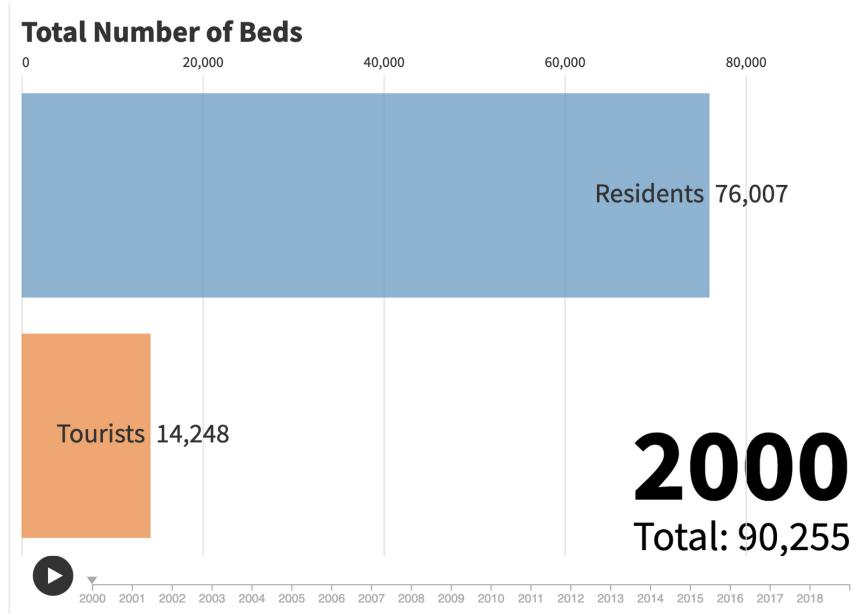


The graph above shows the different types of **city users** in Venice and how over the course of the year, the type and quantity of city users changes. In the summer, the amount of students decrease and that the amount of tourists increase.

Another important aspect is the fact that there is a **larger number of tourist excursionists**, compared to the number of **overnight tourists**. This is a negative aspect of over-tourism because, the overnight tourists spend more time in the city, therefore contribute much more to the Venice economy



NUMBER OF BEDS FOR TOURISTS EQUAL THE NUMBER OF RESIDENTS



The bar charts above demonstrate the increase of the total number of tourists beds compared to the total number of residents. According to the "Yearbook of Tourism" from 2019, a **tourist spends an average of €50–€200** each day when traveling to Venice; including both **accommodation** and **transportation**.

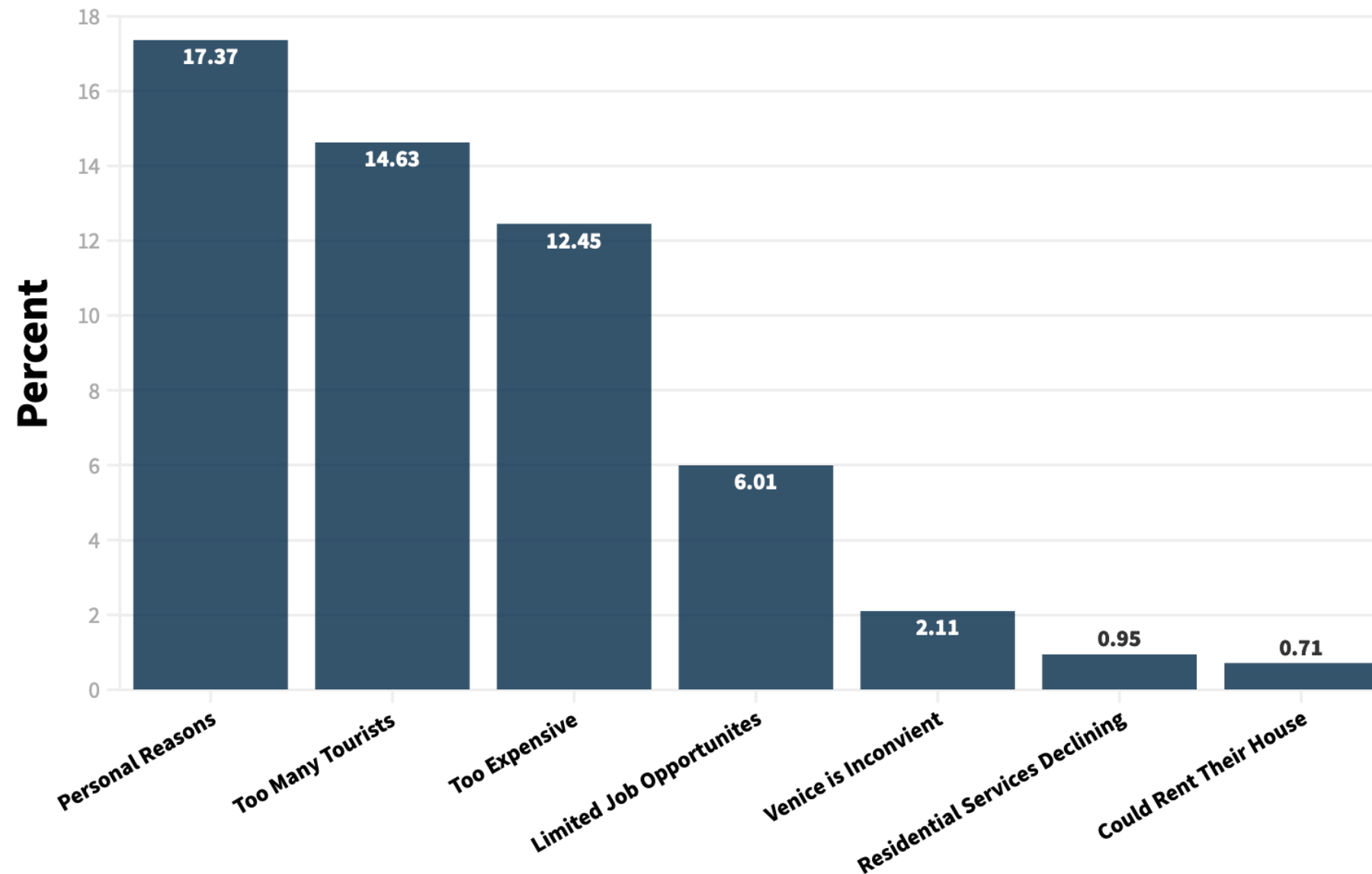


While these graphs show that the number of beds available for tourists is almost equal to the total number of residents, the residents are actually **outnumbered** daily when **students** and **excursionists** are included.



RESIDENTS NAME PRICE AND EXCESSIVE TOURISM AS REASONS WHY THEY LEFT THE CITY

■ Former Residents

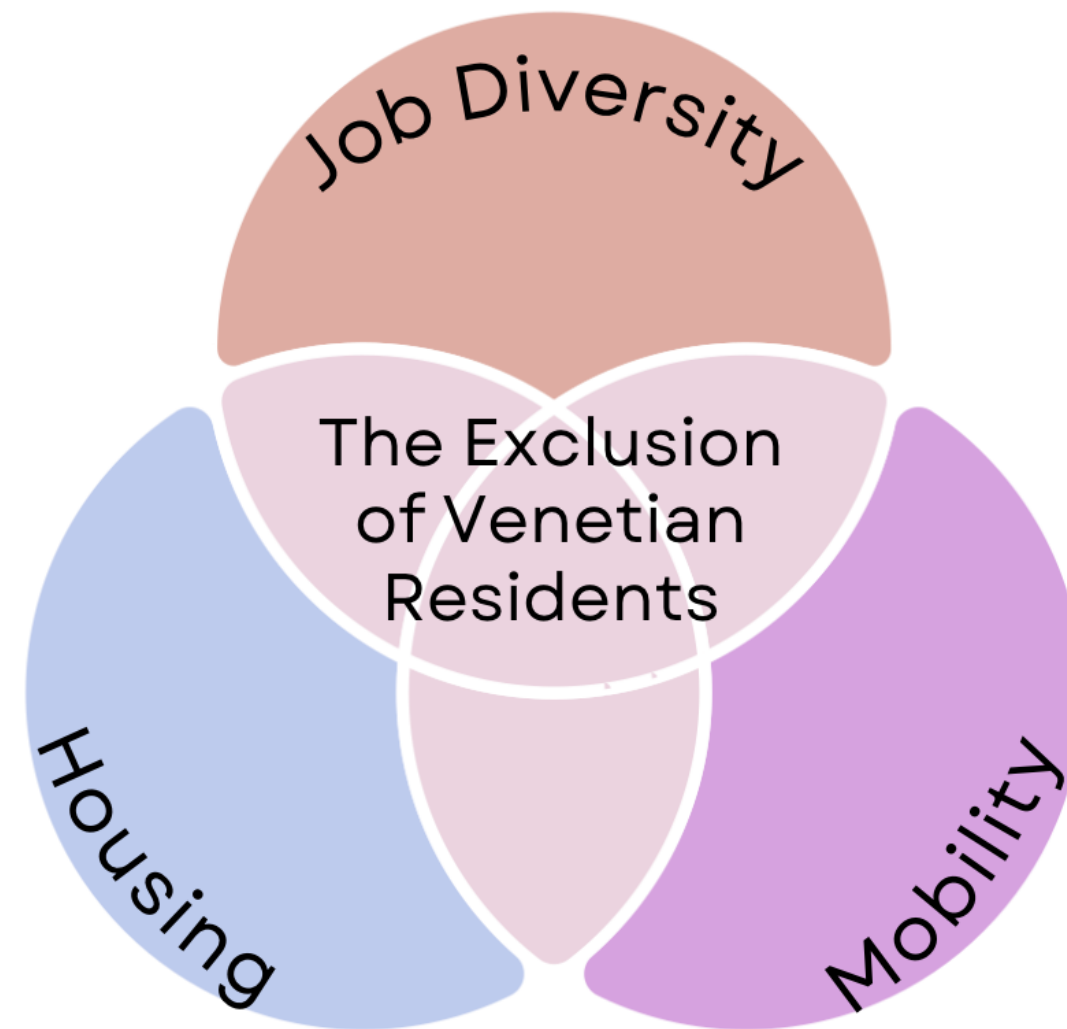


The inverse relationship of tourism and residential population might lead you to believe that overtourism is the cause of residential exclusion. While tourism does play an important role, **tourism is not solely to blame for the exodus of residents** from the historic city.

The diagram on the next page illustrates our findings of how these factors interact to **exclude residents from the city**, driving them away.

A recent survey was conducted to identify the reasons why former residents decided to leave the historic city. The most common response was "**personal reasons**" which are factors that are beyond the scope of our research. The next most common reasons that former residents cited, were that there were **too many tourists**, the city was **too expensive**, and that **job opportunities in the city were limited**. These three responses back up our decision to look into **housing, mobility, and job diversity** as major components of the depopulation of the historic city of Venice







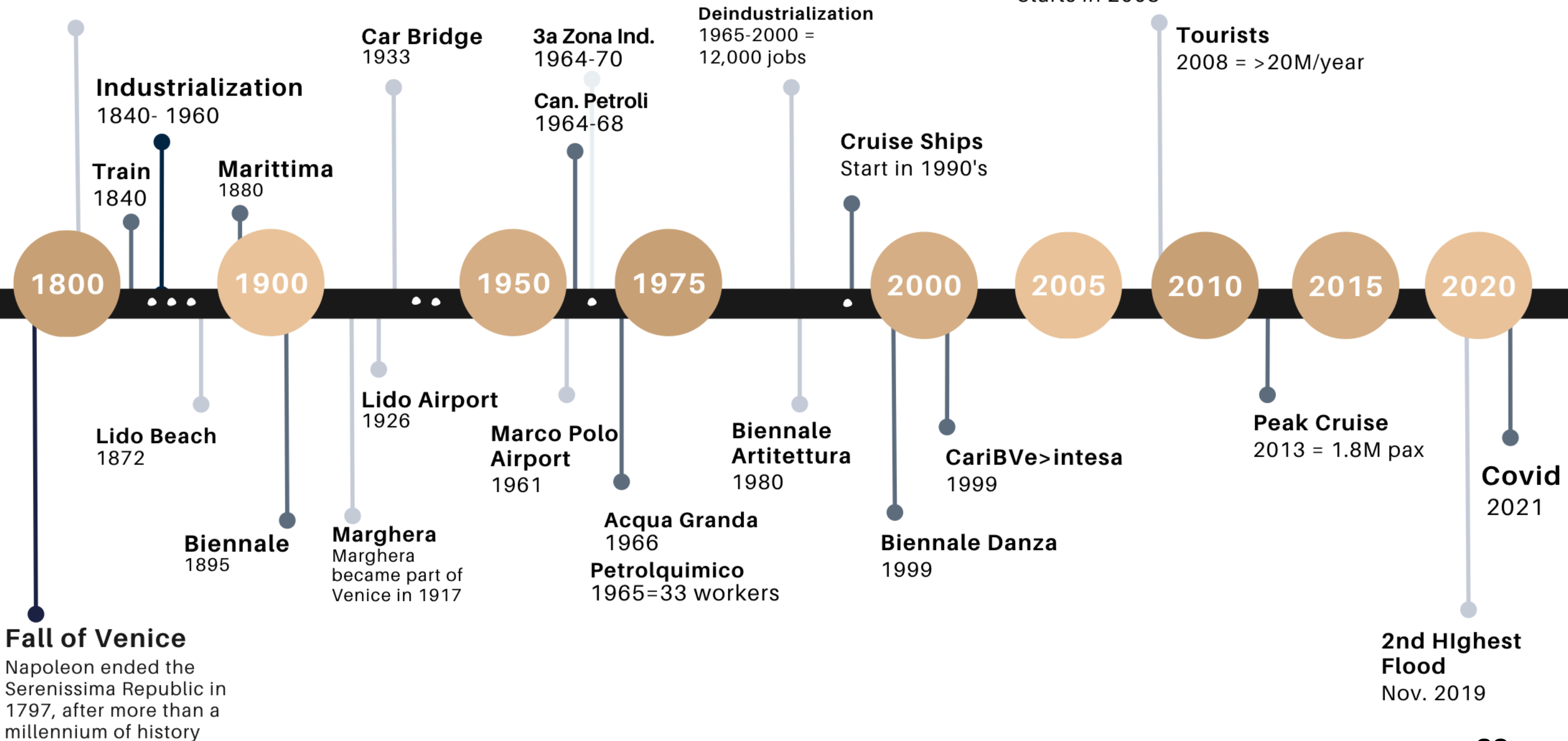


JOB DIVERSITY

FROM INDUSTRIALIZATION TO A TOURISM-BASED ECONOMY

Industrial Revolution

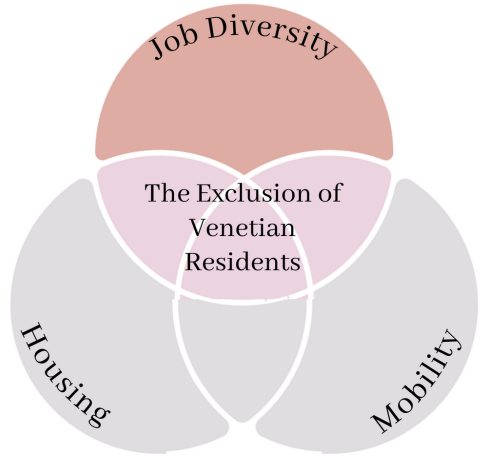
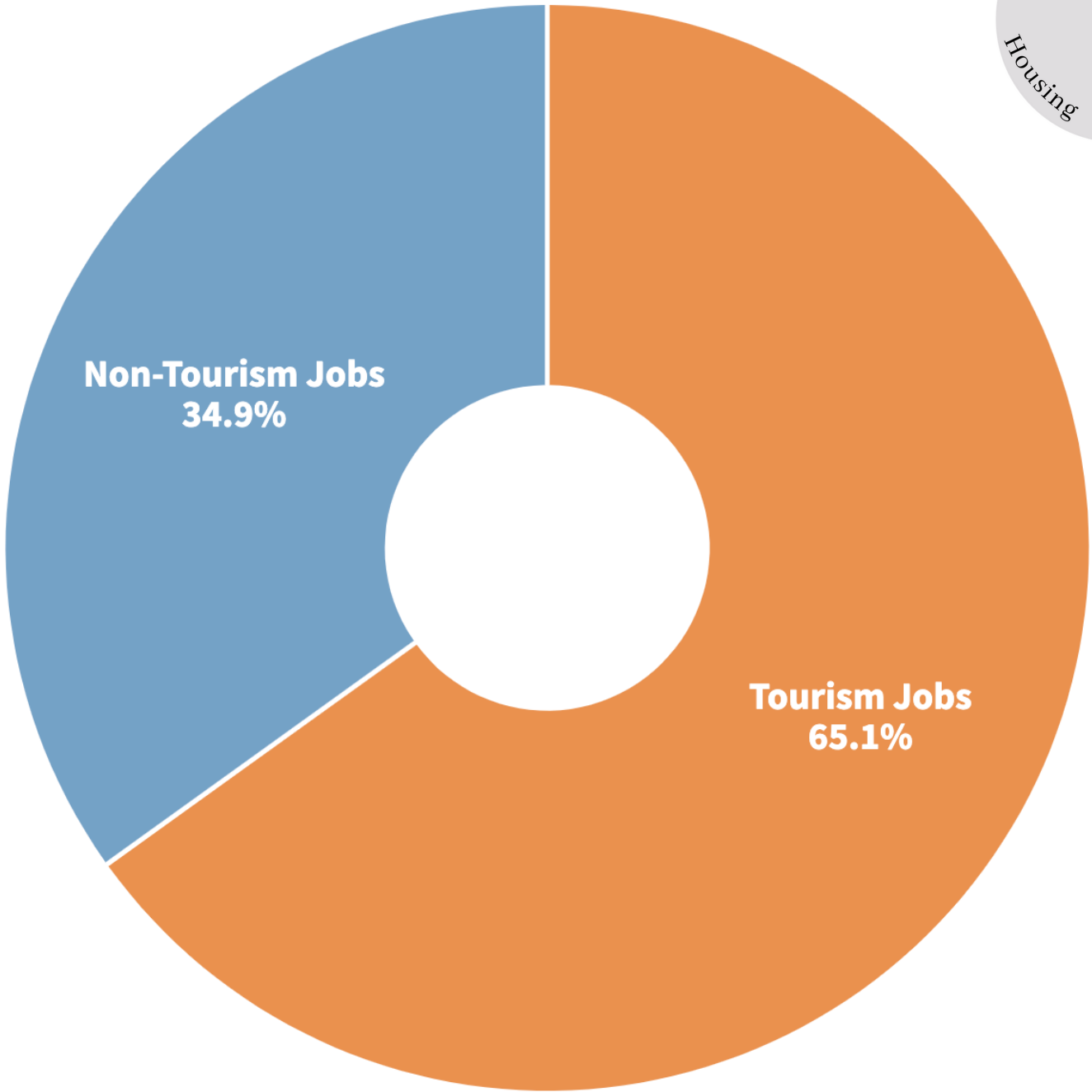
Austrians brought the train to Venice and started the industrialization of Giudecca, Murano and other parts of the city..



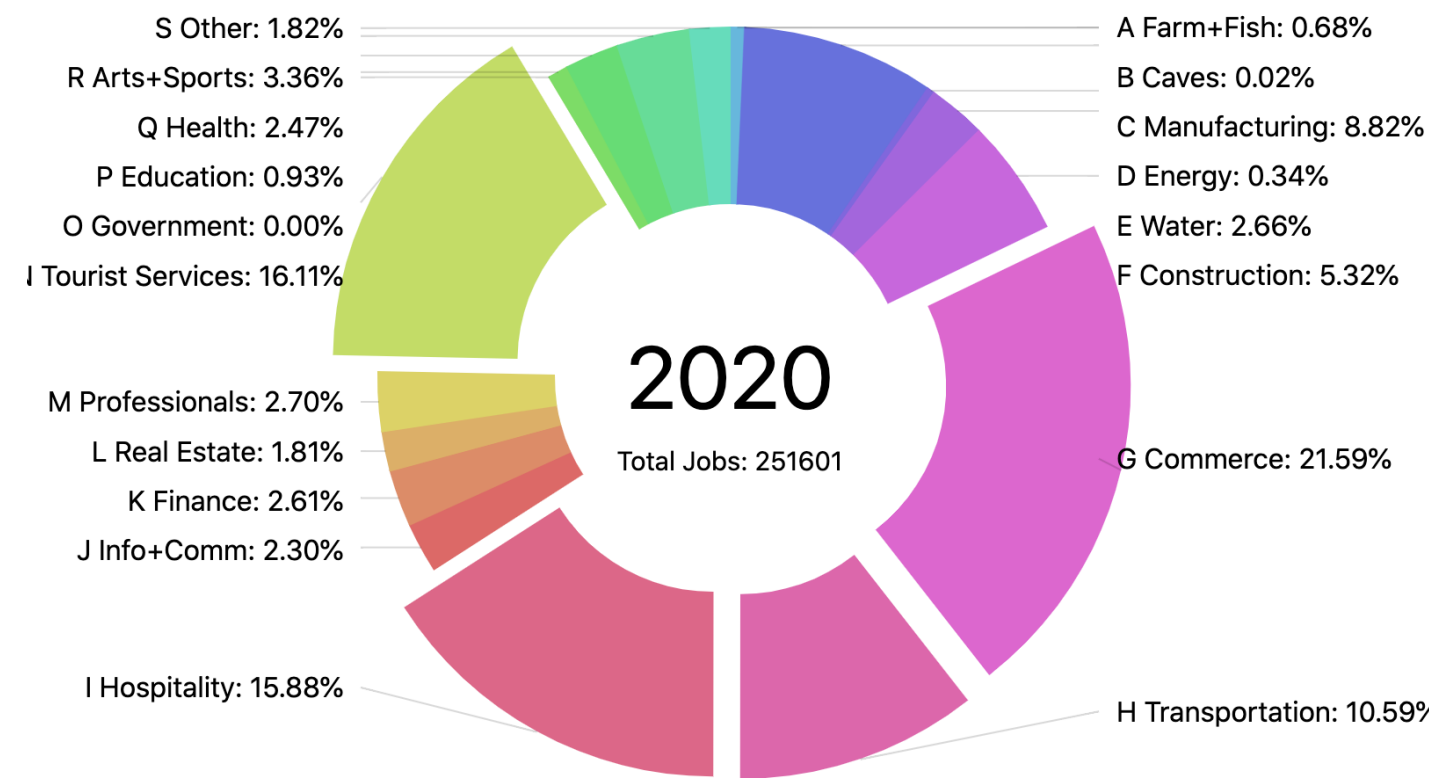
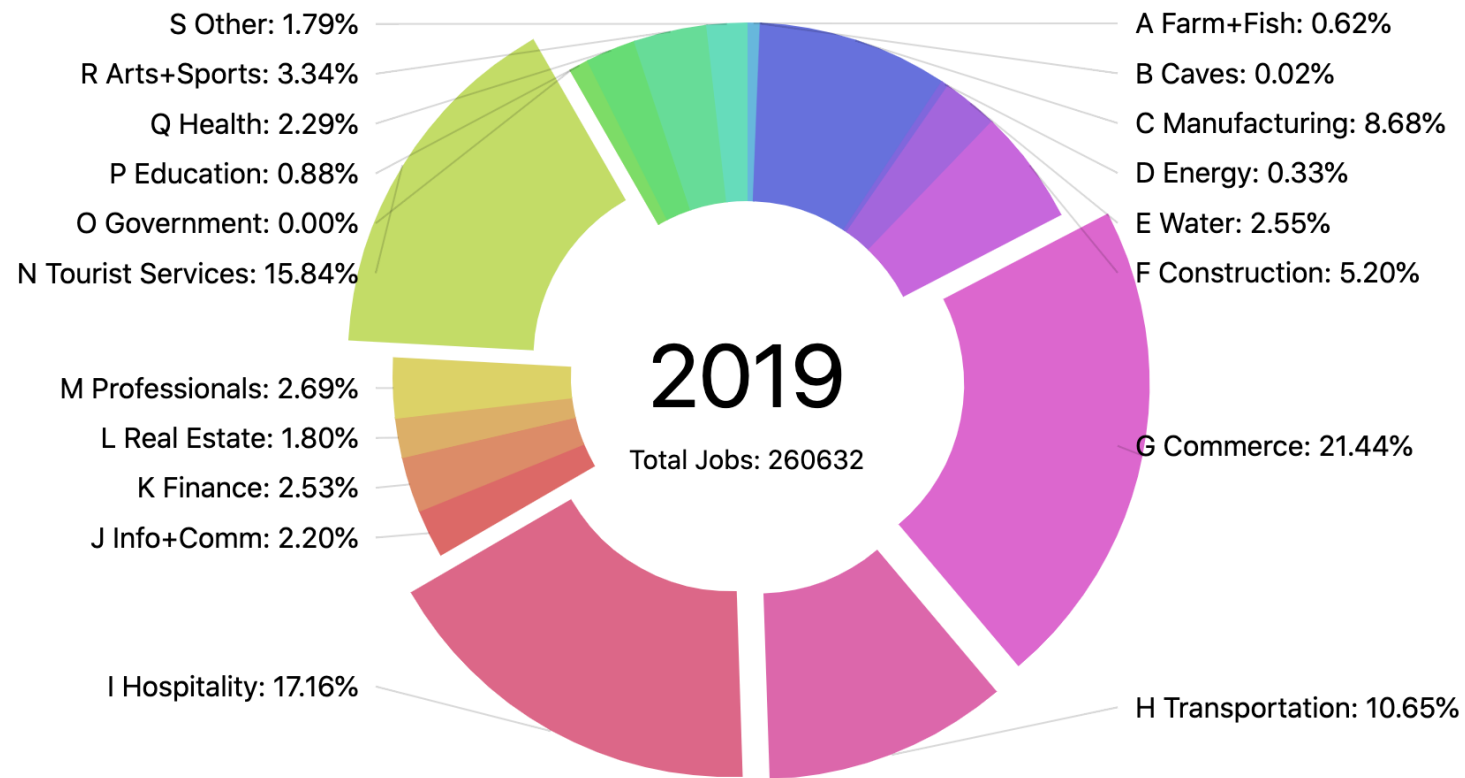
MAJORITY OF JOBS IN VENICE ARE RELATED TO TOURISM

Venice's economy has been shaped heavily around **tourism** in recent history. With nearly **two thirds of Venetian jobs** being linked to tourism in some form. Centering their economy around a single economic sector not only puts Venice at **risk of economic downturn**, but also **limits job prospects** and wages for its residents.

The timeline to the left depicts major events in Venice's history that have contributed to shaping the Venetian economy.



FURTHER BREAKDOWN INTO THE TOURISM-BASED ECONOMY



65.04% Tourism Jobs

64.17% Tourism Jobs

The doughnut charts above show the breakdown of the different job sectors in Venice and how tourism services dominate the Venetian economy. Each chart is split into 19 different sections which represent the different job sectors present in Venice. We classified **commerce, transportation, hospitality, and "tourist services"** as the sectors that are most linked with tourism. These sectors made up **65.04% of jobs** in 2019 and **64.17%** in 2020. The density of **tourism linked jobs** in the city **minimizes the opportunities** for jobs in **higher paying sectors**, like engineering or science. By displacing these jobs residents of the city must either **take a lower paying tourism job, or look to the mainland for greater pay.**



HIGH PAYING JOBS ARE SCARCE IN VENICE

Non-Tourism Related Career Salaries (per year)

Nurse – €46,017

Civil Engineer – €52,483

Software Engineer – €56,075

Pediatric Doctor – €113,317

Corporate Lawyer – €74,655

Average: **€68,509 per year**

Tourism Related Career Salaries (per year)

Chef – €31,777

Museum Guide – €16,586

Shop Clerk – €15,773

Youth Hostel Manager – €22,388

Waiter – €16,558

Average: **€20,616 per year**

While non-tourism jobs offer a comfortable yearly salary, it is clear to see that the tourism related jobs that make up much of Venice's economy may significantly less. Living off of the **average salary of €26,349 per year** makes living in the historic city considerably less feasible for residents due to the increasing cost of life and housing which we will discuss later.





HOUSING

€66K SALARY FOR AN AVERAGE HOUSE IN THE HISTORIC CITY

Average house in the historic city:	€480,000
20% down payment:	- €96,000
<hr/>	
Loan principle	€384,000
Interest rate	1.25%
Loan period	30 Years
<hr/>	
Monthly payment	€1,660

Monthly payment	€1,660
Payments per year	X 12
<hr/>	
Annual cost	€19,920
30% of income scale factor	X 3.333
<hr/>	
Minimum Salary	€66,400

In the historic city the **average 100 square meter home costs roughly €480,000** to buy. In order to purchase a house in Italy a prospective home buyer needs to present a **20% down payment** in order to finance a mortgage from a bank. In this case that 20% would be **€96,000**; a substantial amount that is difficult for many Venetians to save. That leaves a **mortgage principle of €384,000**, assuming record low interest rates of 1.25% and a 30 year loan term that would leave the buyer a **monthly payment of approximately €1,660**.

General consensus within the financial planning community states that people should spend no more than **30% of their gross income** on their housing. Twelve months of €1,660 monthly payments would cost the buyer **€19,920 each year**, and would require a **gross income of €66,400** to keep the monthly payment under 30%

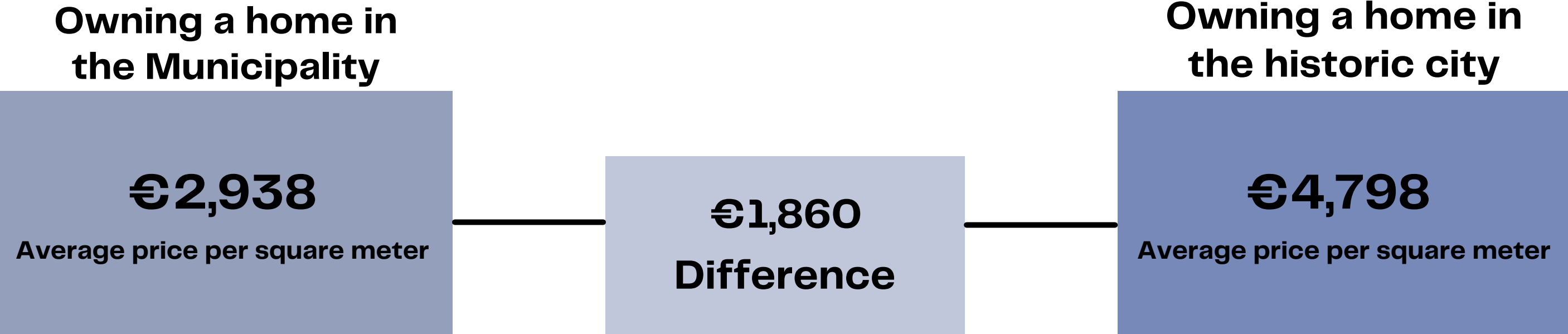
As previously mentioned the average salary in the historic city is only €26,349 so requiring a **minimum salary €40,000 more than the average** to afford the average house is indicative of a greater housing affordability problem in the historic city.

CHEAPER PRICES ON THE MAINLAND ENTICE RESIDENTS TO LEAVE THE HISTORIC CITY

As housing becomes increasingly **less affordable** inside the historic city Venetian residents looking to move out into the city have been **forced to look to the mainland areas** of Venice to find housing they can afford. As seen below housing in the historic city costs on average **€1,860 more** per square meter than it does on the mainland. Considering that the average residence in Venice is around 100 square meters, the **difference in price** ends up being around **€186,000**.

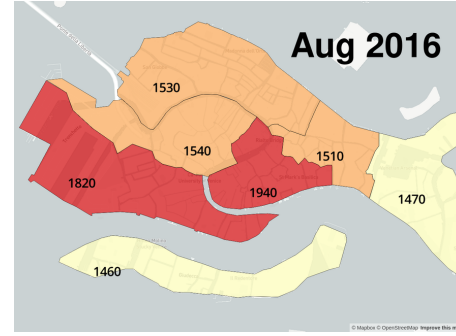
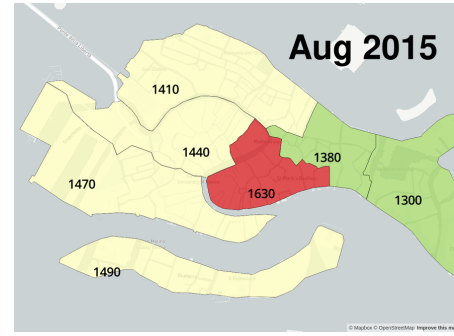
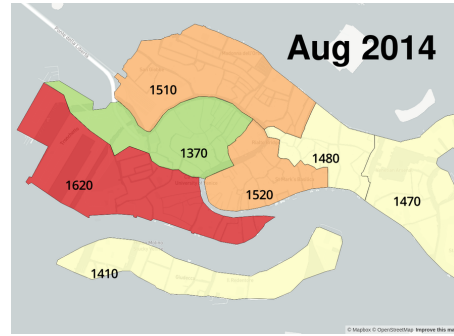
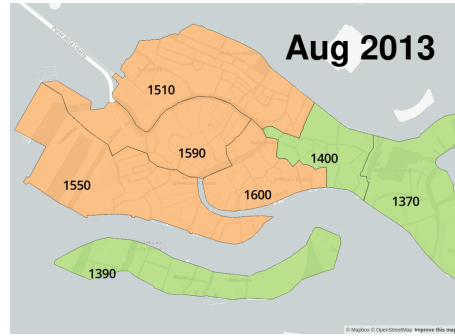
Using calculations similar to those on the previous page we can see that an **average house on the mainland costs around €300,000** and would require a **down payment of €60,000**. The mortgage on the residence would total €240,000 and assuming the same 1.25% interest rate over 30 years the monthly payment would be roughly **€1,060 each month**. Keeping the monthly payment under 30% of gross income would require a **minimum salary of €42,400 a year**.

This number is more feasible for those who work in the historic city as a couple who both made the average salary of €26,349 would easily be able to afford the average house on the mainland. The disparity between houses on the mainland and the historic city make it so the only viable option for workers in the historic city is to move out to the mainland; often with a partner to help subsidize the cost.

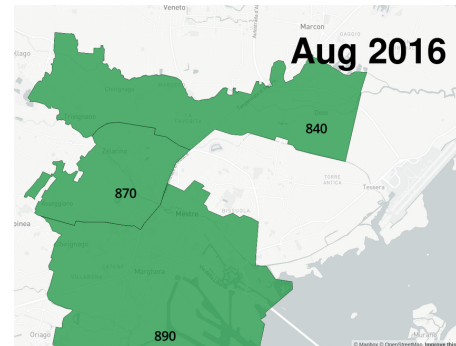
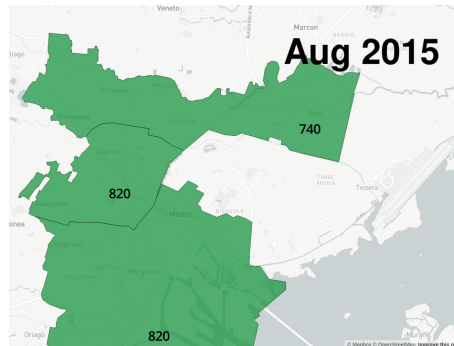
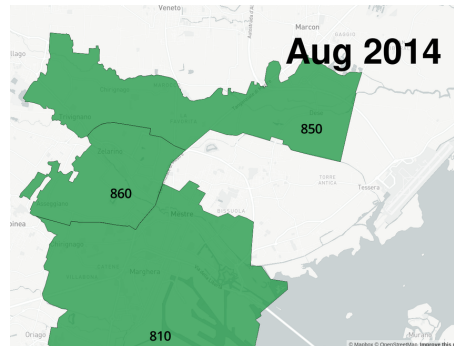
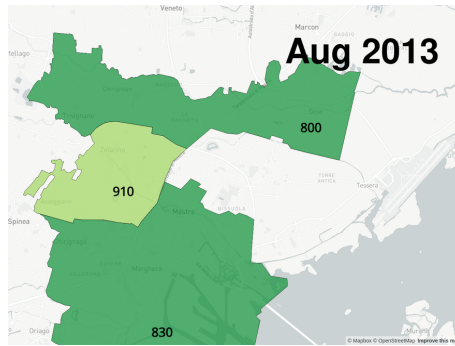


RENT PRICES

Historic City



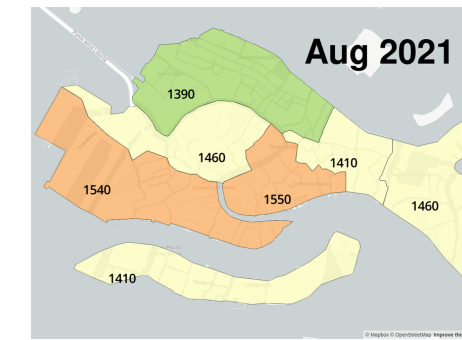
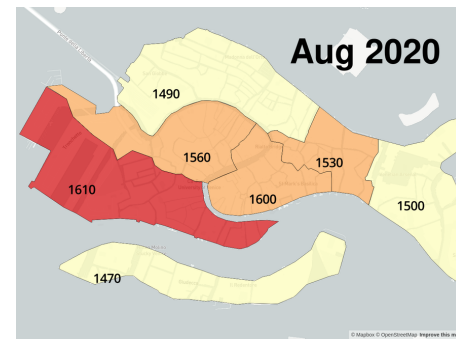
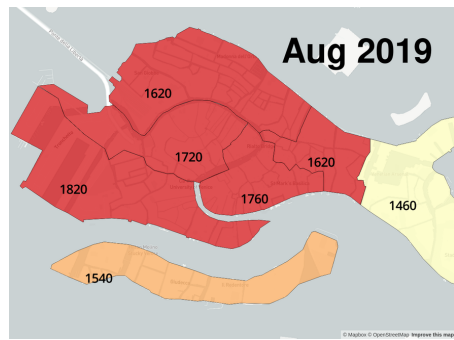
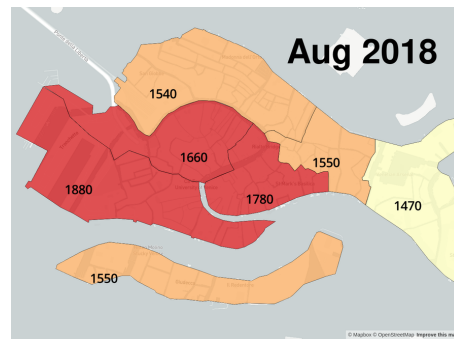
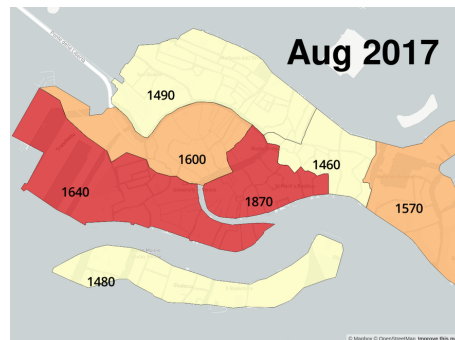
Mainland



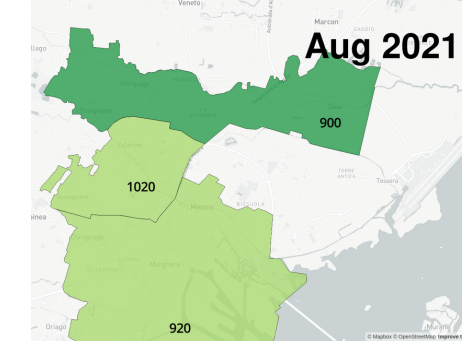
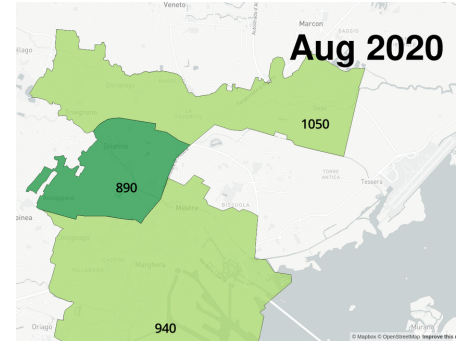
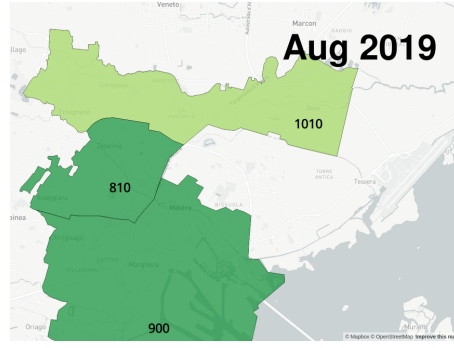
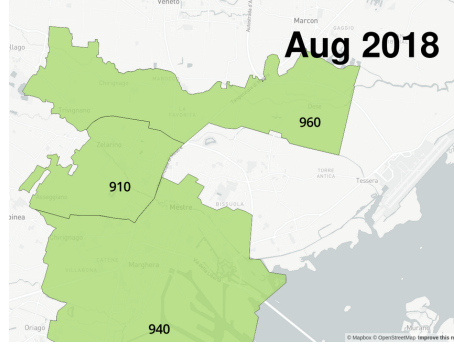
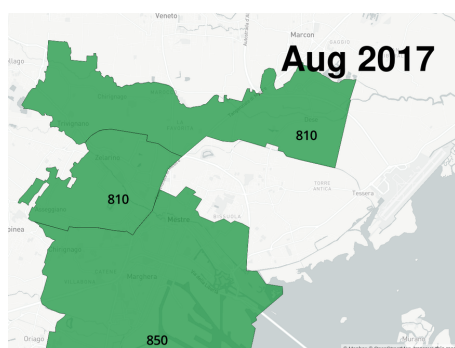
In this comparison of rental prices it is clear to see that rent prices in the historic city are **consistently greater** than those on the mainland. As the years go on, the different sestieri in the historic city change color from the lighter colors, that represent cheaper prices, to the darker red which represents more expensive rental prices. This happens until 2020 when the COVID-19 pandemic restricted tourism in the city and as a result rental prices decreased throughout the city

(These images depict the average rental price for a 100 square meter unit in each sestieri)

Historic City



Mainland



Rent Price (Euro):

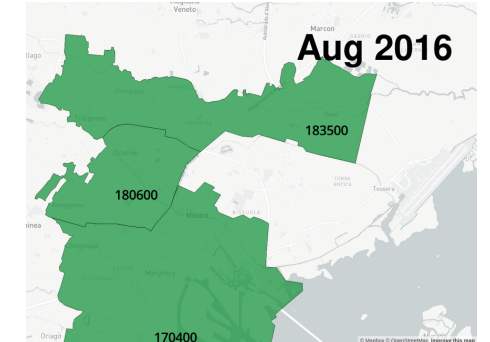
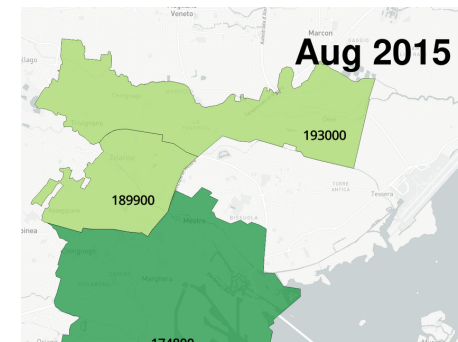
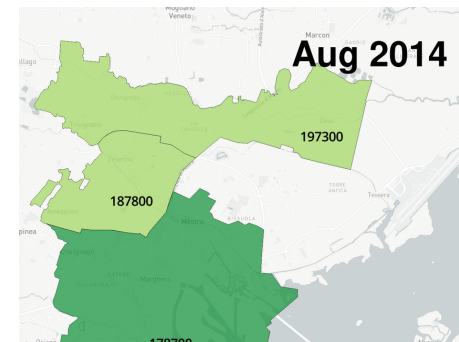
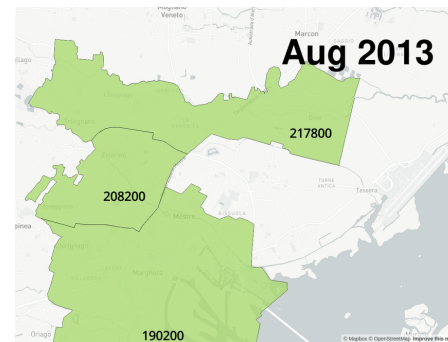
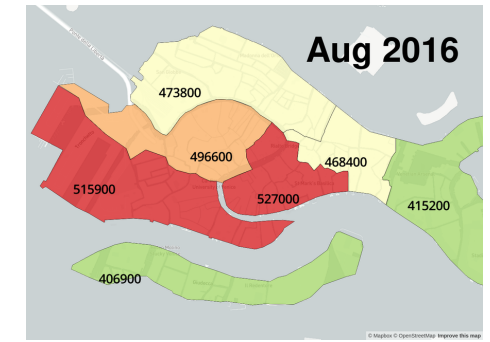
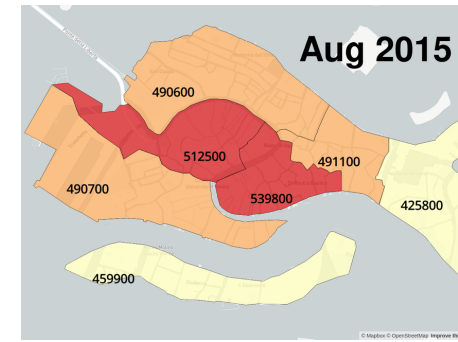
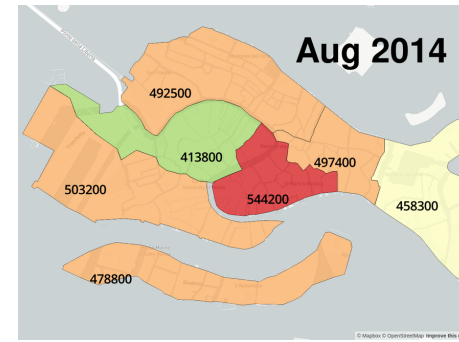
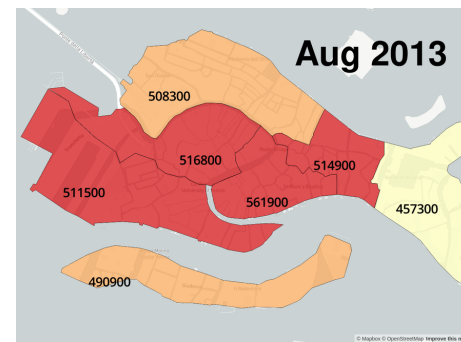
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- 910-1,409
- 1,410-1,509
- 1,510-1,610
- 1,610+



SALE PRICES

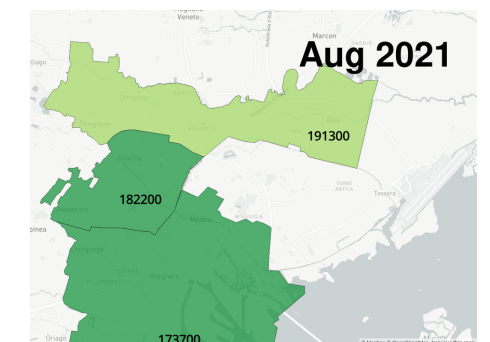
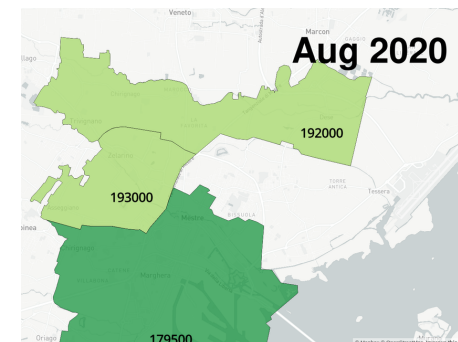
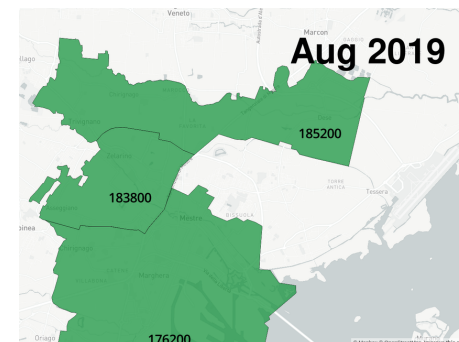
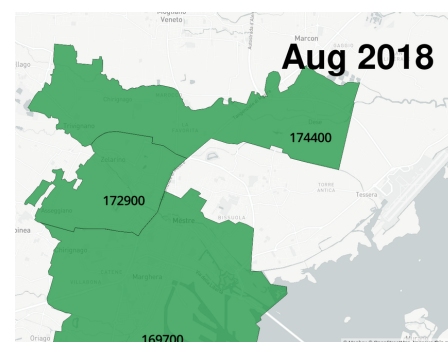
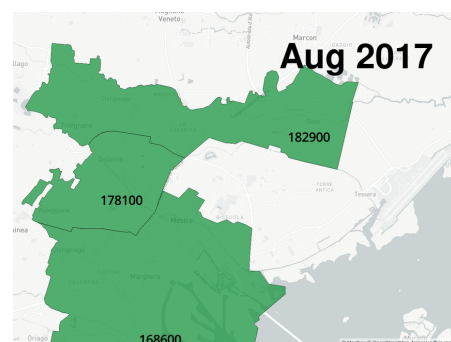
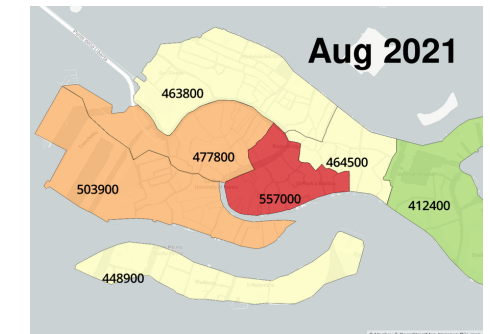
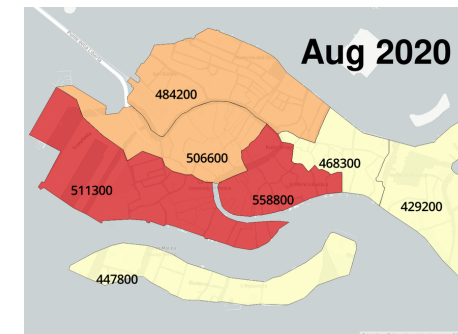
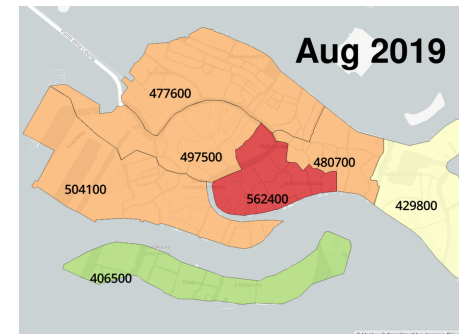
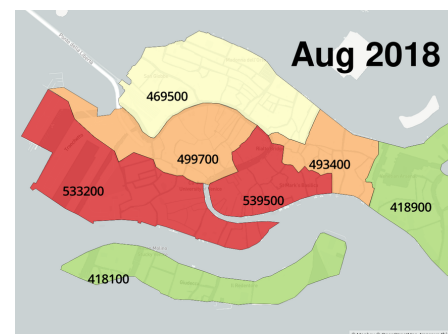
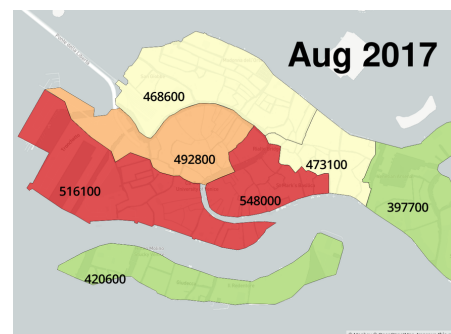
Similar to the rental prices, the sale prices in the historic city are significantly higher than those on the mainland. While not as pronounced as the rental prices, there is still a slight **upward trend in the sale prices** over time. Again, this persists until the COVID-19 pandemic which can explain the decrease in sale prices in 2021.

(These images depict the average sale price for a 100 square meter unit in each sestieri)



Sale Price (Euro):

- 0-187,799
- 187,800-423,599
- 423,600-477,299
- 477,300-508,499
- 508,500+



Historic City

Mainland

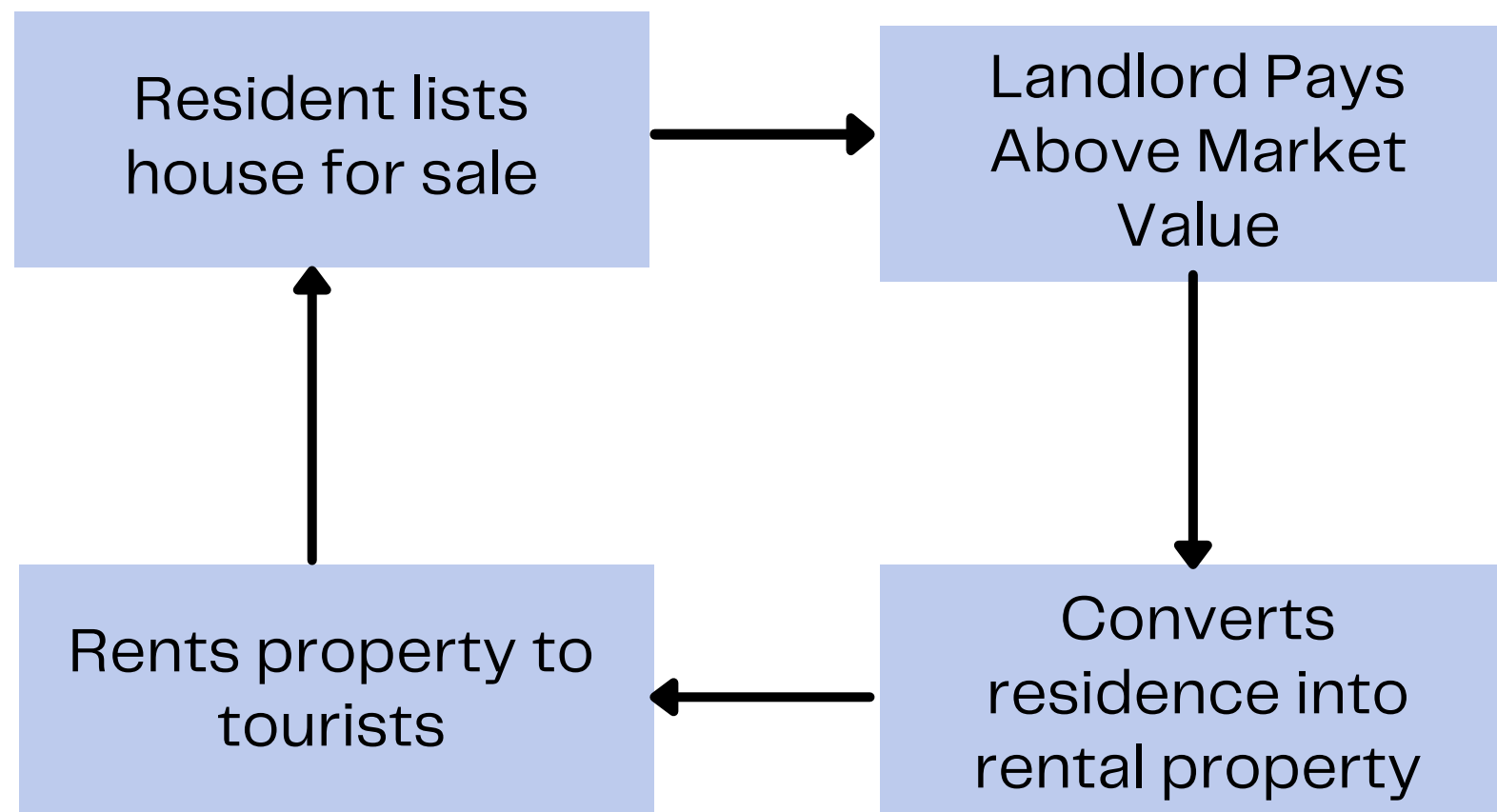
Historic City

Mainland

AIRBNBS ARE INFLATING THE HOUSING MARKET

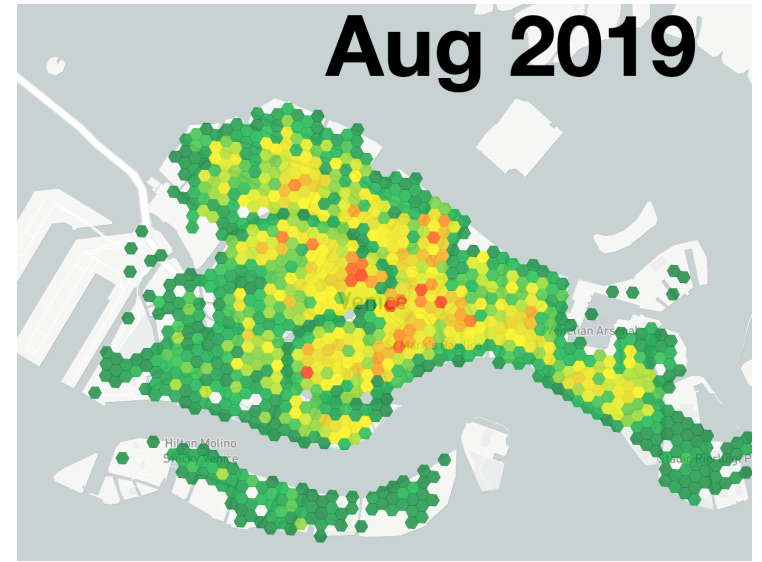
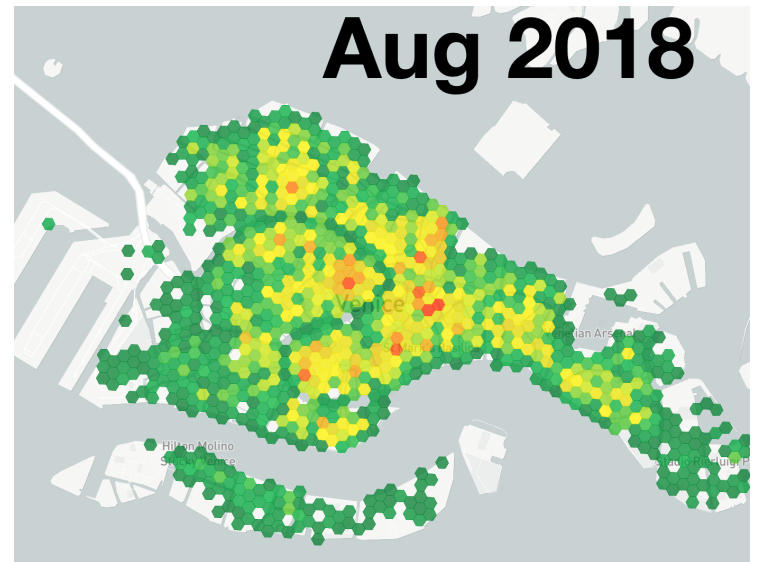
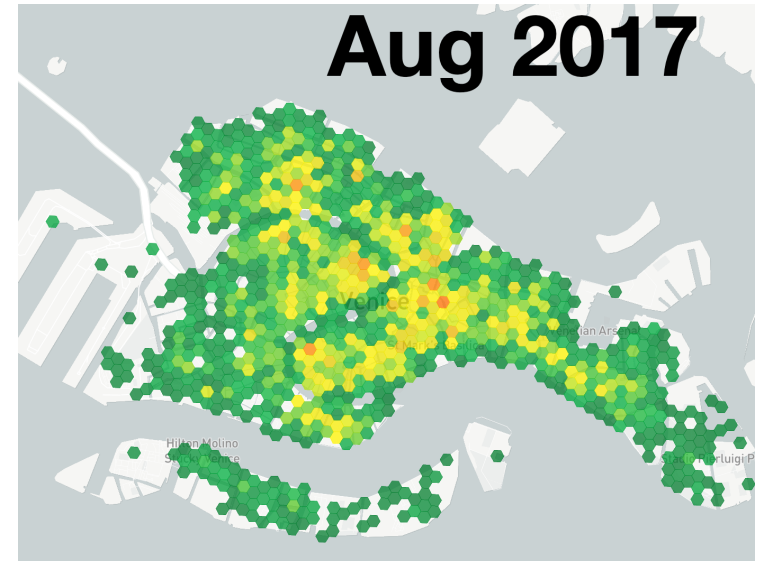
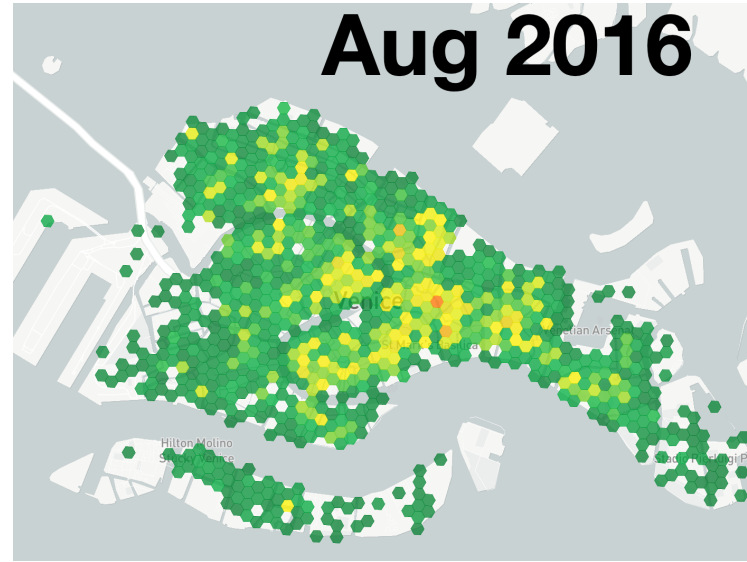
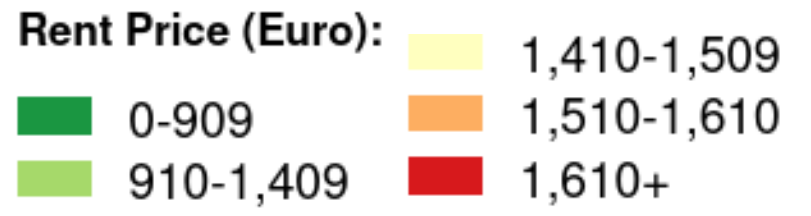
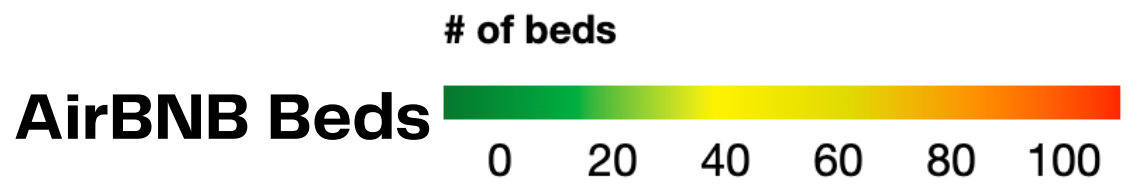
In recent years there has been a **explosion of new "tourist beds"** in the city. New places for tourists to stay overnight in the city have had a lasting impact on the housing market. The rise in popularity of services like AirBNB can be linked to this increase as many of these new tourist beds came in the form of short term rentals

As people move out of the city they can sell their residence or, as many have found, they can rent it out to tourists on platforms like AirBNB as a source of secondary income. The newly discovered ease of renting out residences has led to an explosion of these types of rentals in the historic city. As a result, the city has become more accessible to tourists, but in turn has **increased housing and rental prices** throughout the city for residents as well.

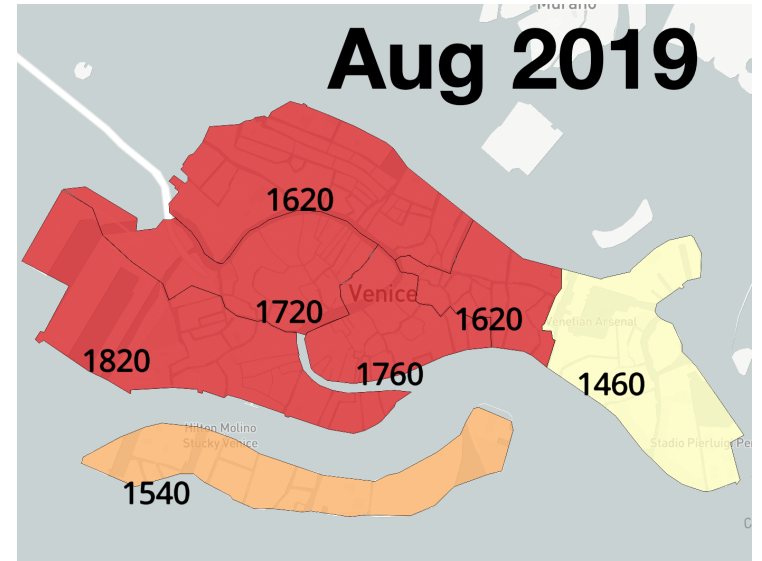
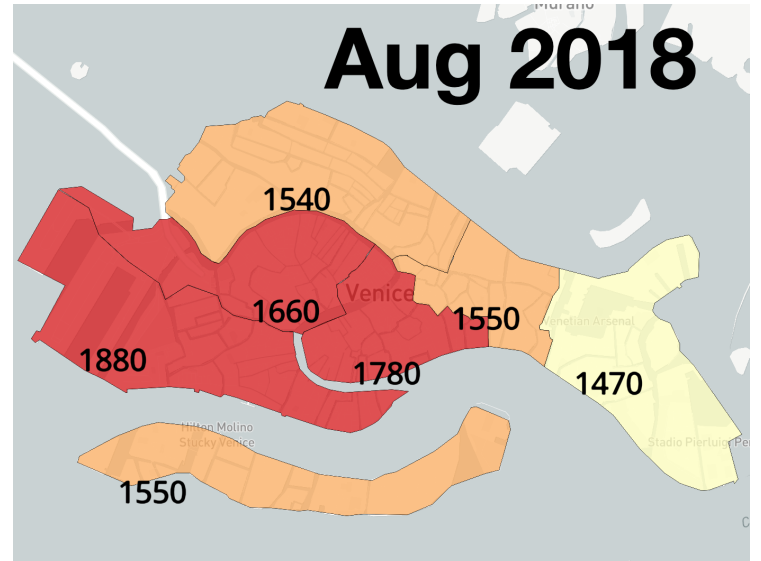
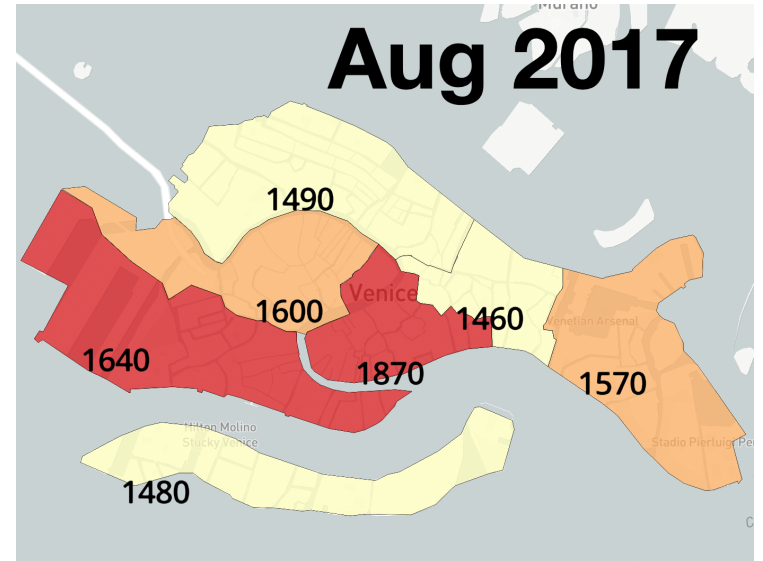
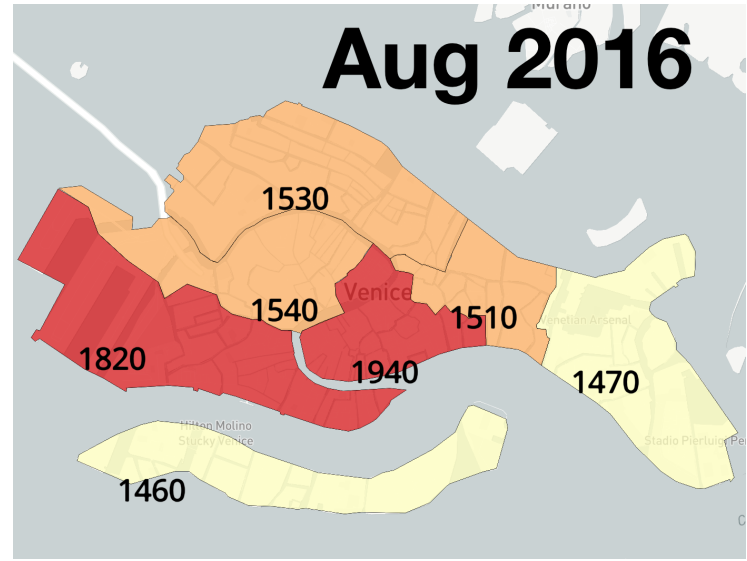


The figure to the left explains the cycle of events that has driven up housing prices in the city. As residents leave the city and sell their homes landlords buy up their residences and **convert them into rental properties**.

This cycle inflates housing prices as the landlords buying the homes **outbid regular residents** for more than the property is worth. Also, this cycle removes potential residences for residents and essentially restricts them for only tourists. This increases scarcity of housing in the city thus driving up prices.



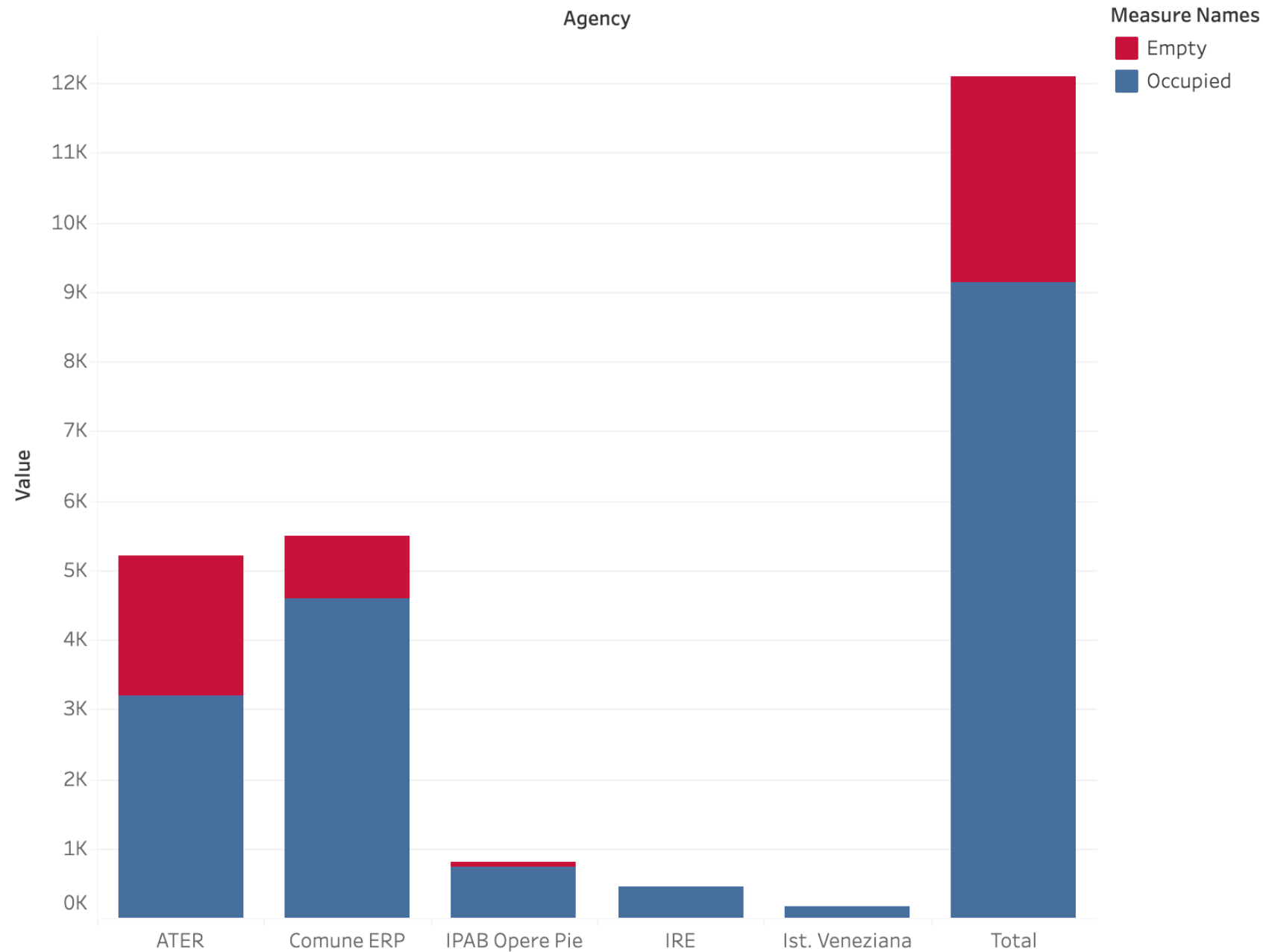
Rental Prices



Above, you can see a comparison of the density of AirBNB beds throughout the historic city and the average rental prices for the sestieri for August from 2016–2019. It is clear to see that the density of **AirBNBs increased** in the four years shown, and that the corresponding rental prices also show a **positive trend**. The positive correlation between the density of AirBNB beds and rental prices in the historic city may indicate a pattern between the two; a pattern that would require further research to solidify and understand.

AFFORDABLE HOUSING PROJECTS HAVE BEEN UNDERUTILIZED

There is a severe **discrepancy** between median **housing prices** and median **household income**. To combat this issue, affordable and low-income housing can be found throughout the island. There are about **12,110 low-cost dwellings**, but only 3/4 are being utilized. With the problems that residents are having with affording housing we would expect all of the affordable housing projects to be filled. It should be top priority to get these housing projects filled to give as many people as possible the ability to live in the historic city.



In the municipality of Venice, there are **five affordable housing providers**. The City of Venice contributes by providing 5,500 of these dwellings under ERP.

As of 2019, almost 3,000 affordable apartments were unoccupied and available to rent. However, there were only only 2,230 applicants for the housing.

There has been a recent push to help middle-class families and university students in Venice that do not qualify for affordable housing, but still **cannot afford** to live in the city.



MANY HOUSING PROJECTS HAVE BEEN PROPOSED BUT MOST ARE NOT EXECUTED

The map below shows some of the affordable housing projects that have been proposed to the historic city of Venice since the turn of the millennium. The graph on the right shows the company's name, the capacity of the housing, if they are operating, and the percent of the dwelling that are occupied.

Since 2000, more affordable housing projects have been proposed throughout the city. Only four of the projects have been **executed**. Three of the projects are still operating but are only at a **69%** capacity. Even without the obstacle of money, the number of people deciding to make a permanent **residence in Venice is dwindling**.

€41,800,000 has been publicly funded for these projects. 196 dwellings have been built and offered to the public, 20% of the total advertised. On the other hand 800+ apartments were announced and never built, 80% of the number of dwellings that were promised.

As a way to invite more housing projects to the island, the city recently invented **"social housing"**. To create social housing, a developer would get **incentives** to build but only with the promise that a portion of the dwellings would sell for lower, more affordable rates. Currently, the social housing projects have had varying results.







MOBILITY

MOBILITY IMPROVEMENTS THROUGH THE YEARS

Row Boats

Personal and cargo transportation was primarily by row boats until WWII. Until 1840, arriving in Venice entailed a gondola ride from Mestre

Steam Boats

Vaporetti provided steam-powered public transportation from 1900 until 1945

Motor Boats

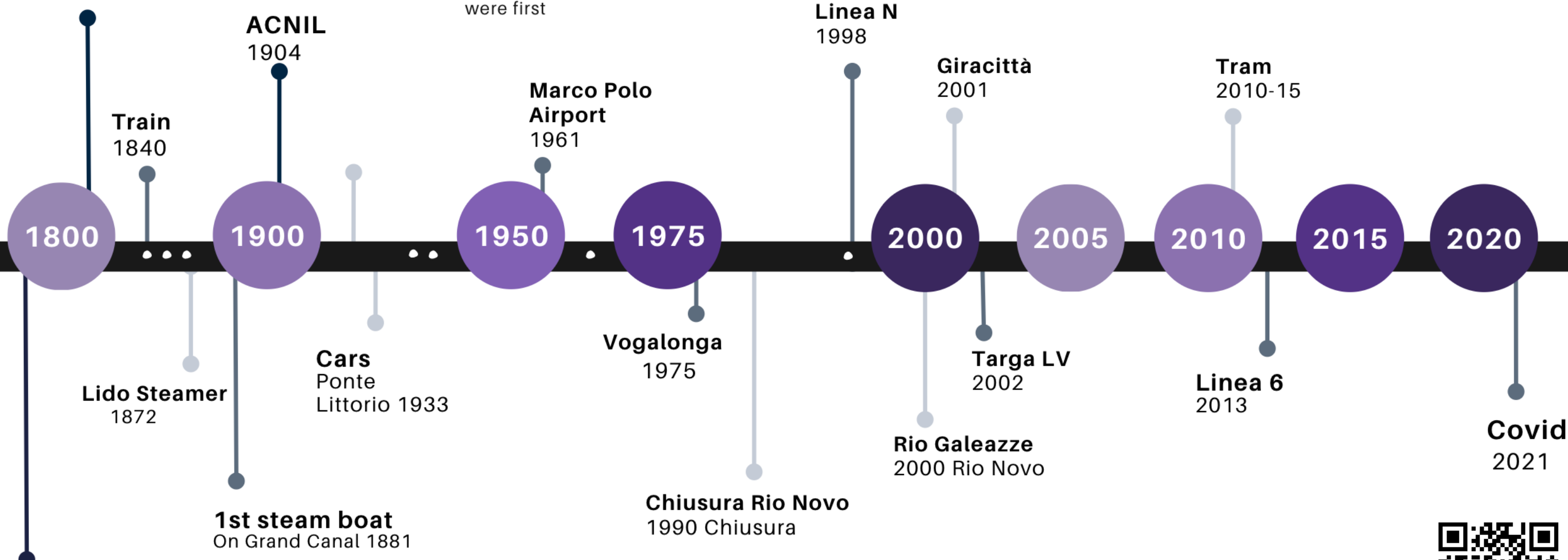
WWII brought widespread use of gasoline and diesel - powered motors in the general population. Taxis and cargo boats were first

Plastic Boats

Since the 1980's gradually more and more boats were made of plastic, leaving only a niche market for traditional wooden boats

Electric/Hybrid boats

The first ACTV electric passenger boat debuted in 1996. In 2017, Alilaguna introduces Scossa, a hybrid passenger boat. Several entrepreneurs began developing electric/hybrid systems applicable in Venice



Fall of Venice

Napoleon ended the Serenissima Republic in 1797, after more than a millennium of history

Remiere

With the demise of row boats as the main means of transportation of people and cargo, rowing became a leisure activity promoted through rowing clubs (remiere)

Sublagunare

The proposal of subway system under the lagoon began anew in the early 2000's. Many alternatives were proposed but none went beyond preliminary plans



MOBILITY CHALLENGES DRIVE RESIDENTS FROM THE CITY

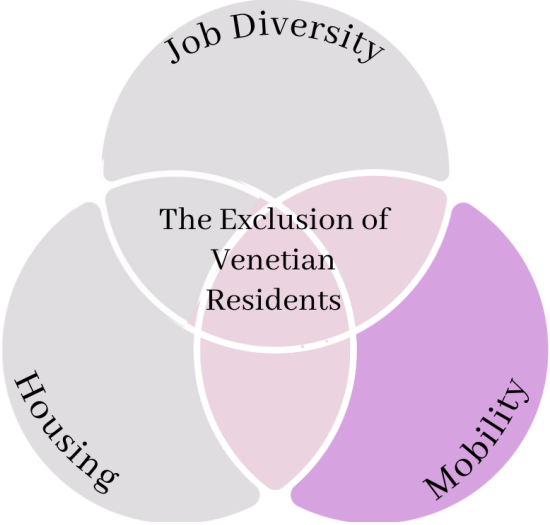
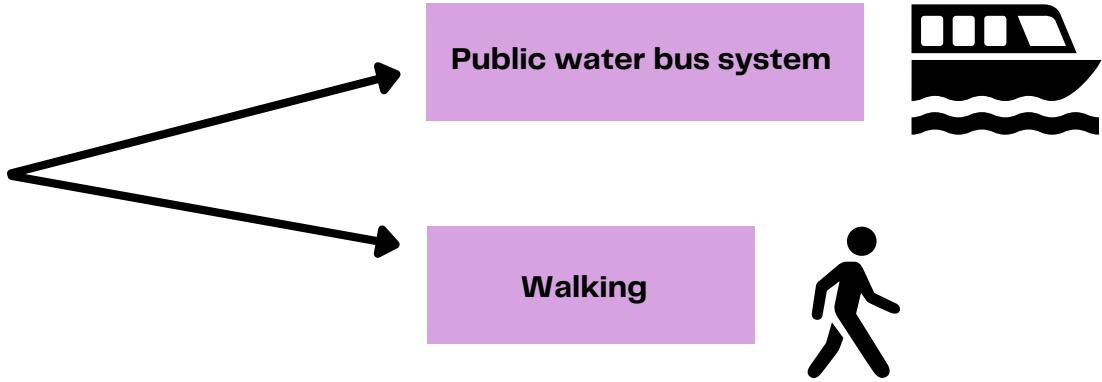
Unlike any other city in the world, Venice has a **unique transportation** network. The historic city of Venice lays in the middle of a lagoon, along with **over 100 islands** such as Murano, Burano, and Lido. In addition, the municipality of Venice includes the **Terraferma**, the mainland off of the Adriatic Coast. The mainland can be accessed via train, bus, or car on a road leading in and out of the main city. The historic city itself contains large and small canals, **only connected by bridges**.

A large proportion of the population walk around the island to and from their destinations. While walking can be the most convenient mode of transportation, it can be difficult in Venice. As previously stated, the bulk of the population is getting older. Going up and down the stairs of the many bridges in the city becomes increasingly more difficult.

Venice experiences a rainy season from October through November. Enforced by harsh seasonal winds, the rain and tides increase the chances of an **acqua alta**. On any given day, the streets in Venice can become flooded with the water from the lagoon, forcing residents to seek alternative routes. These high tides effect the public water bus system that so many people rely on. Postponements and cancellations are common as the docks where patrons wait flood, and the risk of a boat running ashore increases. Any interruption to these transportation services becomes a massive burden to the residents that rely on them.

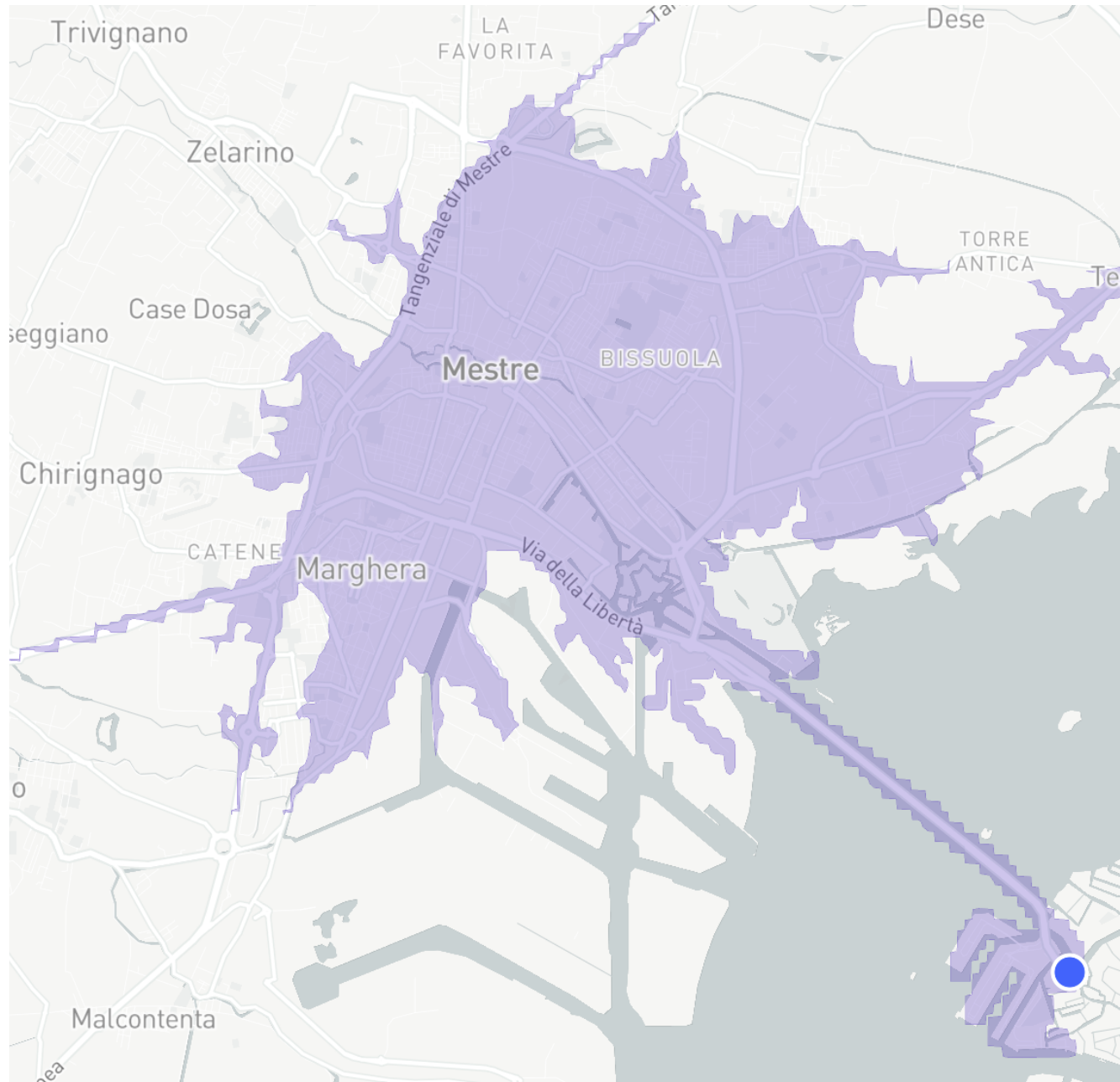
If people chose to **find higher paying work on the mainland** they will have to commute between the mainland and the historic city. **Commuting presents its own challenges**, either needing a car and dealing with the costs and hassles that come with that, or having to manage public transportation and sacrificing your time for less cost.

There are **two main modes** of transportation throughout the historic city.



WORKING OUTSIDE THE CITY INTRODUCES COMMUTING ISSUES

Transit times on Venice's Vaporetto water bus system take about twice as long to cover the same distance when compared to more mainstream urban train systems. However, according to many residents, **mobility within the city is not the main issue**. Many of the residents of the historic city **need to commute to their jobs on the mainland** in order to afford their housing in the city. As a result, current and former residents said that their greatest issue with mobility was going in and out of the city, to and from the mainland.



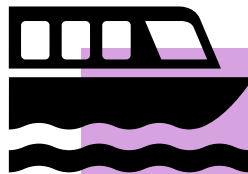
The map to the left shows the distance that one can travel in a **15 minute** period in a car. It shows the versatility that commuting by car offers. While driving can be a more convenient mode of transportation, there are tradeoffs for residents that choose to have a car in the city. One, is the cost of having a car in the historic city. Owning a car comes with recurring costs for things like **gas, insurance, and repairs**. All of these are usual costs of owning a car anywhere, but given the lower wages and expensive housing in the historic city this can still be a burden. There is also the problem of parking that residents of the historic city have to deal with. As shown in the map to the bottom right there are a **limited number of parking spots** in the city. In total there are only **7,500 parking spots** which have to be shared between both residents and tourists. Reserving one of these spots for a car would add additional cost to already struggling residents in the city

The alternative to commuting by car would be to utilize public transportation. While the cost of using public transportation is less than owning and driving a car in the city, relinquishing the versatility and freedom that a car offers is a large tradeoff for residents. Also, using a combination of the ACTV boats and either a bus or a train dramatically increases commute times. The image on the next page demonstrates that fact.

COMMUTING IN AND OUT OF THE CITY IS THE ISSUE

Here is a demonstration of what a typical commute could look like for a resident of the historic city using public transportation. Traveling from the Lido to Mestre using public transportation takes **1 hour and 17 minutes each way**. So on a normal day a resident would spend over **two and a half hours commuting** using public transportation going to and from work. Commutes like these are discouraging for residents and are the main mobility challenges that comes with living the historic city.

ACTV DATA



160 Boats

520,000 hrs of Navigation per year
190 Million passengers per year



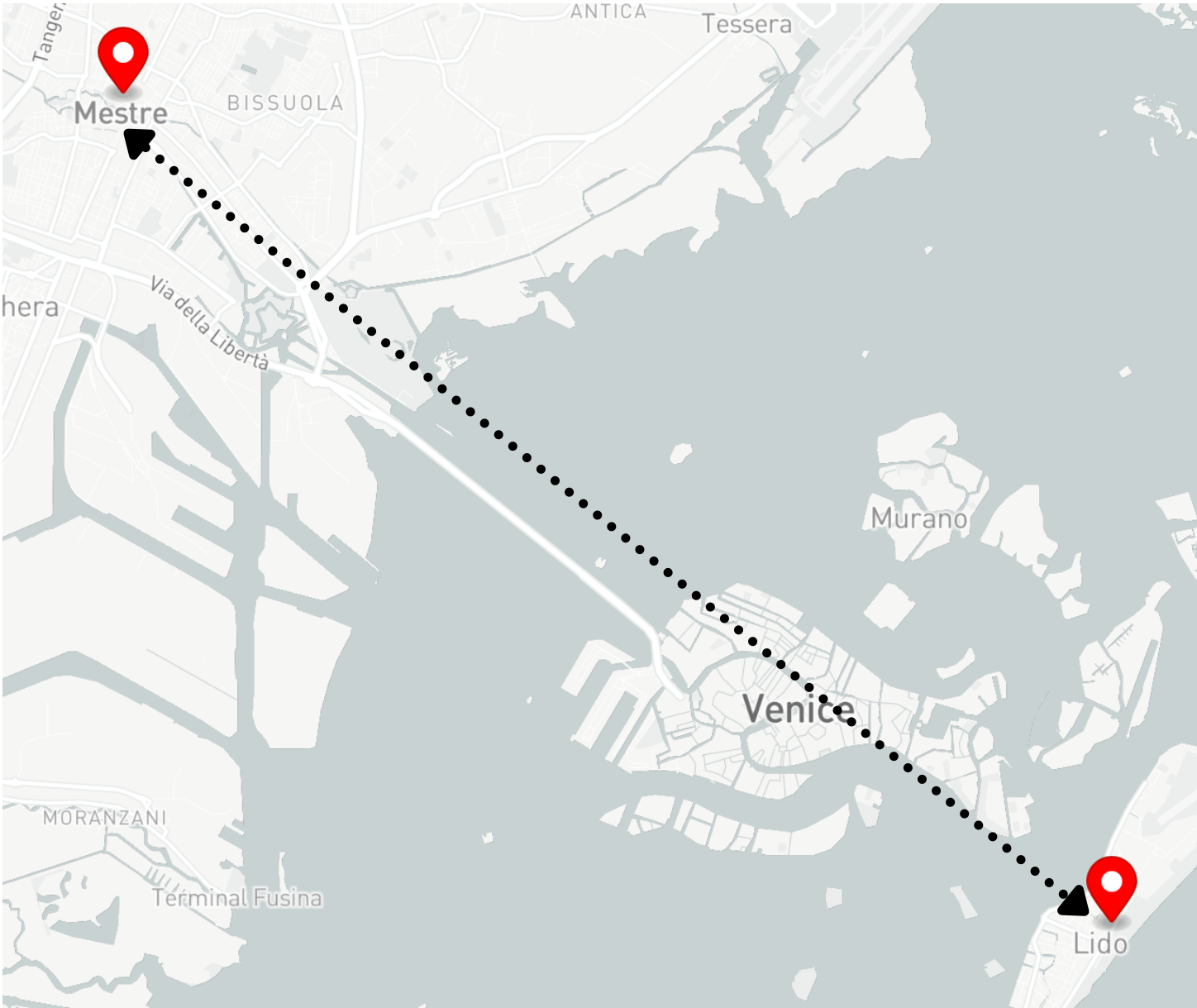
620 Buses

3 1/2 Million Km per year



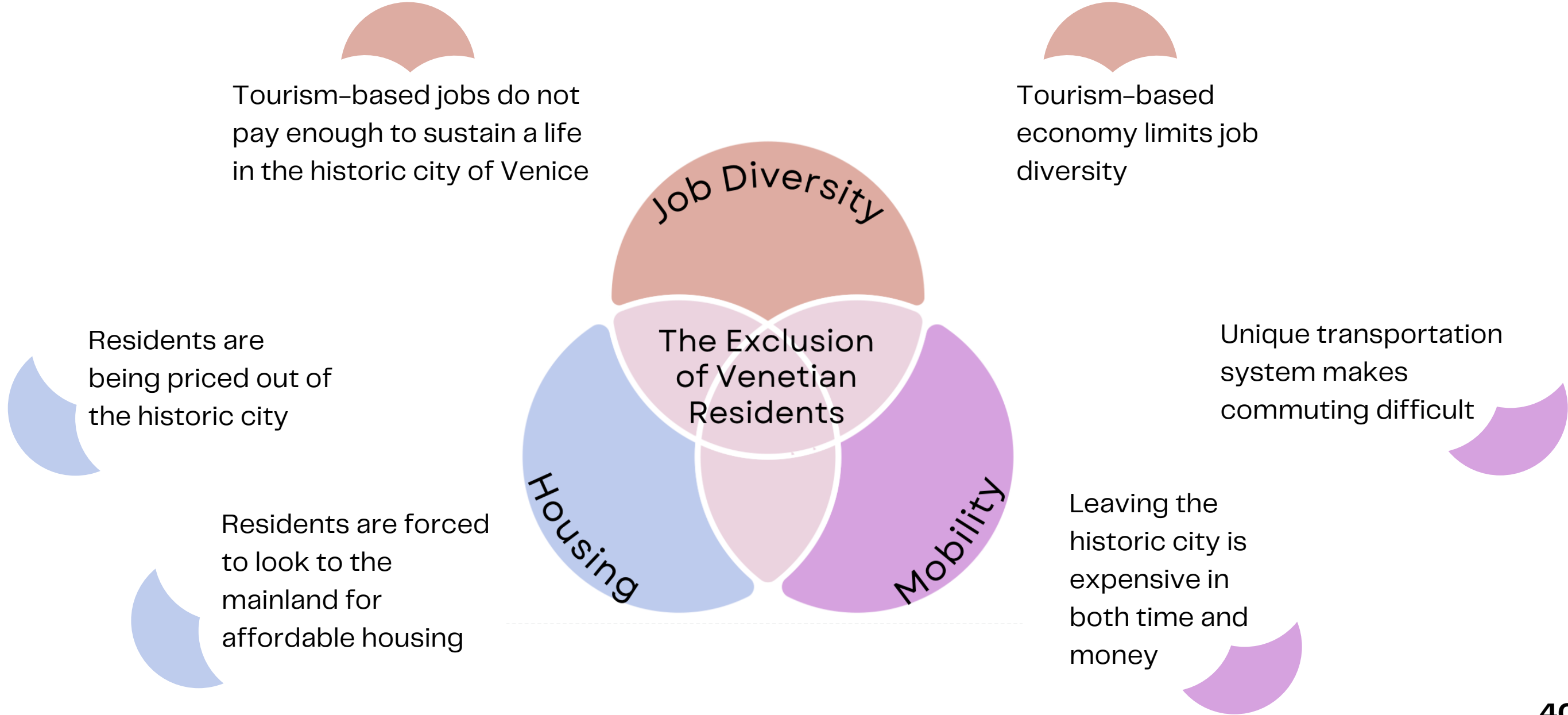
100 Floating Pontoons

1 hour 17 minutes

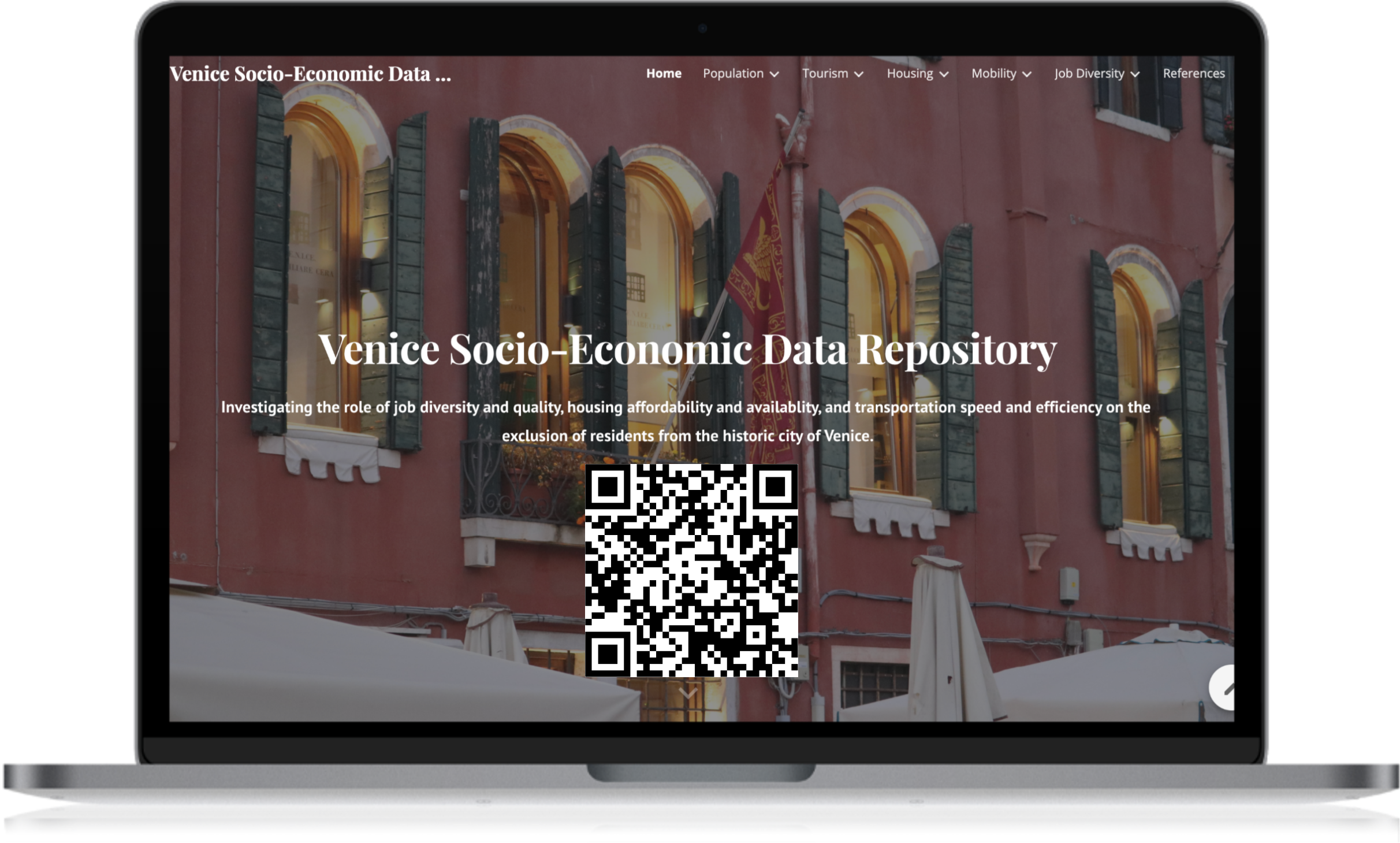


VENICE LACKS AFFORDABLE HOUSING WORSENERD BY LIMITED WAGES AND BURDENSOME TRANSPORTATION

Residential exclusion is a complex multi-faceted problem, where all of the components feed off of each other creating a large residential exodus. We hypothesize that if these problems are addressed, the Venetian emigration will halt and hopefully reverse.



FOR FURTHER INFORMATION AND ACCESS TO OUR DATA AND SOURCES FOLLOW THE QR CODE BELOW



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