



Cruise Shipping and Urban Development

The Case of Venice



Case-Specific Policy Analysis

Cruise Shipping and Urban Development

The Case of Venice



Case-Specific Policy Analysis

The International Transport Forum

The International Transport Forum is an intergovernmental organisation with 57 member countries. It acts as a think tank for transport policy and organises the Annual Summit of transport ministers. ITF is the only global body that covers all transport modes. The ITF is politically autonomous and administratively integrated with the OECD.

The ITF works for transport policies that improve peoples' lives. Our mission is to foster a deeper understanding of the role of transport in economic growth, environmental sustainability and social inclusion and to raise the public profile of transport policy.

The ITF organises global dialogue for better transport. We act as a platform for discussion and pre-negotiation of policy issues across all transport modes. We analyse trends, share knowledge and promote exchange among transport decision-makers and civil society. The ITF's Annual Summit is the world's largest gathering of transport ministers and the leading global platform for dialogue on transport policy.

The Members of the ITF are: Albania, Armenia, Argentina, Australia, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Canada, Chile, China (People's Republic of), Croatia, Czech Republic, Denmark, Estonia, Finland, France, Former Yugoslav Republic of Macedonia, Georgia, Germany, Greece, Hungary, Iceland, India, Ireland, Israel, Italy, Japan, Korea, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Mexico, Republic of Moldova, Montenegro, Morocco, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Serbia, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, the United Kingdom and the United States.

International Transport Forum
2, rue André Pascal
F-75775 Paris Cedex 16
contact@itf-oecd.org
www.itf-oecd.org

Case-Specific Policy Analysis Reports

The International Transport Forum's Case-Specific Policy Analysis series presents topical studies on specific issues carried out by the ITF in agreement with local institutions. This work is published under the responsibility of the Secretary-General of the International Transport Forum. The opinions expressed and arguments employed herein do not necessarily reflect the official views of International Transport Forum member countries. This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

Acknowledgements

This report forms part of an ITF project on Cruise Shipping and Urban Development, directed by Olaf Merk. It was written by Olaf Merk and Bénédicte Busquet. The report was made possible through a voluntary contribution by the Venice Port Authority and Venice Passenger Terminal. Valuable comments on a draft version of the report were provided by Stephen Perkins, Alain Lumbroso, Liv Gudmundson and Michael Kloth of the ITF. Stefanidaki Evaggelia, Researcher at the University of the Aegean, acted as Peer Reviewer during a study visit to Venice.

During this study visit, interviews were conducted with the following stakeholders: Paolo Costa (Venice Port Authority), Nicola Torricella (Venice Port Authority), Claudia Marcolin (Venice Port Authority), Stefano Bonaldo (Venice Port Authority), Alberto Maria Pietrocola (Capitaneria Di Porto de Venezia), Massimo Maiolo (Capitaneria Di Porto de Venezia), Francesco Galietti (CLIA Italy), Salvatore Patti (ARPAV), Federica Montaguti (CISSET), Stefano Soriani (Ca' Foscari), Carlo Magnani (Università IUAV di Venezia), Agostino Cappelli (Università IUAV di Venezia), Silvio Testa (Comitato No Grandi Navi), Lidia Fersuoch (Italia Nostra), Luciano Mazzolin (Associazione Ambiente Venezia), Andreina Zitelli (Grupo di Studio Venezia Laguna Porto), Cristiano Chiarot (Gran Teatro La Fenice), Massimo Fioresi (CNA VE), Francesco Mattiazzo (Confesercenti), Filippo Olivetti (Confindustria Venezia), Luigino Rossi (Comitato Italiano per la Salvaguardia di Venezia), Fabio Sacco (Alilaguna), Vincenzo Monaco (Vela), Fabio Gava (SAVE), Davide Calderan (Comitato Cruise Venice), Alessandro Santi (Associazione Agenti Raccomandatori e Mediatori Marittimi del Veneto), Marco Agostini (Comune di Venezia), Roberto Perrochio (Venezia Terminal Passeggeri).

Table of contents

Executive Summary	6
Venice as a cruise port	9
Cruise port characteristics.....	9
Attractiveness of Venice as a cruise port.....	18
Impacts of cruise shipping on the port and city.....	21
Economic impacts: Higher than the European average	21
Environmental impacts: Emissions and waves	22
Traffic impacts: Fairly moderate effects.....	26
When do impacts occur?.....	28
Policies	31
Determining the place for cruise shipping in Venice.....	31
Tourism and cruise tourism policies in Venice.....	39
Green port policies.....	39
References	43

Executive Summary

What we did

This study aims to assess the impacts of cruise shipping on urban development in the case of the city of Venice, Italy. It was carried out as part of a programme on Cruise Shipping and Urban Development at the International Transport Forum (ITF) at the OECD and benefits from a study visit to Venice and a series of interviews conducted with relevant stakeholders.

What we found

Venice is one of the world's success stories with respect to cruise shipping. It is the third largest cruise port in Europe, with 1.7 million cruise passengers in 2014, and Europe's largest home port, thanks to a very large share (around 90%) of turnaround passengers. The number of cruise passengers is very limited in comparison to the total amount of tourists to Venice: 34 million in 2014 for the province of Venice, which is more than all tourists to the whole of Germany. Venice benefits from unique assets as a destination, first-rate dedicated cruise terminals located in the historical city and great external as well as internal connectivity, via Venice international airport and various urban transport modes. Although passenger numbers have stagnated in recent years, this stagnation is less pronounced than in most other Mediterranean cruise ports, although set to become more substantial due to the uncertainty created by a cruise ship ban in Venice.

Cruise shipping generates large economic benefits for the city of Venice. These come in the form of spending of passengers, crew and cruise ships. Passenger spending includes hotels, restaurants, excursions and shopping; crew spending mainly comprises shopping, and cruise ship spending relates to provisioning and shipbuilding. Total calculated economic value of cruise shipping to Venice was EUR 400 million in 2012. It has been demonstrated that cruise passengers provide considerable economic value added: on average EUR 200 per home port passenger; higher than the economic value of non-cruise tourists. The local employment related to the cruise sector amounted to approximately 7 500 jobs in 2012. A distinction can be made between home port passengers and transit passengers: transit passengers generate daily visits with relatively lower economic value added, whereas home port passengers stay longer in the city and home port calls are associated with ship provisioning, generating more economic value added and employment.

However, cruise shipping for Venice suffers from a bad reputation with part of the population. This partly explains a cruise ban proposal, following the sinking of the cruise ship MS Costa Concordia in January 2012. The size of cruise ships calling Venice has doubled over the last decade, which has fueled vocal opposition against cruise shipping, in particular based on their visual dominance, environmental impacts and perceived safety risks. Based on these concerns, a cruise ban was proposed by the national government in 2012 with new requirements in 2013, which would limit the number of large cruise ships calling the Port of Venice through the Giudecca Canal.

One could wonder whether a cruise ship ban is necessary, especially because certain mitigation measures might minimise impacts. With respect to air emissions, the Port of Venice has been the first

and so far the only port in the Mediterranean to put in place a voluntary fuel switch programme with cruise lines, which has substantially reduced cruise ship emissions. A more long-term roll out of the fuel switch programme – possibly combined with other measures such as the installation of shore power facilities – could further minimise the impact of cruise ship emissions in Venice. The wave impact of cruise vessels has been shown not to be more substantial than those of other ships in Venice. The safety risks of navigation through the Giudecca Canal have been minimised via slower speeds and additional tugboats and pilots. The visual dominance of cruise ships is mostly concentrated in the early morning (when cruise ships arrive) and early evening (when cruise ships depart). A way to further reduce their visibility could be to only allow passage through the Canal during certain times to limit their visibility during the day.

Following the cruise ban proposal, the regional court decided that the ban could only be implemented if alternative access would be available to cruise ships, for which various proposals have been formulated. One set of proposals envisages the creation of an offshore cruise port at the entrance of the lagoon. This option raises many concerns with respect to safety and navigation and would almost certainly lead to Venice losing its home port status and the economic benefits associated to it. The relocation of the cruise port to the industrial port area, *Porto Marghera*, would take away one of the current advantages of Venice as a cruise port, namely its easy pedestrian access to the historical city. It would imply giving up a substantial part of the cargo port and is not realisable in the short to medium term, considering that Port Marghera is a pure cargo port without any equipment for handling cruise ships.

The official proposal by the Venice Port Authority suggests using the access channel to the industrial port in order to reach the cruise port. This proposal foresees the creation of a side-channel (*Contorta Sant' Angelo*) which would link the Stazione Marittima (the current cruise terminals) with the industrial port access channel (*Canale Malamocco Marghera*). It has run into administrative difficulties, following a negative assessment of the process by the regional court. The port authority and the city council have since proposed an alternative, still using the *Canale Malamocco Marghera*, but with a shorter new channel (the *Tresse Nuovo*), which would allow cruise ships to enter the Port of Venice through the *Malamocco* inlet without interfering with cargo traffic. Whatever option is retained, there is a need to rapidly create clarity on the future maritime access of Venice as a cruise port. The uncertainty generated by the current situation hampers the sustainability of the success of Venice as a cruise port and risks to undermine its status as Europe's leading cruise home port.

What we recommend

Create certainty about the future of cruise shipping in Venice.

A concerted policy effort will be needed to sustain the success of Venice as a cruise port. This policy effort would need to include a long-term perspective for development, embedded in a wider tourism policy for the city of Venice, a coherent effort to mitigate air emissions from cruise shipping and more focus on generating high economic value rather than continuing passenger growth per se. Based on a credible and sustainable long-term development perspective, ways should be explored to adapt the cruise ship ban in such a way that provisions only apply during a certain time window of the day, allowing for passage of large cruise ships through the Giudecca Canal at the fringes of the day.

Develop a tourism strategy for the city including guidance on which tourists to prioritise.

In this strategy, the city could prioritise tourism segments with high value added (economically, culturally and in terms of involvement and interaction), which would undoubtedly include cruise tourists.

As part of this strategy, the cooperation between port and city should be intensified to increase synergies between city tourism policy and the port's cruise tourism policy.

Develop instruments to contain the number of tourists in the city of Venice.

These instruments could include local fees and incentives, quotas on the number of visitors and entry tickets to the city.

Develop an action plan for extracting more value from home port passengers.

An action plan should identify why half of the home port passengers to Venice do not stay at least one night in Venice and address the question of how the share of these low-spending home port passengers can be reduced.

Give a more structural character to environmental policies that have a discontinuous nature

To strengthen its position as a leading cruise port, the city of Venice should implement a multi-year roll out of effective programmes, such as the Blue Flag Programme, which grants lower port tariffs to ships with lower sulphur emissions, and implement earlier engagements to install shore power facilities.

Venice as a cruise port

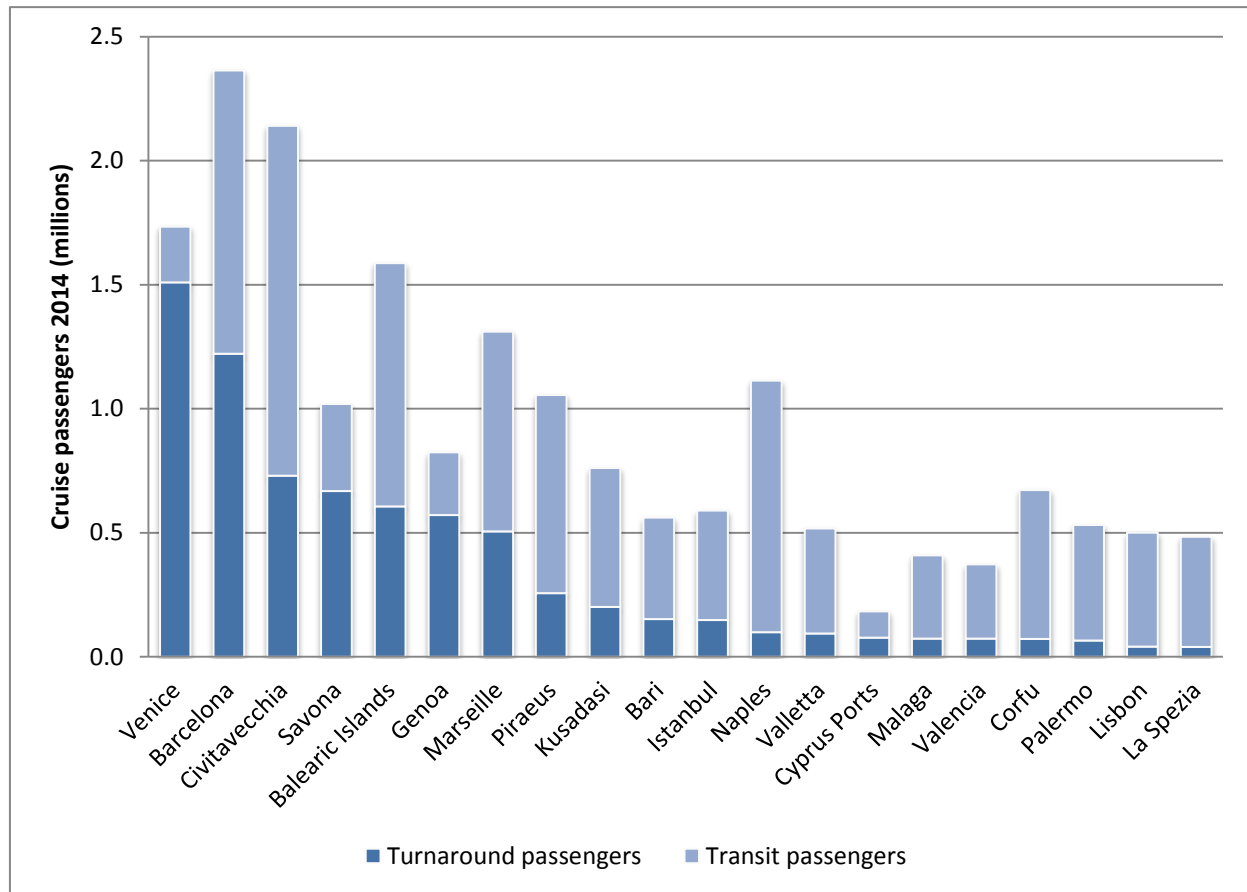
Venice is a well-known and popular cruise destination. How can its attractiveness be explained and what are the challenges Venice would have to resolve to remain attractive as a cruise port-city? These are the questions that this section would like to answer. As such, the section focuses on characteristics of Venice as a cruise port and the determinants of its attractiveness. How many ships and passengers does cruise shipping bring to Venice? How does it relate to other port traffic? What is the ship size of the cruise ships coming to Venice? Is opposition to larger cruise ships affecting the attractiveness of Venice as a cruise port?

Cruise port characteristics

Venice is the largest European port for cruise turnaround passengers. In terms of total cruise passenger movements, Venice ranks third in Europe with around 1.8 million passenger movements in 2014, after Barcelona and Civitavecchia. Approximately 87% of these passengers are turnaround passengers, meaning passengers that start or end their journey in Venice. This share is very high: in the Mediterranean only the ports of Savona (66%) and Genoa (69%) come close to a similar percentage. Thanks to this very high turnaround passenger share, Venice is the largest European cruise port for turnaround passengers, representing 1.5 million passenger movements.

Cruise passengers represent a fairly small part of the tourists to Venice. Although the exact numbers of visitors to Venice are not known and differ according to source and definition, it is assumed that the annualised number of total tourists to the province of Venice reached 34 million in 2014. This would imply that cruise passengers represent approximately 5% of the total tourists to Venice. This might present slight underestimation, considering that some cruise tourists stay a few days in Venice prior to or after embarkation on their cruise.

Figure 1. Top 20 turnaround cruise ports in the Mediterranean (2014)

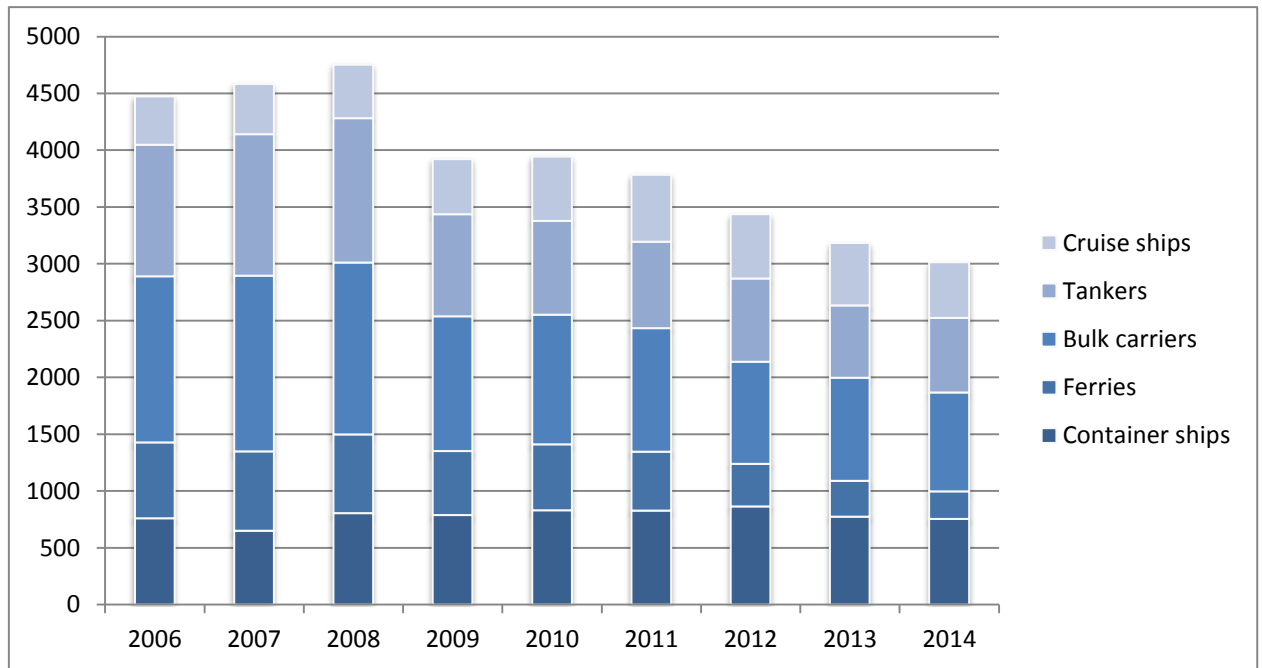


Source: Own elaborations based on data from MedCruise.

Increasingly important activity for the Port of Venice

Cruises represent an increasingly important share of the activity of the Port of Venice. This can be expressed by the number of ship calls and the development of cargo in comparison with cruise passengers. In 2014, the Port of Venice had 488 calls from cruise ships; this represents 16% of the total port calls. This share is smaller than for bulk carriers (29%), container ships (25%) and tankers (22%), but the share of cruise calls has grown over the last decade from 9% in 2006 to 16% in 2014. From 2006-2014, cruise passenger movements increased by 96%.

Figure 2. Number of calls per year and shipping sectors (2006-2014)



Source: Own elaborations based on data provided by Venice Port Authority.

Cargo handling and cruise passenger handling do not take place at the same port site. Cargo handling takes place at Porto Marghera, which is not in the historical city, whereas cruise ships are handled at a port site in Venice that is called Stazione Marittima, which has 12 dedicated cruise berths. The geographical separation of cruise activities from the rest of the port's commercial activities has implied that both types of ships use different routes to access their respective terminals, which enabled smooth traffic and guaranteed safety and security for cruise activities. The Marittima terminals are located within the islands of Venice at the south-west end of the city. That location provides cruise passengers with a direct and quick access to the city and other important infrastructures such as the Italian road network, the train stations of Mestre and Santa Lucia and the Venice Marco Polo International Airport, which most cruise passengers use to reach their cruise from their country of origin.

Figure 3. Map of Venice: Cruise port and cargo port

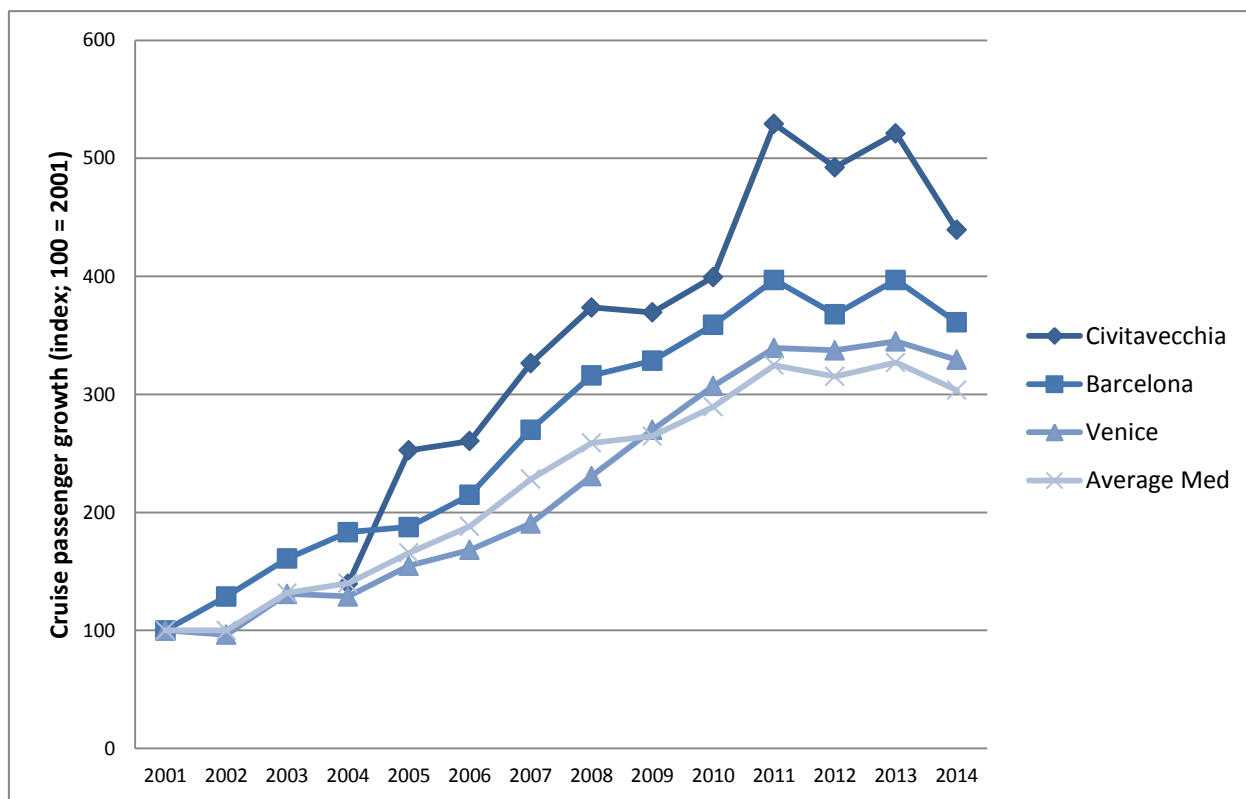


Source: Port of Venice.

Declining passenger numbers in recent years

Growth in cruise passengers in Venice has halted over the past few years, in line with developments in the Mediterranean. Venice witnessed a steady growth (239%) of cruise passenger movements over 2001-2011, like the Mediterranean ports in general (225%), but since 2011 growth has been stagnant, resulting in a decline of 3% for Venice over 2011-2014, considerably better than for the Mediterranean ports overall (-7%). The two largest cruise ports in the Mediterranean also saw declining growth at more spectacular rates (-9% for Barcelona, -17% for Civitavecchia). Reasons for this decline could be the deployment of cruise ships in emerging cruise markets in Asia, at the cost of deployment in the Mediterranean or declining transfers from Caribbean to Mediterranean ports.

Figure 4. Development of cruise passengers in main Mediterranean ports (2001-2014)

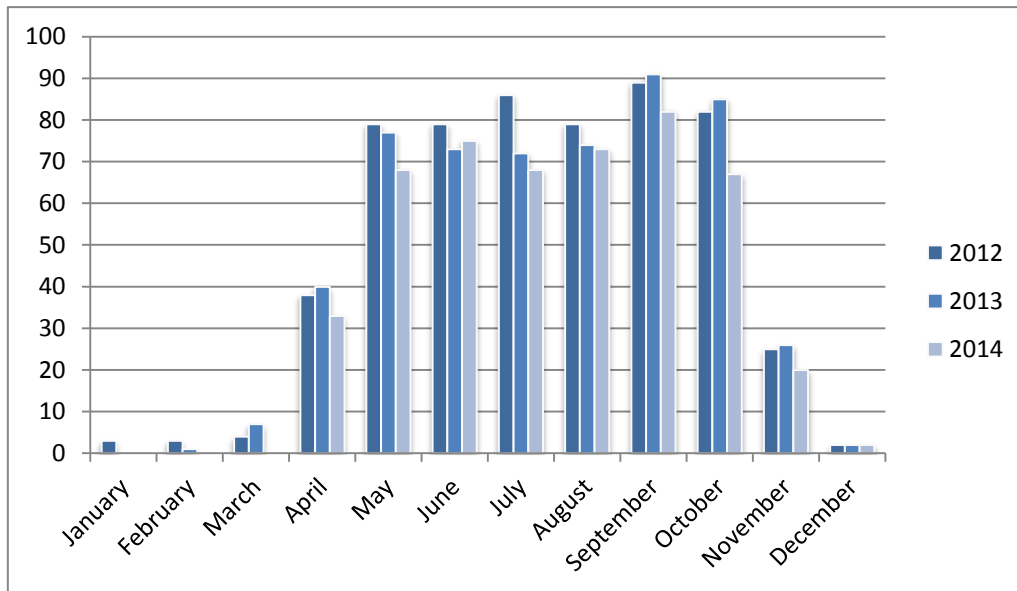


Source: Own elaborations based on data from Cruise Industry News, 2014; and MedCruise, 2015.

Considerable seasonality

Cruise port activity is concentrated over six months of the year: 89 % of the cruise ship calls in 2014 took place between May and October. This share has been fairly stable in recent years (87% in 2012; 86% in 2013), even if 2012 had cruise ship calls every month of the year. The month with the highest activity is September with 80 to 90 calls during recent years. Tidal movements and occasional floodings of Venice during the winter season would make the city less suitable for all-year round cruise tourism. Concentration of cruise tourists coincides with the high season for land tourists. Seasonal concentration comes together with concentration in terms of ship types. As it happens, only ten ships make half of the cruise ship calls in Venice. In 2014, Venice had 488 cruise ship calls by 76 different ships. Almost all ships had several calls to Venice throughout the year, but the 10 ships with the most calls to Venice together covered 244 of the cruise ship calls. The ship with the highest number of calls in Venice in 2014 was Costa Fascinosa, calling 35 times.

Figure 5. Number of cruise ship calls per month (2012-2014)

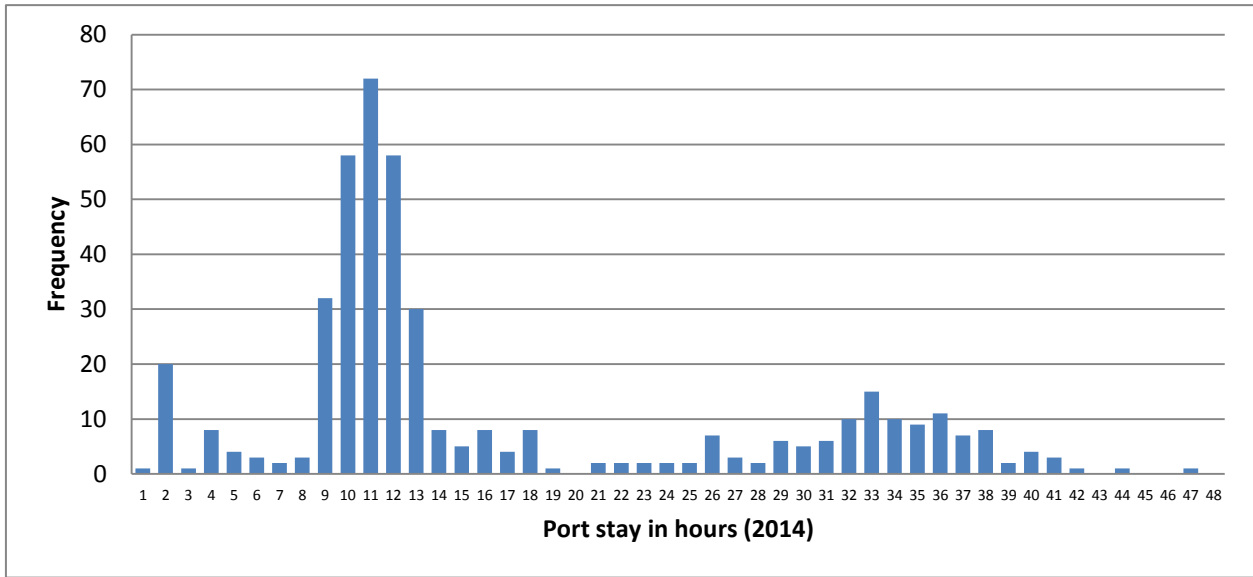


Source: Own elaborations of data provided by Venice Port Authority.

Long port stays

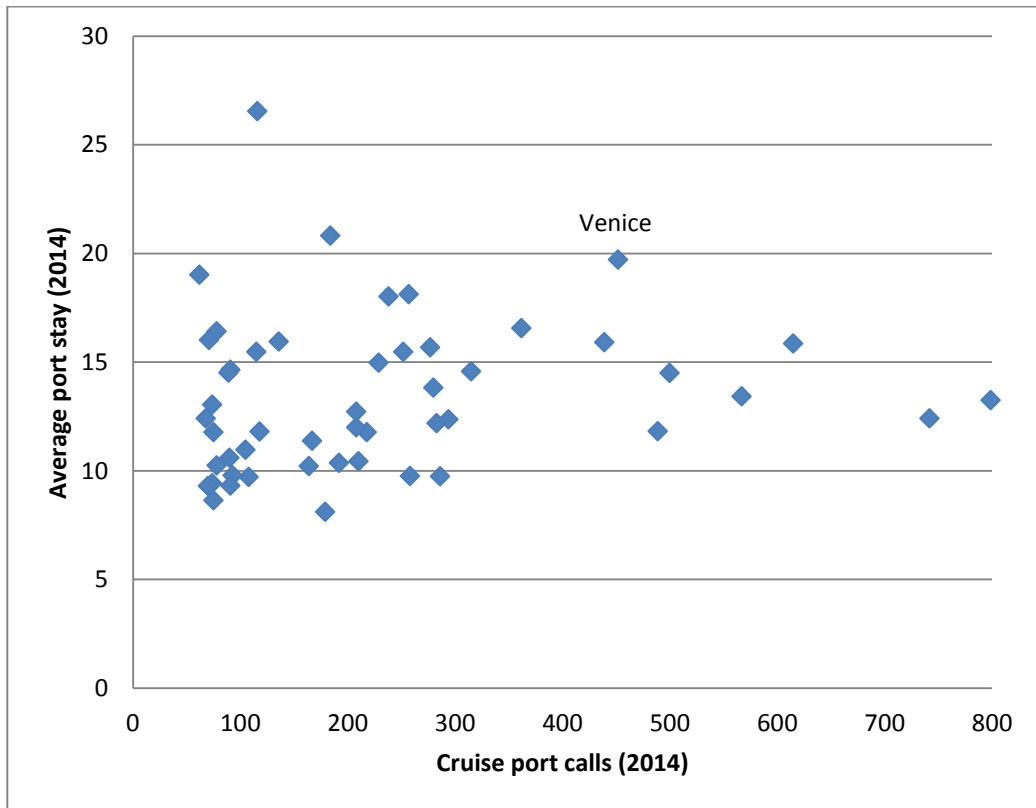
Cruise ships stay relatively long in Venice, namely almost 20 hours on average. This is considerably longer than the average port stay in Mediterranean cruise ports, including in other large cruise ports such as Barcelona (12 hours), Civitavecchia (13 hours) and Piraeus (16 hours). Only the ports of Split and Corfu had longer average cruise port stays in 2015, among the Mediterranean cruise ports. Cruise ships most frequently stay 10-12 hours in Venice, with a fair amount of ships staying 32-36 hours. Of the cruise ships staying less than one day in Venice, 75% stay 9-13 hours (and 56% stay 10-12 hours). Of the cruise ships staying more than one day, around half stay 32-36 hours. This can be explained by the fact that Venice has a particularly important share of turnaround calls (89% of calls) for which ships stay at berth longer due to embarking disembarking procedures, luggage handling and ship provisioning.

Figure 6. Cruise port stay in Venice (2014)



Source: Own elaborations based on data from Lloyds Intelligence Unit.

Figure 7. Cruise port stay of top 50 Mediterranean Cruise ports (2014)



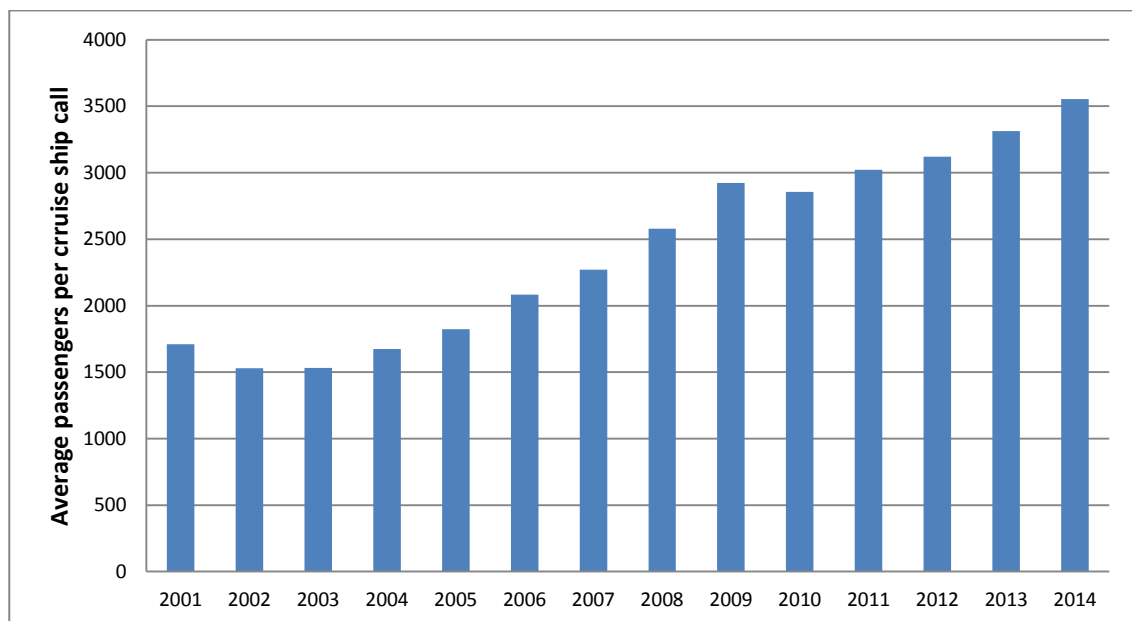
Source: Own elaborations based on data from Lloyds Intelligence Unit.

Large size of cruise ships in Venice

The size of cruise ships is a particularly contentious issue in Venice. There is vocal local opposition against the number and size of cruise ships calling Venice, considered to be disproportionately big in comparison to the city itself. As will be explained in more detail in the “Policies” section, this concern was expressed in a proposal for a cruise ship ban: first a limitation on the number of cruise ship passages in the Giudecca (708 calls per year) in 2014 for ships over 40 000 gross tonnage (GT), then an interdiction for cruise ships larger than 96 000 GT to come to Venice replacing the former limitations. Even though this decision was overturned by the Regional Administrative Tribunal, shipping companies keep sticking to this limit to avoid further issues and difficulties to re-deploy ships if imposed.

The average cruise ship calling Venice had 3 553 passengers in 2014, compared to 1 824 in 2005 which means almost a doubling (95% increase) of the average number of passengers per ship. This steady growth is faster than the general trend in the Mediterranean that saw an increase in the number of passengers per ship of 64% over the same period. Although cruise ship sizes have increased over the same period, it is at a much slower pace: 16% in terms of dead weight tonnage.

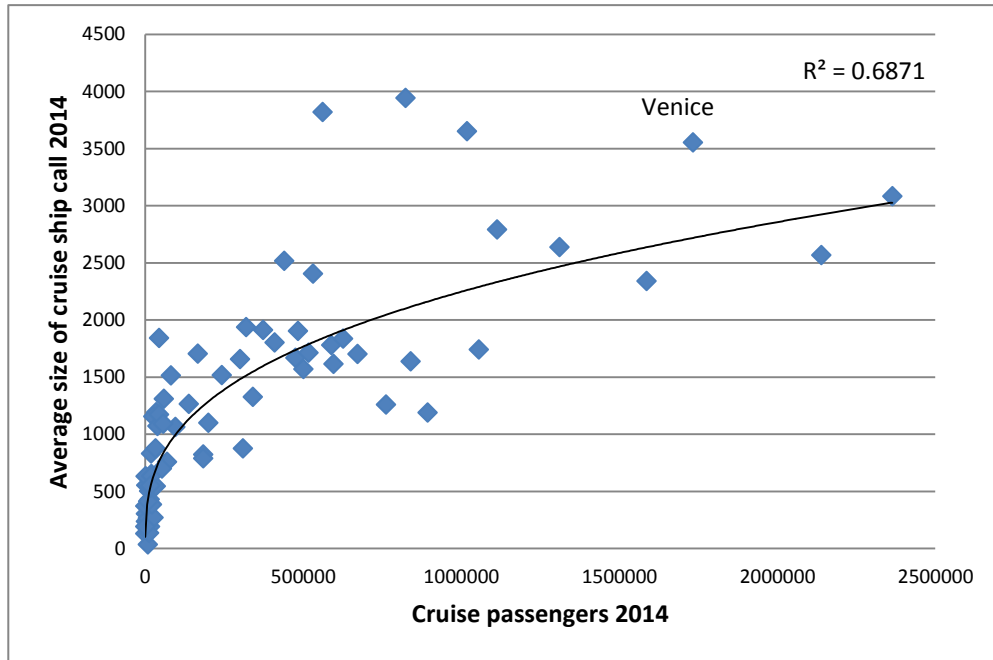
Figure 8. **Average size cruise ship call in Venice (2001-2014)**



Source: Own elaboration based on data provided by Venice Port Authority.

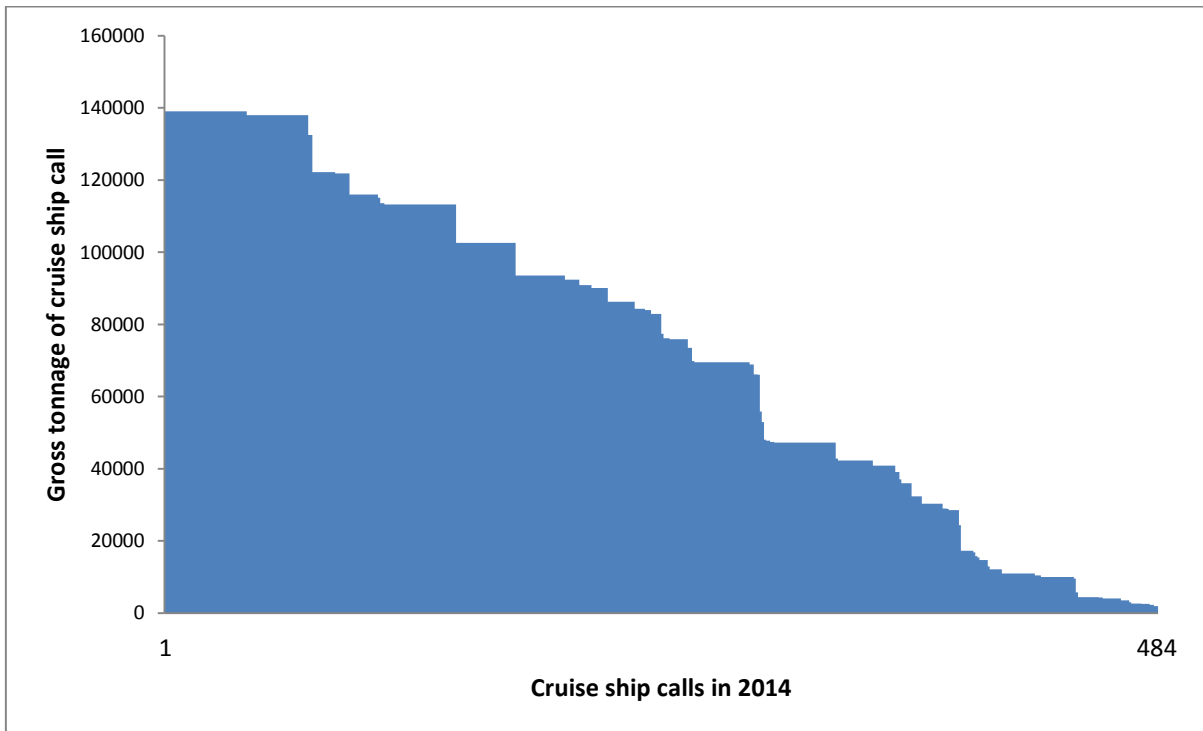
Venice is one of the Mediterranean cruise ports with the largest average cruise ship calls. In the Mediterranean only three ports had on average of more passengers per cruise ship call in 2014: Genoa (3 943), Bari (3 820) and Savona (3 652). The average passenger size of cruise ship calls in the Mediterranean was 1 878 in 2014. In general, larger cruise ports also handle larger ships: there is a strong correlation between average passenger per cruise ship call and the total cruise passenger movements in a cruise port (Figure 9).

Figure 9. Average size cruise ship calls in Med ports (2014)



Source: Own elaboration based on data from MedCruise, 2015.

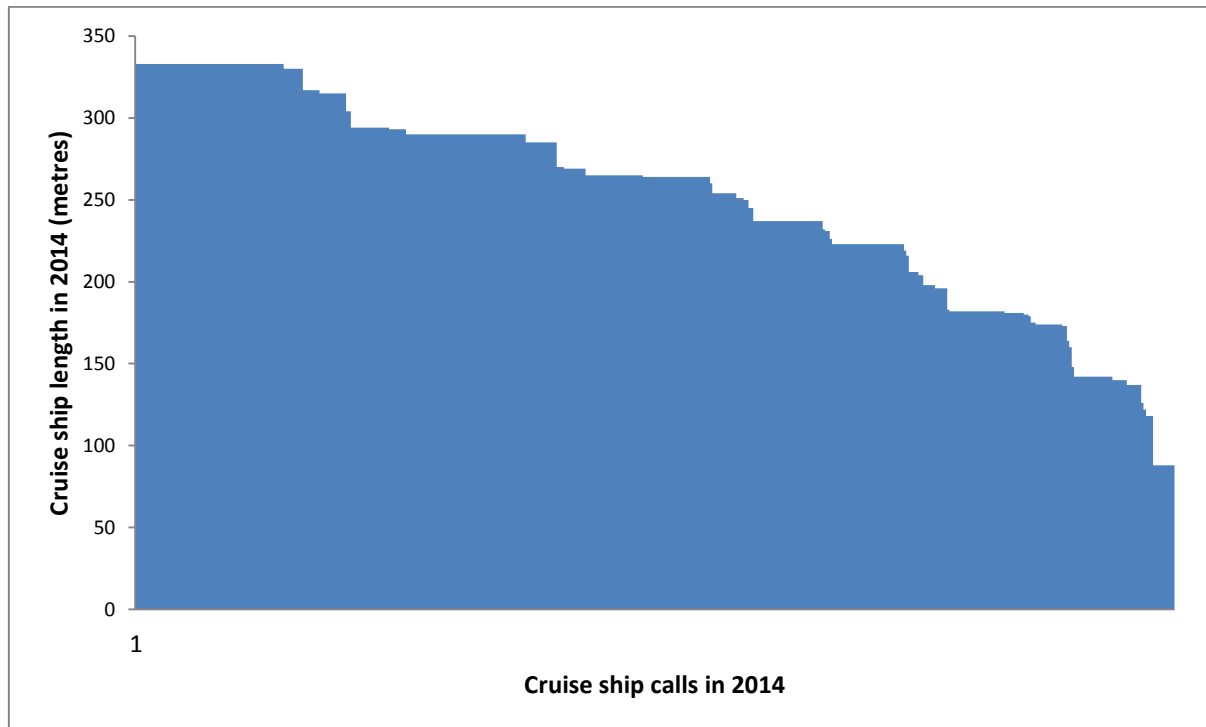
Figure 10. Gross tonnage of the cruise ships calling Venice (2014)



Source: Own elaborations based on data from Lloyds Intelligence Unit.

Approximately 35% of the cruise ships calls in Venice in 2014 were larger than 96 000 GT, 74% larger than 40 000 GT, the critical values stipulated in the proposal for the cruise ship ban. In terms of other dimensions, the following observations can be made: around three quarters (74%) of the cruise ships calling Venice in 2014 had a length of at least 200 metres; the tallest cruise ship calling Venice in 2014 had a length of 333 metres; the widest beam observed was 44 metres.

Figure 11. **Length of the cruise ships calling Venice (2014)**



Source: Own elaborations based on data from Lloyds Intelligence Unit.

Attractiveness of Venice as a cruise port

The attractiveness of Venice as a cruise port is first and foremost based on its exceptional assets as a destination. The unique historical city of Venice is one of the world's top tourist attractions, because of its cultural and architectural heritage, its historical value and unique high quality environment where the only motorised transport is waterborne. Due to these features, Venice has no real competitors, as the cruise experience in Venice cannot be replicated elsewhere. In addition, there are many other attractions nearby, including the historical cities of Treviso, Padua and Verona, as well as the Garda Lake. The wineries of the Prosecco or the Soave grapes, the Euganean Hills, golf courses like the Asolo Golf Club or the Lido of Venice, the Dolomites and Cortina d'Ampezzo are an hour and a half away.

These cultural assets have been made accessible by first-rate dedicated infrastructure. Venice has ten dedicated cruise terminals, with the necessary facilities and equipment for smooth operations, adding up to a yearly passenger capacity of 2.5 million passengers, thanks to considerable investments by Venice Port Authority (VPA) and *Venezia Terminal Passeggeri* (VTP), the latter of which has invested EUR 165 million since 1997. The horse-shoe shape of the Marittima area allows for the simultaneous berthing of seven cruise ships; in addition with the facilities at St. Basilio this raises the berth capacity to 12 ships. The increased quality of the terminal services and the new investments to enlarge the terminal

capacity have played a crucial role in making the Port of Venice the home port for so many shipping lines and a port of call for the cruises in the east Mediterranean. Another advantage for cruise lines is the presence of ship repair yards nearby.

The infrastructure assets in Venice include a well-connected airport, the Marco Polo International Airport located 13 kilometres from the cruise terminals. It is the third biggest airport in Italy with more than 200 daily flights, used by 99% of cruise passengers that come by air before starting their cruise trip. SAVE (Venice Airport owner and operator) is one of the major shareholders of Venice Passenger Terminal (22.8%) and an important stakeholder in the development and facilitation of the cruise business in Venice. It also organises special services for cruise lines and passengers such as luggage handling from the aircraft to the ship and faster processing of passengers and groups.

In addition, Venice is an interesting cruise destination because of the cruise port's location. The cruise terminals are located just at the exit of the *Ponte della Libertà* – the causeway connecting Venice to the main land – a few hundred metres from *Piazzale Roma*, in the historical city centre. There is a wide public and private transport offer with quick connections to and from the airport, but also to and from the historic city. All terminals are easily connected with the main land: cruise facilities are easily reached by car, taxi-cab, water taxi, public waterway, bus and the automated People Mover.

The attractiveness of Venice has impacts for the whole Adriatic region. The development of Venice as a home port and its location are also responsible for a significant part of cruise traffic at other Adriatic ports so the region is highly dependent on the capacity of Venice to keep attracting such a number of turnaround calls.

Challenges to Venice's attractiveness as a cruise port

One of the threats to the growth of cruise traffic in Venice comes from the increasing deployment of cruise ships in Asia. The concentrated industry structure of the cruise sector has resulted in strictly controlled supply of cruise ships, closely in line with demand for cruise shipping. Considering the growing demand for cruise shipping in less mature cruise markets in Asia, more and more cruise ships are being deployed in that area, which implies less deployment in the more mature markets such as the Mediterranean. As indicated before, this tendency has depressed the growth rates of the cruise ports in the Mediterranean including Venice.

A more specific challenge to Venice is the vocal local opposition to cruise shipping, which has resulted in a government proposal for a large cruise ship ban, adopted in 2013. This proposal intended to prevent ships above 96 000 GT from passing through the Giudecca canal – and therefore to call at the port – and to restrict passage of ships between 40 000 and 96 000 GT through the channel to five per day. The Veneto Regional Administrative Tribunal overturned this decision in early 2015, specifying that the ban could be implemented only once an alternative access route to the port could be found. Following this decision, several proposals have been floated that are still under discussion. These will be discussed in more detail in the “Policies” section below.

The cruise ship ban proposal has generated uncertainty on the future of cruise shipping in Venice. For the moment, cruise liners decided not to direct ships over 96 000 GT to Venice in 2015 and 2016. This will have an impact on the number of cruise passengers in these years, predicted to decline. On a more fundamental level, continuing uncertainty might undermine the status of Venice as Europe's largest turnaround port, which could have large impacts. The following section will outline the current impacts of cruise shipping in Venice and the final section of this report will touch upon the potential consequences of enduring uncertainty.

Impacts of cruise shipping on the port and city

The large influx of cruise passengers to Venice has evident impacts on the port and the city. This section focuses on economic, environmental and traffic impacts. Economic impacts relates to economic value added, for example as generated through spending by cruise passengers. Environmental impacts treated in this section relate to air emissions, waves and vibrations. Finally, traffic impacts are covered via the angle of port and waterways congestion, safety and security. The section also identifies when these impacts take place.

Economic impacts: Higher than the European average

There are various documents on the economic impact of cruise shipping in Venice. One of the first studies dates back to 2006 (Soriani et al., 2006) covering the average spending of cruise passengers in Venice in 2005. Subsequent studies have used the numbers of Soriani et al. and updated them in 2012 (Dosi et al., 2013; Di Cesare and La Salandra, 2012). The study of Dosi et al. (2013) is used as reference for some of the calculations in Tattara (Tattara, 2013, Tattara, 2014). There is also a study carried out by the Policy Research Corporation – commissioned by the European Commission – in which Venice figures, but this study is based on the assumed spending of a “typical cruise passenger” with findings from the literature on cruise passenger spending in other cities and regions. This does not take into account the specificities of Venice (Policy Research Corporation, 2009). And finally, there is also a study by CLIA on the economic impacts of cruise shipping in Venice in 2013-2015 (CLIA, 2015).

At the core of these studies is the average passenger spending of cruise passengers in Venice, as indicated in Soriani et al. 2006, namely EUR 175 for all cruise passengers and EUR 100 for the transit passengers. These numbers were derived from a survey of 404 respondents, including 73 transit passengers and 341 turnaround passengers. Based on this sample, the average spending of the different cruise passenger categories was established, including the turnaround passengers according to the number of nights they stayed in Venice, namely zero, one, two and three or more nights. The limited size sample has been criticised by Tattara (2013). The passenger spending, in addition to crew spending and ship spending, is used to calculate the direct economic impact. The update in Dosi et al. (2013) covers both the amount of average spending per passenger (which is assumed to have increased to EUR 195 in 2012) and the number of visitors, taking the 2012 numbers instead of 2005 numbers. Subsequent application of input/output modeling is used to provide estimations of indirect and induced economic effects.

Based on the assumptions above, Dosi et al. (2013) calculate a total economic value added of cruise shipping in Venice of EUR 397 million, EUR 221 million of which constitute “local effects”. These economic impacts translate into cruise-related employment, calculated to be 7 473 full time jobs at the national level, of which 4 255 are local jobs. This number more or less aligns with another study that tried to calculate cruise-related employment by mapping 91 regional cruise-related companies and their workers: according to this study, Venice had 3 700 cruise-related workers, more than 2 000 of which spend at least 50% of their time in activities related to or dependent on cruise shipping.

The economic impacts of cruise home port visitors in Venice is larger than that of transit passengers, but all depends on how long they stay in Venice. The average spending of transit passengers was found to be EUR 107 in earlier studies (Soriani et al., 2006), considerably higher than for home port

passengers without a night stay in Venice (EUR 19), and approximately the same amount of spending as a home port passenger that stays one night in Venice (EUR 109). The real difference is with home port passengers that stay two nights (EUR 494) or three nights and longer (EUR 690). This could indicate a potential increase of value added. If the share of home port cruise passenger without hotel night could somehow be halved (so brought down from 48% to 24%), e.g. by packages with airline companies, in favour of more overnight stays. This would increase the average cruise passenger spending to EUR 200 instead of EUR 175, and thus bring in additional local revenue to Venice.

Table 1. Average spending per transit and home port passenger in Venice (in EUR)

Visitor type	2004	2012	2013	2014
Source	Soriani et al., 2006	Dosi et al., 2013	CLIA, 2015	CLIA, 2015
Transit	107	172		
Home port	176	201		
All		195	140	135

Source: Soriani et al., 2006; Dosi et al., 2013; CLIA, 2015.

These figures for Venice are higher than what is usual in most European cruise port-cities. The European Commission estimated that home port passengers spend an average EUR 95 at European home ports, which is a weighted average between the expenses of those who stay in the city of destination (EUR 170 per capita) and those who do not stay overnight, namely EUR 45 (Policy Research Corporation, 2009). This estimate assumes that 40% of passengers to a home port stay one night in their place of destination at an average cost of EUR 70. For transit passengers it is estimated that average expenditure per passenger is EUR 60. Similar amounts are provided by the European Cruise Council, who estimated that the average cruise home port passenger spends EUR 74, with EUR 61 for passengers in transit (CLIA 2014a).

Environmental impacts: Emissions and waves

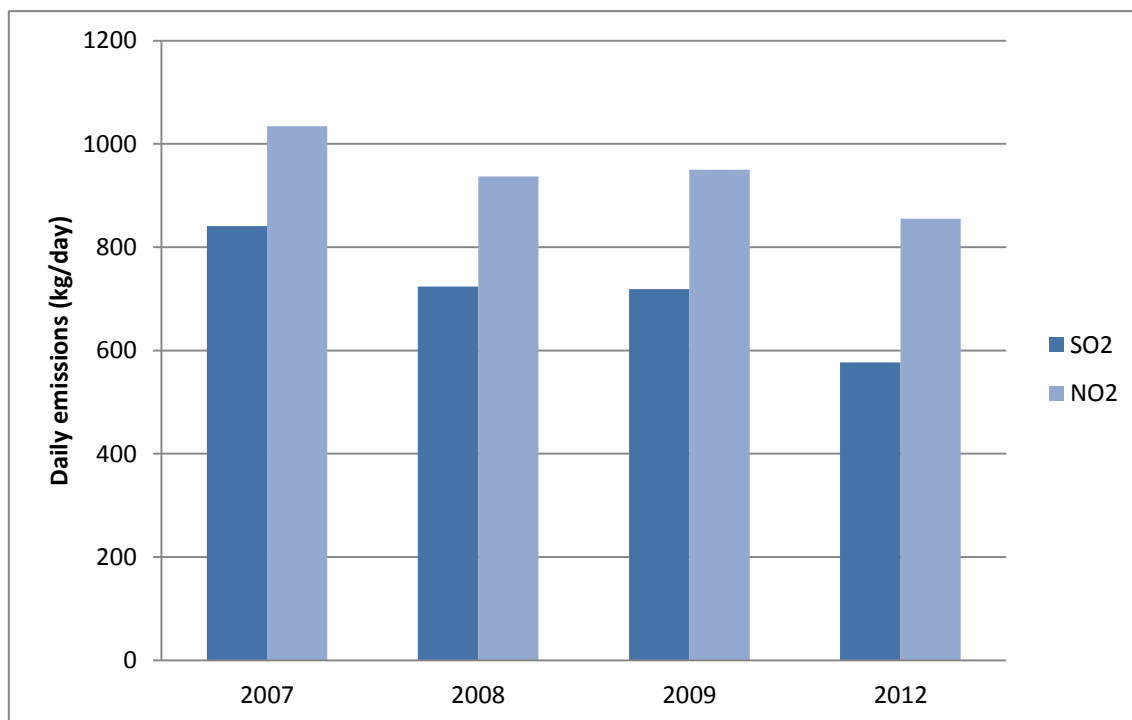
Various studies have been conducted on the air emissions of cruise shipping in Venice. Extensive research was conducted in the context of the European Program APICE, notably by ARPA Venet (ARPAV). ARPAV stands for: *Agenzia regionale per la prevenzione e protezione ambientale del Veneto*, which means: Regional agency of Venice for environmental prevention and protection. It is the main institution for air quality monitoring in the region and owner of most of the recording sites. The study covers all emission types and the weight of maritime transport on air quality of the city, with a specific interest of the impact of cruise shipping.

ARPA Veneto regularly conducts its own recordings and studies and works in collaboration with both the Venice Port Authority and the Municipality of Venice on their own impact assessments. The Venice Port Authority also commissioned several assessment studies from researchers at the University Ca'Foscari, with the help of IDPA-CNR (Istituto per la Dinamica dei Processi Ambientali) and ARPAV. Research was conducted every year from 2007 up to 2012, with the exception of 2010 and 2011. This positions Venice as a leader within Mediterranean ports in terms of air quality assessment reports and monitoring relating to cruise shipping. Several additional academic studies on the topic have been released as well (Contini et al., 2011; Contini et al., 2015).

Two main types of methods for recording emissions have been applied to the case of Venice: a model-based approach and empirical measurements using captors and meteorological data. The first calculation is based on installed power of the engines of each ship and the time spent at each stage of the ship's journey into the harbor, namely hoteling, maneuvering and cruising. This methodology has been

used in the context of the APICE/ARPAV project. Tattara (2014) employs a similar approach to calculate the external costs of air pollution in Venice. Another approach is to use air concentration in particles through captors, meteorological data and related methodologies developed to evaluate gaseous pollutant flow rates from moving sources which enables to assemble precise data for different time sequences (day, hour, ship passage, etc). With this method, however, it can be difficult to dissociate the impact of one ship from the other emission sources.

Cruise traffic generates air emissions, but these seem to be more or less in line with their share of ship calls. The results of the APICE project show that for the year 2011, cruise ships generated 46 tonnes of particulate matter (PM₁₀ and PM_{2.5}), 589 tonnes of NO_x and 136 tonnes of SO₂. During the same year, commercial traffic generated 108 tonnes of PM, 2 049 tonnes of NO_x and 338 tonnes of SO₂ altogether. Overall, port traffic in Venice generated 176 tonnes of PM, 2 895 tonnes of NO_x and 535 tonnes of SO₂. Given that passenger ships represented around 30% of the ship calls in Venice in 2011, these figures show that proportionally they are not contributing considerably more to air emissions than other ships. However these figures do not account for emissions when ships are in cruising mode through the lagoon. At the scale of all city emissions for PM_{2.5}, cruise ships contributed to 12% of all emissions the same year while commercial traffic accounted for 19% (ARPAV, 2013). Contini, et al. (2011) found other figures, estimating the direct contribution of ship traffic to PAHs (Polycyclic Aromatic Hydrocarbons) in the gas phase to 10% and the contribution to PM_{2.5} and to PM₁₀ from cruise ships to overall emissions between 1% and 8%. These differences can be explained by the different methods used and the smaller scope of the study. The studies commissioned by the Venice Port Authority account for a great diversity of emissions sources (PM_{2.5}, PM₁₀, SO₂, NO₂, PAHs especially). Recordings at the Giudecca Canal show that average daily emissions of SO₂ and NO₂ by large ships have decreased over the years (Figure 12), despite strong cruise passenger growth. This means that on average, emissions per ship have been decreasing, which can be explained by ships using cleaner fuels when cruising through the Venetian lagoon. Similar findings exist on the contribution of ship passages to PM_{2.5} concentration, which went from 7-8 % in 2007 to 2.5-4.5% in 2012. Average concentration of PAHs in the gaseous phase also decreased from 3.02 µg/m³ in 2007 to 2.05 µg/m³ in 2012.

Figure 12. Average daily ship emissions in the Guidecca Canal (SO₂ and NO₂)

Note: This figure contains the estimated total values based on air quality measurements. It includes the values for all ship traffic, including small boats.

Source: Venice Port Authority, 2007, 2008, 2009 and 2012.

Generally, large cruise ships seem to be generating less air emissions than smaller and “local traffic”. The average daily mass of gas emitted by these ships as they sail through the city is around 176 kg for SO₂ and 266 kg for NO₂. in 2012. Overall, total shipping emissions per year are 434.5 kg for SO₂ and 649 kg for NO₂. So, large and medium vessels correspond to around 40% of total emissions for both SO₂ and NO₂ which is significantly less than expected. This could be explained by the low sulfur fuels used by large cruise ships, due to the Blue Flag Agreement, subscribed in Venice (Premuda et al., 2011). Cruise ships are not important sources of CO₂ emissions, with 112 tonnes per year, compared to 845 tonnes per year for local water traffic overall in 2011. Similarly for NO_x emissions, 1 268 tonnes were attributed to local traffic in 2011, against 846 for cruise ships. The authors also claim that they generally have a lower local impact because emissions come out of the ship at an important height with smaller exposure for people and the city in opposition to local water traffic boats (Gambaro & Contini 2012). The APICE project results also verify this fact of PM emissions (PM₁₀ and PM_{2.5}) recording 85 tonnes emitted by local water traffic compared to 46 tonnes by cruise ships in 2011.

Overall, Venice is still close or over the acceptable levels of air emissions as defined by the European Union. From other research ARPAV (2013) showed that for NO₂ in 2012, the average annual emission level (32µg/m³) is just inferior to limit levels for health protection per day (40µg/m³). It has also been decreasing slightly from 2004 where it was reaching 39µg/m³. The NO₂ level was 300% superior to the limit for the protection of the ecosystem. The suspended particulate matter PM₁₀ is below (34µg/m³ in 2012) the annual acceptable limit (40µg/m³). However, there are many more days where emissions exceed the daily maximum of 50µg/m³. This should not be repeated more than 35 days per

year, yet occurs around 70 days per year. ARPAV also found that most of air pollution in the Veneto region is due to large external pollution produced outside Venice, but which is moved in by the wind.

Waves and vibrations

Large ships also create concerns because they produce waves. Two types of waves can be distinguished: surface waves and depression waves that are produced by ships underwater as they sail through the lagoon.

A study commissioned by the Venice Port Authority showed through the measurements of waves and currents made over the years that it is not possible to distinguish the effect of the passage of a ship along the Giudecca Canal and through St. Mark's Basin. The wave motion present, in fact, is due principally to the traffic of small boats (local traffic), while the displacements of water along the side canals take place at speeds comparable with those of the tidal flow. It is estimated, that cruise ships, because of their hull shape and low speed actually created less waves than small boats (Attilio Adami di Protecno srl, 2003: findings confirmed by a 2004 study from Venice Center for Study of Tides, the National Research Center and the City Council Commissioner for Wave Action). Further research would be required however for validation of the findings.

Concerning depression waves, the main issue is that it very likely contributes to erosion and deepening of the Venetian Lagoon. When ships sail they create water displacement that is a function of their speed and the depth of their hull below the waterline (a depression wave). In areas like lagoons, which are protected from sea waves and winds, their effects are much more important than in the open sea. Several studies conducted in the Venetian Lagoon have shown that ships, especially large ones create significant depression waves (Rapaglia et al., 2011, 2015; Parnell et al., 2015; Rodin et al., 2015; Gelinis et al., 2013). They can reach up to 2.5 metres in vertical displacement and can propagate up to 500 metres away from canals to shallow areas (Parnell et al., 2015). The phenomenon also explains partly how the lagoon has deepened substantially around the Maloccolo-Marghera channel since the 1970s. It is estimated, however, that ships alone cannot explain this phenomenon and that other factors also sped up that process (Rapaglia et al., 2015; Fletcher and Spencer, 2009).

Other effects of sediment resuspension are the reduction of sunlight penetration in the water, which could have important consequences on the health of the lagoon. Similarly, the resuspension of sediments coming from industrial areas can contaminate the lagoon's environment (Rapaglia et al., 2011; Rapaglia et al., 2015). However, an analysis of the lagoon's sediment was conducted by Masiol et al. (2014) and found that even if there must be relationship between erosion and deposition, the correlation between the two phenomena could not be proven, probably due to the interference of other factors. This phenomenon also does not occur in the Giudecca Canal, which cruise ships use today for transit to the terminal. The Canal is the only one that does not need maintenance dredging. Mitigation measures to limit the erosion effects of the lagoon would be to reduce ship navigation speed, to allow extra time and distance between each ship while they are sailing through the canal and to limit navigation to tidal levels above 0.3 metres from the reference mean sea level (Rapaglia et al., 2015).

None of these studies distinguish between the types of ships and the effects they produce and they all focused on the surroundings of the Maloccolo–Marghera channel. Further research is required on the impacts of cruise ship depression waves in the Giudecca canal and the impacts they have on the lagoon's environment. However the findings are interesting when considering the various alternatives to the Giudecca canal that have been proposed to dig new canals for cruise ships to reach the Marittima terminals (see the “Policies” section for details of the proposals). In light of these studies, such projects

could have a considerable impact on the lagoon and its environment, such as a further deepening of the lagoon and new consequences for its ecosystem and hydrology.

There is also a concern that vibrations from ships could be threatening the old foundations of the city of Venice. The Venice Port Authority commissioned a programme of research into the vibrations produced by maritime traffic to determine any effects it may have on structures (Franchetti and Modena, 2006). The measurements, carried out on the former building of the Venice Port Authority in front of the Giudecca Canal (obligatory passage for cruise ships), show that the vibrations detected do not have significant structural effects on buildings.

Traffic impacts: Fairly moderate effects

Cruise passengers are only a small part of the tourists that go to Venice each year which implies that their contribution to urban and waterway congestion is fairly small. Every year, Venice hosts around 1.7 million cruise passengers. Venice Port Authority estimates that within these, only about 500 000 people stay as tourists in the city. Riposte Turismo and Venice Terminal Passeggeri's study (2011) finds that most cruise passengers go directly to the ship (73.2%) and leave straight from it (71.1%), compared to those who stay at least one night before or after (24.2% and 16.5%) or just allow themselves a few hours to walk around the city (2.6% and 12.6%). These figures do not include pre-booked city stays through cruise lines, which explains why the percentages are lower. Most cruisers actually decide not to visit the city, the main reasons being that they have already visited it, that they live close enough so that they will have other visiting opportunities and that they are lacking time.

Port and waterways congestion

Cruise passenger travel patterns in the city also show that cruise shipping is generally not responsible for important congestion of main transport modes and ways in the city. Three types of cruise passengers can be distinguished in order to understand the movements resulting from cruise shipping around the city.

The first type of cruise passengers are those who arrive in the city and embark directly onto the ship (or alternatively, leave the city as soon as they disembark). These do not create congestion in the city directly since they just connect to the terminal from the airport, the train station or arrive directly by cruise lines buses or their own cars. The three favoured alternatives for directly reaching the terminal are the car (and consequently using parking available at the terminal or nearby), the People Mover that goes from Piazzale Roma to the Terminal, and Cruise operated buses. Statistics from SAVE (airport company), estimate that from Marco Polo Airport to the terminal; around 80% of cruise passengers use special cruise line transfers and not public buses.

The second type of cruise passengers are those who embark or disembark in Venice but decide to stay a few days in the city before or after their cruise. They tend to book accommodations in the historic centre in large majority (66.2% before cruises and 60.1% after), with others staying in the Comune (27.3% and 32.5%), with very few staying further away (6.5% and 7.4%) (Risposte Turismo, 2011). In general 85% of them visit only the historic centre during their stay. From the city to the terminal and vice versa, there is no substantial impact on traffic since most of them apparently use the People Mover (64% to go to the terminal, and 47% to reach the city from the terminal), that is especially dedicated to move passengers from the cruise terminal to the city centre, therefore not used as extensively by locals and other tourists. The other preferred transport means are Alilaguna (18% to reach the terminal, 19% to reach the city), water taxis (7% to reach the terminal, 13% to reach the city) and walking that remains a significant option (11% to reach the terminal, 6% to reach the city) (Risposte Turismo, 2011). These

fluxes are important additions to local traffic but given the small number of cruisers visiting the city each year their contribution to congestion is not significant.

The third type of cruise passengers transit passengers who only get off the ship for a few hours during the day. This type is more of an issue in terms of congestion as it might cause extra stress on an already saturated infrastructure. However, the number of transit passengers through the Port of Venice is very limited (10.66% of the calls in 2014). Transit calls are a greater operational challenge because several thousands of passengers need to be brought in the city centre within the least amount of time possible. The terminals do not have much space available to operate the rotations. Only two or three boats can stay inside at the same time, with boats having in majority a capacity of 100 passengers even if 200 to 300 passenger boats can exceptionally be deployed. Overall, transport companies do not have much extra capacity since these other ships are not needed the rest of the time (Alilaguna / Vela). The preferred transport mode for transit passengers remains the boat to the city centre, which occasionally imposes extra pressure on waterways.

Security and safety

The only access to the Marittima passenger terminal implies going through the Lido and then the Giudecca canal, currently the only way that is deep enough (10 metres) to accommodate large vessels, considering that the average depth of the lagoon is 1.5 metres. This canal passes through the city and in front of Saint Marco's square, which has caused concerns among the local population and associations as regards to safety and security. However, the perspective of a ship crashing into the city is highly unlikely, according to the responsible authorities: the canal is deep in its center but next to the shore water depth is no more than two metres, which means that ships would be grounded rather than collide with the city. In addition, there are important security measures taken for ships crossing the Giudecca canal. Each cruise ship has two pilots and is guided by two tug boats, the maximum allowed speed is six nautical miles, the minimum distance between ships is two nautical miles and there are restrictions in case of bad weather conditions. For example, ships are not allowed to come if there is less than 400 metres visibility or wind over 30 knots. Pilots reach the cruise ship on their own pilot boats that establish their identity, which minimises the possibility of intrusion on the ship (from terrorists for instance) (Piatelli et al., 2012).

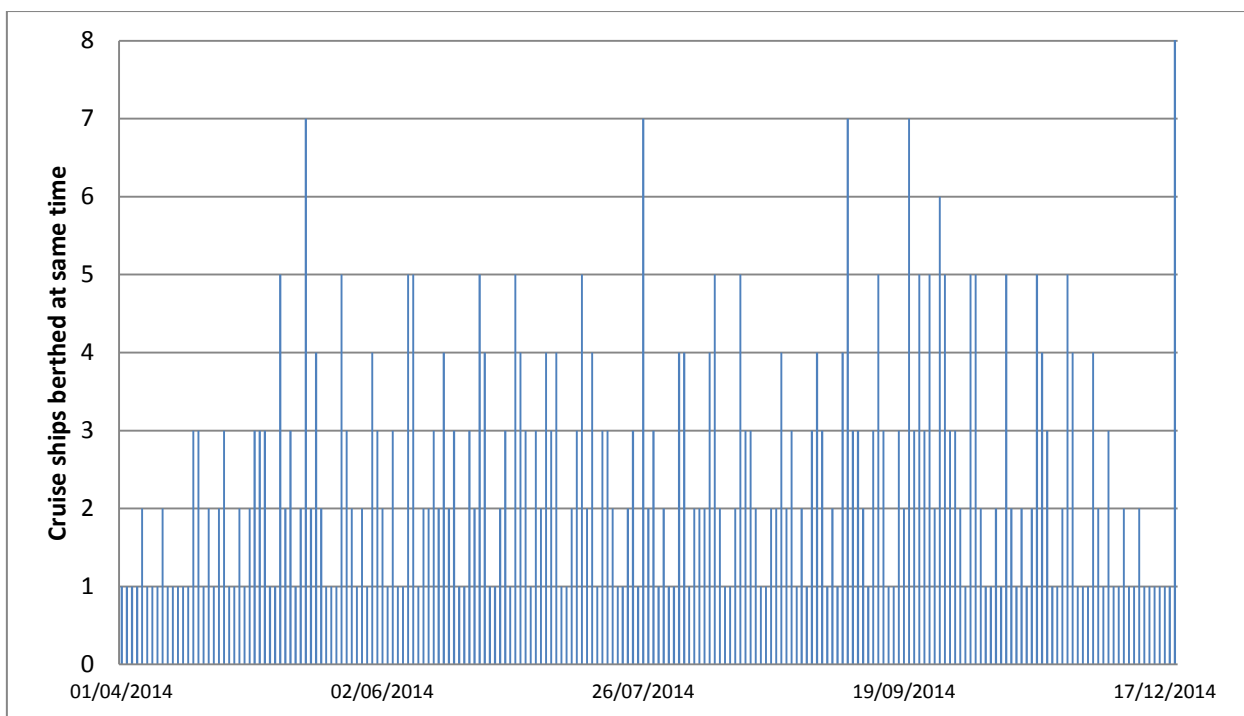
In addition to the practical elements, the Port of Venice uses technical tools to ensure that no risks are taken during the ship's approach of the terminal. It uses a satellite based monitoring system (AIS System) to constantly track vessels and their progression so intervention can be ordered if any issue is detected. The port authority also developed a system called Hydra with sensors recording vessel speed, wake effects, traffic density and visibility conditions to spot and avoid potential threats. A simulator is available to pilots so that they can practice navigation through the channel before they manoeuvre for real (Piatelli et al., 2012).

When do impacts occur?

Cruise port stays are unevenly distributed over the week, even during peak months. During the cruise period, there is always at least one cruise ship berthed in Venice, but much depends on the period of the year and the days of the week. In 2014 there were four days during which Venice had seven cruise ships at the same time, and 23 days with at least five cruise ships. Seven of these days with at least five cruise ships were in September, a peak month for cruise shipping in Venice. These peaks are concentrated around weekends.

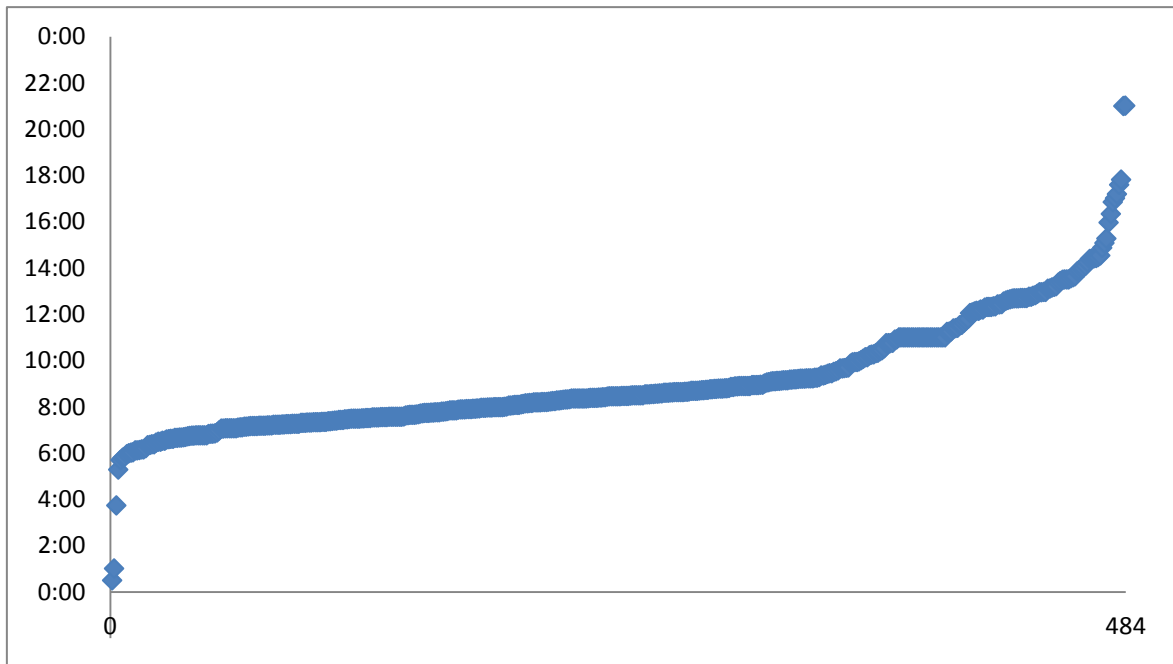
The cruise ships typically arrive in Venice in the early morning, whereas the typical departure time is in the early evening. Between 6am and 9am, 63% of the cruise ship arrivals take place, with the exact same share (63%) of the departures occurring between 6pm and 9pm. This means that cruise ship movements during the day are relatively limited: 14% of the total cruise ship movements take place between 11am and 4pm.

Figure 13. Number of cruise ships berthed at the same time for each day in 2014



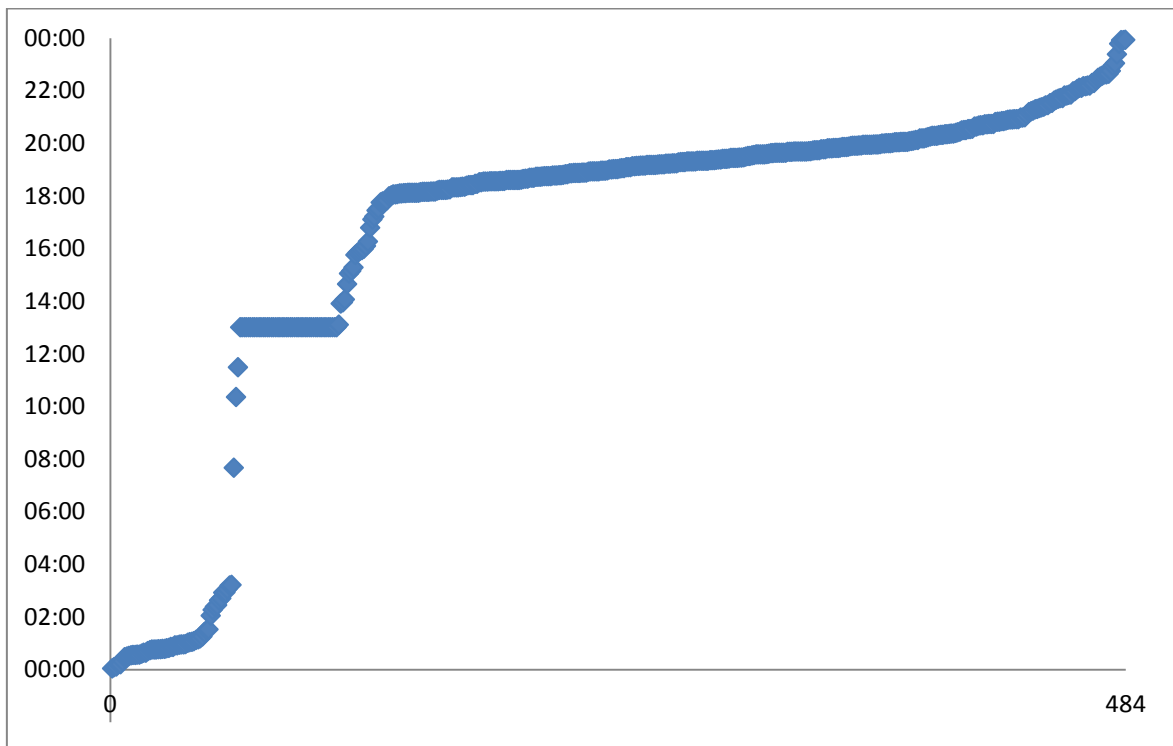
Source: Own elaborations based on data from Lloyds Intelligence Unit.

Figure 14. Arrival times of the cruise ships calling Venice (2014)



Source: Own elaborations based on data from Lloyds Intelligence Unit.

Figure 15. Departure times of the cruise ships calling Venice (2014)



Source: Own elaborations based on data from Lloyds Intelligence Unit.

Policies

Do policies in Venice manage to get the best out of cruise shipping? That is the central question of this section and in order to answer it, the following section identifies main policies deployed and provides an assessment as to their results. Part of this section presents the ongoing discussions on the place for cruise shipping, considering real or perceived impacts from large cruise ships, the large cruise ship ban that resulted from this and the possible alternative access routes proposed. Other elements treated below include the role of cruise passengers in city tourism policies, as well as green port policies to mitigate the environmental impacts of cruise shipping on residents.

Determining the place for cruise shipping in Venice

Cruise port policies in Venice have accommodated trends in the cruise industry. Substantial investment in terminal capacity has taken place to facilitate the arrival of increasingly large cruise ships. As such, it seems that implicitly or explicitly, the cruise policy of Venice has been driven by increasing the number of cruise passengers visiting Venice and maximising the number of employees. The increase in cruise ship size is evidently driven by commercial considerations of cruise lines, with very limited room for ports to influence this. However, considering the position of Venice as an almost inevitable cruise destination, one could wonder if Venice might not have been in a position of moderating the size of cruise vessels, if it would have set out a more selective approach towards cruise vessels that can call Venice.

Consequently, Venice has attracted ever larger cruise vessels, which have become some kind of scapegoat for many concerns, including their dominant visibility in the urban landscape of Venice, potential security concerns, and environmental and wave impacts, which would affect the unique status of the heritage of Venice and its Lagoon. The previous section of this report discusses the merits of these different claims. Whatever validity these might have, the concerns have found expression via various associations (e.g. No Grande Navi, Ambiente Venezia) that have managed to bring the issue to the attention of local, national and even international media.

This set of concerns has motivated the cruise ship ban. This ban has come in two parts. The first part was an inter-ministerial decree (the Clini Passera Decree) in March 2012, which stated that transit through the Giudecca Canal for passenger and commercial ships should be limited to 40 000 GT once alternative routes would have been identified by the port authority and would be available. In November 2013 new limitations came into effect via a resolution of the Ministry of Infrastructure and Transport, confirmed in ordinance no. 153/2013 of the Maritime Authority, containing the following elements:

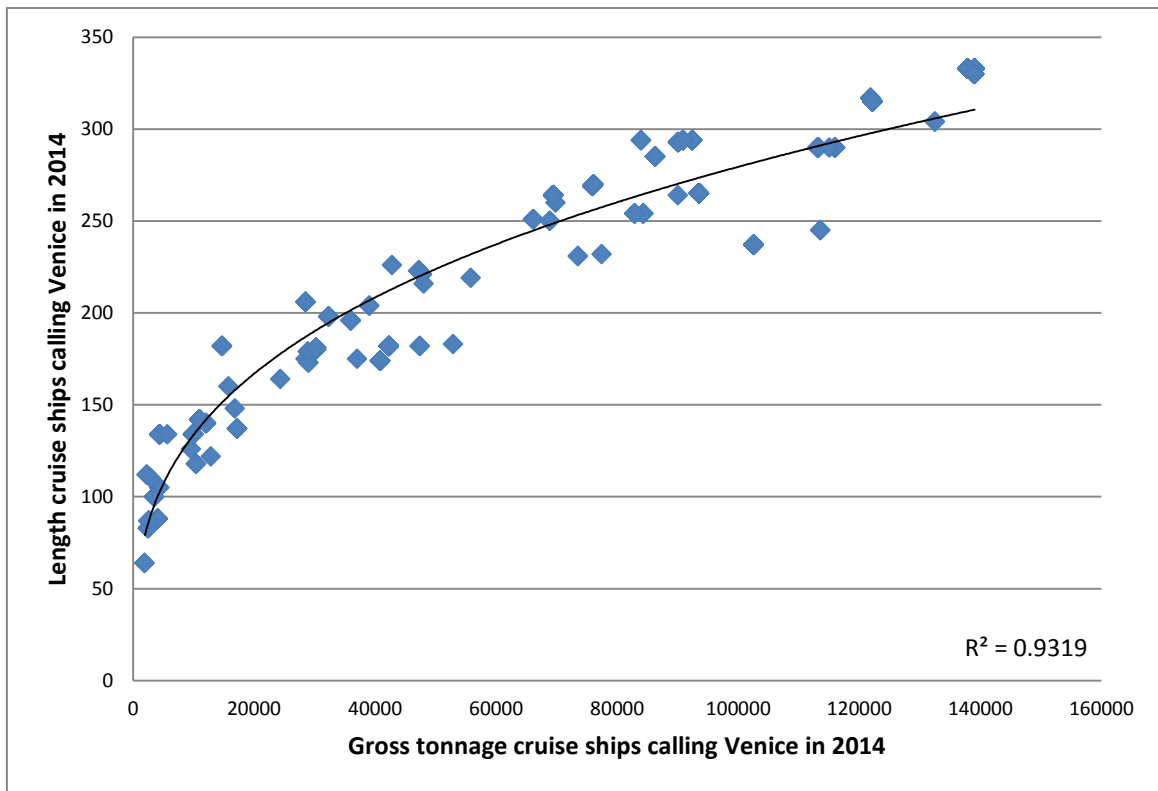
- Prohibit ferries in the Giudecca Canal beginning 1 January 2014, with the aim to reduce the number of cruise ships above 40 000 GT by 20%
- Ban all ships above 96 000 GT from the Giudecca Canal by 1 November 2014
- Moorings limited to five per day for ships over 40 000 GT
- Reduction of transit through the Giudecca Canal during the central hours of the day

This ban is currently not implemented due to various legalistic complications. The Veneto Regional Administrative Tribunal decided in January 2014 to suspend the resolution of the Ministry and lift the ban until an alternative project would be validated. Such an alternative route was presented in the form of

the Contorta Sant’Angelo, as proposed by the Venice Port Authority, on which an environmental impact assessment was requested in August 2014. In the meantime, various actors floated other proposals. These different proposals will be presented in more detail below.

One could wonder if the cruise ban takes the right criteria into account. If the sheer size of cruise ships would be the main problem to tackle, gross tonnage could be considered a relevant measure, as it is highly correlated with the cruise ship length (Figure 16), but in that case ship length, beam or air draft could have been taken as more direct criteria. In terms of environmental impacts, there does not seem to be a clear relation with gross tonnage. As mentioned above, large cruise ships might actually score better on some of the indicators, such as air emissions. The largest cruise ships are recently built and might have more energy efficient designs; the smaller vessels generally tend to have higher average age. Alternative measures could have included yearly quota for the number of passengers, air emissions or other indicators.

Figure 16. Relation between cruise ship length and gross tonnage

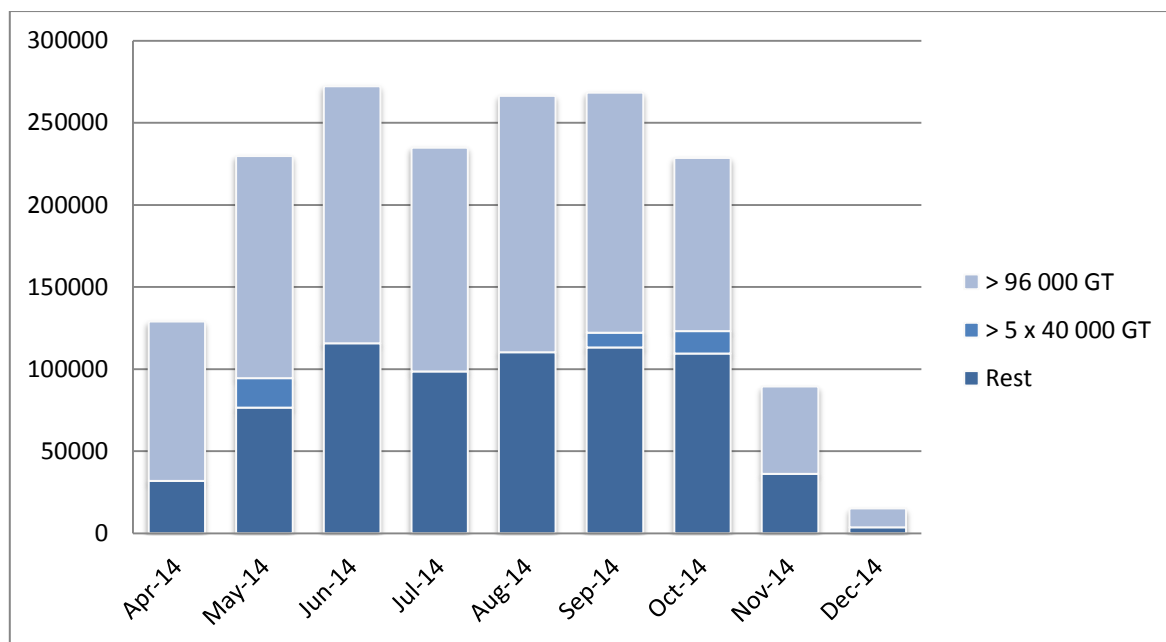


Source: Own elaborations based on data from Lloyds Intelligence Unit.

The impacts from the proposed cruise ship ban would be very substantial. This is in particular the case for the part of the proposal that would ban ships with a volume larger than 96 000 GT, as these ships covered 35% of the cruise passenger movements in Venice in 2014. The second constraint from the cruise ship ban (not more than five passages of ships > 40 000 GT) does not have much additional impact. Although there were 42 days in 2014 in which the movements of ships > 40 000 GT exceeded five, there were only six days for which this was the case for ships between 40 000 GT and 96 000 GT. If the cruise ban would also imply banning all ships above 40 000 GT, this would have even larger impacts, as this represents 74% of the ship calls, and an even larger share of the cruise passengers. A study

commissioned by the Venice Port Authority found that a ban of all cruise ships above 40 000 GT – assuming that 20% of the passenger traffic from these ships would be substituted by smaller ships – would lead to a reduction of 90% of total passengers numbers; and a 86% drop of direct economic effects from cruise shipping (Dosi et al., 2013).

Figure 17. Impact of the proposed cruise ship ban

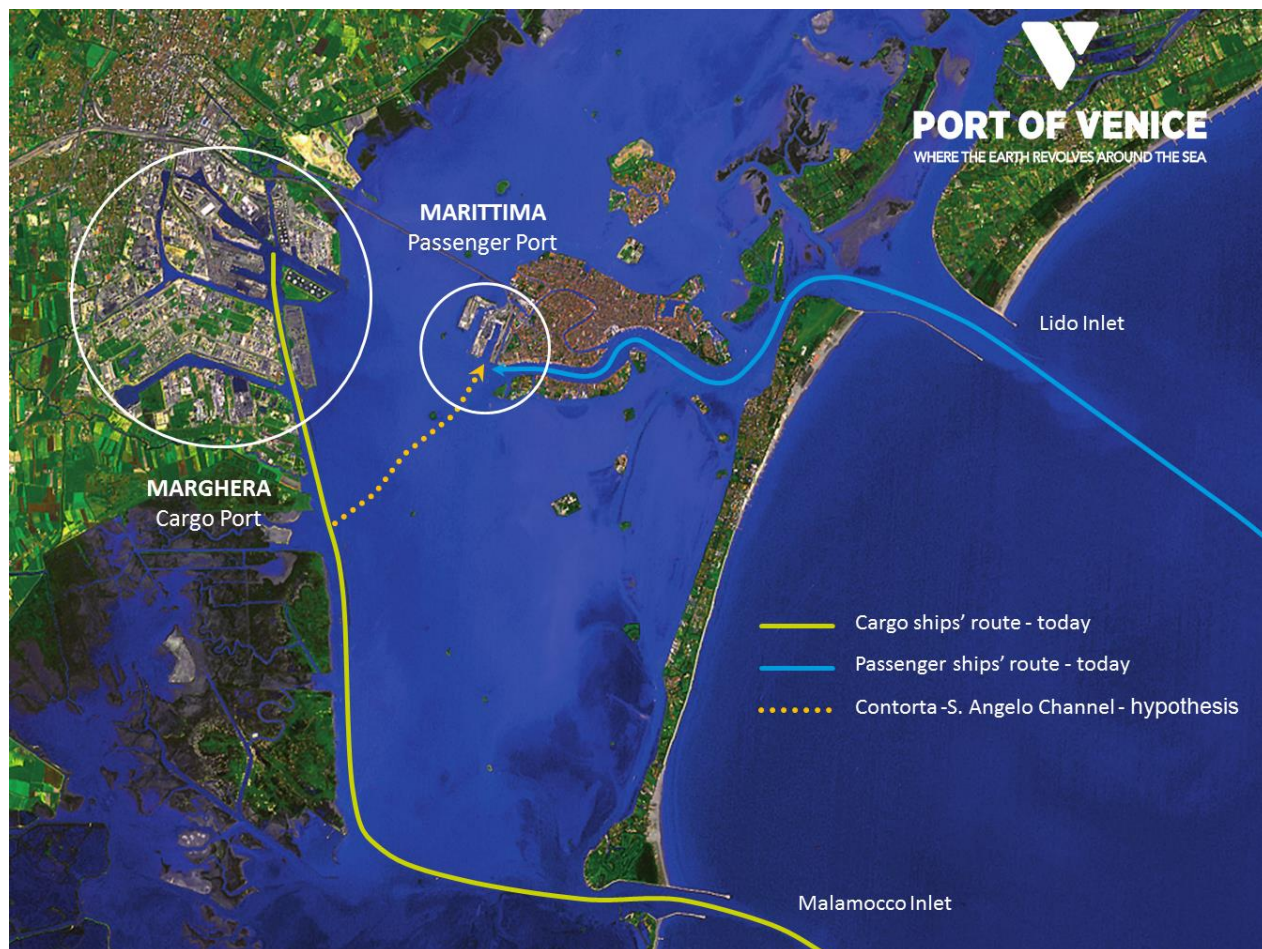


Source: Own elaborations based on data from Lloyds Intelligence Unit.

An alternative access route: The Contorta Sant' Angelo

For the Venice Port Authority, the favored alternative would be a re-routing via the so-called Contorta Sant' Angelo. Instead of passing through the *Bocca di Lido* and the city, the ships would instead use the *Bocca di Porto di Malamocco* (south entrance to the lagoon) and the canal currently dedicated to commercial ships (*Canale Malamocco Marghera*, also called *Canale di Petroli*). Before they get to Port Marghera (commercial port), cruise ships would move eastwards into a new canal (*Contorta Sant' Angelo*) created by the Venice Port Authority to fit the standards of the largest cruise ships. This canal would be 100 metres wide and 10.5 metres deep over a stretch of 4 kilometres; current depth is 1.5 to 2 metres. VPA would take advantage of the collected sediments to reconstruct parts of the lagoon. The estimated cost of the project would be EUR 130 million: which includes EUR 40 million for dredging 7 million cubic metres of sediments, EUR 70 million for reconstruction, and EUR 20 million for extra costs. The canal would take a year and a half to two years to be completed, but the Ministry of the Environment estimates that full implementation would take a total of four years in order to complete others adjustments required for the project to work, such as adjustments to the *Canale dei Petroli*, once all the permits have been granted.

Figure 18. The proposed Contorta-Sant' Angelo channel



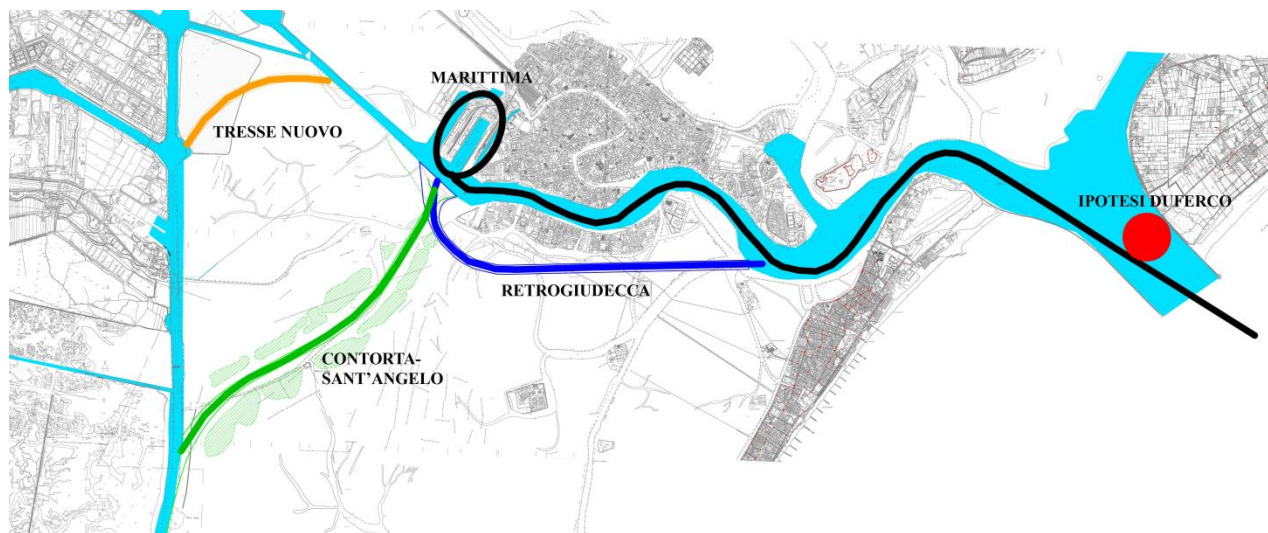
Source: ANSA.

The proposal is not uncontroversial. Environmental protection associations are strongly criticizing the project as they fear it could have dramatic effects on the lagoon. Since the Malamocco Marghera canal was dredged (in the 1960s), the lagoon's ecosystem has been disturbed and new water flows have been created which results in consequent losses of sediments that are pushed out of the lagoon with ship movements (Sarreta et al., 2010; Rapaglia et al., 2015). The extent of sediment movement is explained by the presence and repartition of sediment which is free of physical obstructions to their displacement (salt marshes, sandbanks, islands), elements that the Contorta Canal Project aims to recreate so as to limit sediment loss in the lagoon. However, according to estimations from environmental organisations, around 1 million cubic metres are lost every year; they estimate that since the completion of the project, the average depth of the lagoon has gone from 0.7 metres to 1.5. Dredging the new canal might speed up this process. The volume of sediment lost each year could reach up to 1.7 million cubic metres, according to associations, with the risk that the lagoon – as characterised by its typical shallow water – would disappear with average water depth reaching 2.5 metres within the next 50 years. The project was submitted to the National Government for an environmental impact assessment in August 2014, but the assessment has not yet been finalised. In July 2015, the Veneto Regional Administrative Tribunal (TAR) opposed the Contorta Sant'angelo project, as alternatives other than the Contorta Canal were not taken into account (see Box 1 for alternative proposals). The city and the port have appealed against this decision.

Tresse Nuovo: An alternative to an alternative

Following the negative assessment by the Veneto regional administrative tribunal, the Venice Port Authority and City Council released a new proposal in November 2015: the “Tresse Nuovo” project. The aim of this project is to find an alternative for cruise ships passing through the San Marco basin and Giudecca channel. This project foresees the excavation of a new channel that would allow cruise ships to enter the Port of Venice through the Malamocco inlet, without interfering with the cargo traffic. Cruise ships would sail along the Malamocco-Marghera channel up to the beginning of the cargo port area and then take a diversion towards the Marittima terminal (Figure 19). This solution, like the Contorta Sant’Angelo, would allow for the separation of the cargo and cruise traffic flows. The new channel is shorter than the proposed Contorta channel and will arguably have less environmental impacts, as the installation of submerged elements to separate the canals (Malamocco-Marghera) from the lagoon, negative effects on the sediments would be eliminated according to the port authority. The proposal has been sent to the Veneto Region and the Ministry of Environment for the environmental impact assessment.

Figure 19. The proposed Tresse Nuovo project



Source: Port of Venice Authority.

Offshore cruise port: A viable option?

Various ideas have been floated which have in common that they suggest creating a new cruise port at the entrance of the lagoon just outside of the Lido inlet. All the proposals aim at minimising the environmental impacts of cruise shipping on Venice and its lagoon by avoiding excavation works.

These proposals raise technical concerns, questioning their viability. The proposed location of the new cruise terminal is prone to strong currents and winds, which poses safety challenges for mooring large vessels according to nautical experts. Cruise lines, pilots, ship agents, tug and mooring companies have indicated that the conditions of the location will make it more risky and difficult for ships to berth safely at the terminal, increasing the stress for the actors in ship operation but also for passengers (APV, 2014). Due to traffic restrictions in function of weather conditions, the terminal will also be operational fewer days per year than is Marittima due to the exposure of the location; currently ships cannot reach the terminal 20% of the 365 days in the year due to weather conditions. Moreover, the number of ships

that can berth simultaneously dropped from eight to five, so capacity would be consequently reduced. There also remains a lot of uncertainty concerning the interaction of the project with the MOSE system (APV, 2014). This project intended to protect the city of Venice from flooding via an integrated system consisting of rows of mobile gates installed at the Lido, Malamocco and Chioggia inlets that could temporarily isolate the Venetian Lagoon from the Adriatic Sea during high tides.

The offshore location of the port would also mean that passengers are transferred to and from the terminal by smaller ships. This would result in a large increase in ship traffic in the lagoon. According to estimations by Venice Passenger Terminal 16 catamarans with a capacity of 800 to 1 000 passengers would be needed to move passengers from one terminal to the other. If these would be turnaround passengers, luggage would have to be taken into account implying much more complicated logistics operations for regular tender operations. For provisions that need to be taken to and off the ship (goods, food, water, waste, fuel, etc.) estimations point to another 40 round trips needed with barges (Worlds Monuments Watch, 2014; CLIA, 2014). All these new movements and the distance between Marittima Terminal and the new terminal will imply a strong increase in tariff for cruise lines, by 130% according to estimations of VTP, which could deter them from calling at Venice.

None of the important cruise home ports in the world are offshore ports. Cruise home ports tend to have developed terminal structures on land, for obvious reasons. Tendering implies more logistics to move around people, therefore more time that is lost by passengers in the process and time is critical for turnaround operations. Turnaround ports need to arrange for check-in and check-out operations to conduct, luggage handling and security checks, which are all rendered much more complicated if there is no fixed land infrastructure in place. In practice, an offshore cruise port for Venice would mean the end of the home port status of Venice. For CLIA (2014), the time needed to operate turnarounds in the conditions that would emerge from this terminal are simply incompatible with the dynamics of the cruise industry. It estimates that for disembarking a 3 500 passengers ship, operations would take no less than five hours for passengers to be ready to leave the terminal from the time they leave the ship. CLIA identified various issues such as the complications that could result from the simultaneous arrival of passengers and luggage from different ships at the terminal and the planned capacity for operations (both luggage and passengers) that is unrealistic when taking into account current volumes handled.

Even if Venice would only do transit calls, transferring all cruise passengers by smaller ships would be very unrealistic. Time is also an critical issue for transit calls since ships stay at berth only for a few hours and passengers do not have much time to spend in the city. Moving several thousand passengers from the terminal to the city would imply significant time loss, which most cruise passengers would not appreciate considering the marquee character of Venice. In European ports, tendering is the exception, carried out when ports lack space or infrastructure, and in most cases when passenger volumes are low. This means that the tendering process can be smoother and also that there are much less incentives to invest in a terminal if it could be feasible. In most cases this practice ceases to be used when new terminals are constructed, as show the cases of La Spezia and Dubrovnik. The exception is formed by some Greek Islands, such as Santorini and Mykonos that continue to use tendering despite high passenger volumes. Given the situation of Venice and the density of already existing small boat traffic it appears unpractical to conduct such operations and extra passenger movements within the Venice Lagoon. Technically and in practice this seems complicated and would lower the service quality currently available at Venice Passenger Terminals that attracts cruise lines.

The creation of an offshore cruise port would imply that Venice loses the locational advantages of the current cruise port (Stazione Marittima), which is in walking distance from the historical city and has smooth access to Marco Polo International Airport. This would likely have large repercussions in terms of foregone economic value added. When looking at other major turnaround ports in Europe, these seem

to be conditions to be a cruise home ports (Table 2). All of the largest home ports in Europe are located close to the city centre. This means that almost all of them are within a few kilometres from major tourist attractions. The only exceptions are terminals servicing major non-coastal tourist cities, cities whose core and attractions are located inland even though their metropolitan area stretches up to the coast in some cases such as Southampton (London), Civitavecchia (Rome) and Piraeus (Athens). Individually, some highly rated attractions can be located away from the city center, which is the case in cities that are not major European cultural capitals (Southampton, Kiel) but their cruise terminals remain close to the city center. A similar logics exists with regards to the distance to airports and train stations (in the cases where these are the main way to reach the cruise ship). Almost all cruise terminals in these cities are located no more than twenty kilometres away from the airport. Again, the three major home ports of Civitavecchia, Southampton and Piraeus are located slightly to a lot further away for the reasons developed earlier. In cruise ports whereby train is an important means to reach the cruise, train stations are located within minutes from cruise terminals like it is the case in German home ports for instance. If an offshore cruise terminal would be built, Venice would lose the advantages it currently has in terms of pedestrian access to the city center and smooth connectivity to its airport, unless it would be linked to an underground metro system linking it to the airport.

Table 2. **Main European home ports and their distance to main tourist attraction and to airport**

Port	Distance to main tourist attractions (km)	Distance to nearest airport (km)
Southampton	31	8
Venice	3	14
Barcelona	7	15
Civitavecchia	72	63
Savona	3	10
Palma Mallorca	2.5	12
Genoa	1	41
Hamburg	2.5 – 8	14
Marseille	11	20
Copenhagen	4	17
Kiel	20	10
Piraeus	10	50
Amsterdam	3	21

Source: Own elaboration from Google Maps data.

Box 1. Other alternative proposals for cruise ship access to the Port of Venice

There is no shortage of alternative proposals to passage via the Giudecca Canal, the Contorta Canal and the Tresse Nuovo. Three of these proposals are presented below. Other new canal options to access Marittima port also exist and include the Vittorio Emanuele III Canal option and the possibility of a new Canal behind the Giudecca Island.

Vittorio Emanuele II Canal. The first option consists of letting ships reach the Marittima Terminal by going through the Malamocco mouth to the lagoon, the Canal dei Petroli and the commercial port to reach the terminal parallel to the Ponte della Libertà that trains and road vehicles use to reach Venice from the mainland. The ships would turn at the east of the Tresse Island. Difficulties with this project would be the use of the same canal by commercial and passenger ships, limited space for manoeuvre within the Marghera part of the port and safety issues given the dangerous nature of other activities in the port. This option also requires excavation that could have effects on the lagoon's equilibrium as is the case with the Contorta Sant'Angelo project even if the extent of the dredging works would be reduced. If cruise ships were to take that route it would also increase the time to reach the terminal.

Outer Giudecca Canal. The second option is to create a new canal for ships to reach Stazione Marittima but in this case, it would be dug behind the Giudecca Island so that ships still reach the lagoon through its mouth at the Lido. The cost of such project has been estimated at EUR 60 million and would require two years to be effective. Similar fears concerning the effect of a new canal on the lagoon have been expressed and this route could also directly threaten the Giudecca Island that would be surrounded by two canals on which there is important boat traffic.

Relocation of the cruise terminal to Port Marghera. This project consists in converting old industrial port areas within the area of Marghera into a new cruise terminal. The new port would be divided into two terminals: one in the North Industrial Canal, and the other in the Brentelle Canal. To reach it, cruise ships would have to access the lagoon through the Maloccolo inlet and sail along the Canal dei Petroli. This scenario implies dredging the terminals up to 10.5 metres and reworks of the embankments. Along with the new berths, an urban renewal project of the current Marittima Terminal would be considered, while it would keep hosting ships under 40 000 GT. The cost of the project is estimated at EUR 250 million. The proximity of industrial activities in the area would however create an environment that is less safe and attractive than at the Marittima terminals unless port activities are re-designed in accordance.

Towards a “Venice Standard”?

The Port of Venice has developed a cruise strategy within the existing framework of conditions, rules and market developments. The cruise industry has over the last decade seen a steady expansion in demand for cruise activities and pushed for larger cruise vessels to accommodate this demand. The Port of Venice and the Venice Passenger Terminal have managed the expansion of port infrastructure and services able to facilitate this development. As a consequence, smaller cruise vessels would mean a steep increase in the number of vessels deployed (if volumes remain the same), or a decline of volumes – and thus opportunity costs, in the form of non-realised returns on investments and foregone local economic value added. As such, Venice is in a sense constrained by a certain path dependency. Under current conditions, a significant increase in cruise calls to Venice to compensate for smaller size would have impacts on lagoon traffic and environmental pollution that risk to be larger than the ones caused by the larger cruise vessels, which are generally more modern and eco-friendly, apart from the fact that vessels smaller than 40 000 GT currently represent a minimal part of the world cruise fleet.

However, in a longer term perspective, it would be possible to imagine a different development scenario for cruise shipping in Venice. Considering the opposition to mega vessels – not only in the cruise sector, but also in other shipping sectors such as container shipping (ITF/OECD, 2015) – new “rules of the game” could be discussed, so as to reduce the size of vessels calling the port and, simultaneously, to allow shipping lines to adapt part of their fleets to comply with stricter Venice regulations. The idea of a “Venice standard” cruise ship, a ship that best fit with the features of the Port of Venice has been proposed by the port authority and could be explored further, even if it would take a considerable transition period before it could be realised, considering that new vessels would have to be designed and constructed.

Tourism and cruise tourism policies in Venice

There has been a lack of a clear and defined strategy for the cruise sector in the city. It seems that it has grown independently from it by VPA and VTP with few other local actors developing a consciousness of the potential gain they could retain from it. There has been an important divide between the two and therefore a lack of understanding. Since 2012, this phenomenon has increased with on one side the reinforcement of a “dialogue of the deaf” between shipping actors and those firmly defending the need to ban cruise ships out of the city and on the other side a real reflection by some around the economic benefits it brings to the local economy.

This forms part of a larger picture: a lack of a tourism strategy for Venice. There is wide-spread agreement over how the carrying capacity of the city for tourists has been continuously stretched over the last decades up to a point that could be considered hardly bearable for its residents. This would require a strong and coherent response, well beyond measures that have so far been taken. Measures currently in place include a tourist fee for coach passengers of EUR 5 and a tourist tax of EUR 5 per hotel night. Attempts in this direction have been hampered by certain legalistic obstacles; the tourist tax for example is a nationally determined tax that cannot be differentiated according to local needs.

A tourism strategy for Venice would need to identify the kind of tourists Venice would prefer to continue to attract, while putting disincentives in place for the tourists that it would prefer to avoid getting. An obvious approach might be to devise this strategy based on the extent of economic benefits and negative impacts generated by each type of tourist. Although we have not seen any analysis in this sense on other types of tourists in Venice than cruise passengers, our a priori assessment would be that cruise passengers to Venice would bring relatively large economic benefits. In terms of negative impacts, cruise passengers are associated to the impacts from cruise ships; a comparison with other tourists would need to associate these with the impacts from their local transport means. Disincentives that could be considered include entry tickets to the city, quota of the number of visitors allowed and additional local tourist fees.

Green port policies

Venice has been a pro-active port in its efforts to mitigate the impact of cruise shipping on the environment. Even if various cruise ports in the Mediterranean are developing green port policies, Venice could be considered a frontrunner, in particular with respect to air emissions. Venice Port Authority is the only port to conduct extensive air emissions monitoring specific to cruise vessels. Some other ports monitor all ship emissions but do not distinguish the impact of cruise ships. Many port authorities do not monitor their emissions (Table 3).

Another distinctive policy from Venice is the voluntary fuel switch programme, the Blue Flag Programme. Under this programme, cruise shipping lines engage voluntarily to reduce their sulfur

emissions and use cleaner fuels when entering the port (Box 2). The only other large cruise port to apply such differential tariffs in the Mediterranean region is Marseille that offers a 20% rebate on port dues for ships with zero sulphur emissions, but this has so far not been applied to cruise ships calling Marseille. Throughout the world, there are a few ports that have put in place voluntary fuel switch programmes, often with certain incentive programmes connected to it, but such programmes have in most cases been designed for the container shipping sector. Examples of such programmes are: the Fair Winds Programme in Hong Kong, the Green Port Programme in Singapore and similar programmes in Seattle and Houston.

Table 3. Green policy tools at major Mediterranean cruise ports

Port	Certifications	Air quality measurement	Emissions reduction programme
Barcelona	ISO 14001, EMAS	Yes, but not cruise specific	-
Venice	ISO 14001	Cruise-specific	Blue Flag Programme
Piraeus	PERS, ISO 14001	Yes, but not cruise specific	-
Civitavecchia	-	Yes, but not cruise specific	-
Savona	-	Yes, but not cruise specific	-
Genoa	ISO 14001	Yes, but not cruise specific	-
Palma Mallorca	-	-	-
Marseille	-	Yes, but not cruise specific	Differentiation of port tariff
Naples	-	No	-
Dubrovnik	-	Yes, but not cruise specific	-

Source: Own data collection based on port data.

Box 2. Venice's Blue Flag Programme and its results

One notable instrument in Venice is the Blue Flag Programme. Initiated in 2007, it is a voluntary agreement between shipping lines with the port authority. The shipping companies that endorsed the first Venice Blue Flag in 2007 committed themselves to using a fuel with sulphur content lower than 2.5% by weight, with an occasional margin of 0.5%, for the 2007 cruise season. This voluntary agreement was renewed in following years, bringing the maximum content of sulphur for the 2008/2009 season down to 2.0% when cruising and 1.5% at berth.

These programs have proven to be effective. Gambaro and Contini (2012) observed that the Blue Flag Agreement contributed to a 32% reduction in sulfur emissions between 2007 and 2012. Contini et al. (2015) find a decrease in PM_{2.5} emissions related to cruise shipping from 7% in 2007, to 5% in 2009, to 3.5% in 2012. According to this study the decrease proves the effectiveness of the programme given that during that period, the yearly tourist traffic increased by 25%. This development can also be partly explained by the larger size of the ships which implies they consume less fuel per GT but still shows that low sulfur-content fuels are an effective tool to reduce aerosols and particle concentration in the air locally. Similar findings were gathered by ARPAV from 2007 to 2011, indicating substantive reductions resulting from the Blue Flag programme, up to 38% for SO₂ emissions (ARPAV, 2013).

The Venice Port Authority and Venice Passenger Terminal are also implementing a series of measures to reduce energy consumption at the Stazione Marittima in addition to their action on air emissions. The terminals are equipped with 18 000 square metres of photovoltaic panels producing energy that can be saved in summer and used throughout the year. The terminal's lighting system has also been recently replaced by LEDs which enabled to save 70% of electricity needs in lighting. The port also has two other projects on the way, one to develop an algae biomass energy plant for powering and heating and another to use only electric vehicles for trips within the terminals area.

Considering their substantive effects, green port policies should be systematically rolled out and intensified. The Blue Flag Programme has not been applied every year since 2007 and would be strengthened by longer-term commitments on use of low sulphur fuels before entering the Lagoon, even if the additional effects of the programme will be more limited since the introduction of the EU Sulphur Directive that prescribes that ships at berth in EU ports need to use fuels with a maximum of 0.1% sulphur content. In parallel, other policies to reduce air emissions could be deployed. The Venice Port Authority has officially declared that they are willing to install shore power facilities for cruise ships. This is in line with practices in various North American cruise ports, but it seems that no action on this side will be taken as long as the future of the passenger terminal is uncertain due to the investments this type of infrastructure represents. Considering the increasing number of cruise ships that are or might soon be equipped by scrubbers or run on LNG, adaptations of the Venice terminals would need to be explored, including suitable waste reception facilities and LNG bunkering facilities.

Regardless of decisions eventually taken over ways to access cruise terminals in Venice or movement restrictions, the low Sulphur and other environmental measures should be firmed up and be given a more structural character. In conjunction with an elaborate cruise strategy to maximise economic value for the city, this will help to sustain and possibly increase net positive value of cruise shipping for the city of Venice.

References

- APV (2014), Protocollo APV.U.0017705.04-12-2014.
- ARPAV (2013), Relazione di sintesi sulla qualita' delle' aria a e sul contributo del traffico portuale, Regione del Veneto.
- Autorita Portuale di Venezia (2010), Venezia Porto Verde: Iniziative ambientali per il Porto di Venezia.
- Autorita Portuale di Venezia (2013), Piano Operativo Triennale 2013-2015.
- Chiellino, G. et al. (2012), *To Venice by Sea*, Marsilio Editore.
- CLIA (2014a), Contribution of Cruise Tourism to the Economies of Europe, 2014 Edition.
- CLIA (2014b), Comments of CLIA on the Venis 2.0 project, 11/09/2014.
- CLIA (2015), "The 'Venice stalemate' and the cruise ships' new deployment: the economic impacts on the city and the whole Adriatic," CLIA Europe, June 2015.
- Comitato No Grandi Navi – Laguna Bene Comuna (2013), "Dossier: Grandi Navi, E' ora di dire basta".
- Confcommercio (2014), "Venezia e Crociera, L'equilibrio possibile".
- Contini, D. et al. (2011), "The direct influence of ship traffic on atmospheric PM2.5, PM10 and PAH in Venice", *Journal of Environmental Management*, Vol. 92, pp. 2119-2129.
- Contini, D. et al. (2015), "Inter-annual trend of the primary contribution of ship emissions to PM2.5 concentrations in Venice (Italy): Efficiency of emissions mitigation strategies", *Atmospheric Environment*, Vol. 102, pp. 183-190.
- Costa, P. (2014), "Il Porto de Venezia, Commissione di Studio sui Problemi di Venezia", Vol 1, Istituto Veneto Di Scienze, Lettere ed Arti, editor Ruggero Ruggolo.
- Dosi, C., I. Musu, D. Rizzi and M. Zanette (2013), "L'Impatto Economico della Crocieristica a Venezia", Autorita Portuale di Venezia.
- D'Alpaos, L. (2014), "Il Porto de Venezia, Commissione di Studio sui Problemi di Venezia", Vol 1, Istituto Veneto Di Scienze, Lettere ed Arti, Editor Ruggero Ruggolo.
- Fletcher, C. A., T. Spencer (eds.) (2009), *Flooding and Environmental Challenges for Venice and Its Lagoon: State of Knowledge*, Cambridge University Press, Cambridge.
- Fersuoch, L. (2014), *Misreading the Lagoon*, Corte Del Fontego Editore.

- Gambaro, A., Contini, D. (2012) "Emissioni e immissioni" in: Chiellino, G. et al. (2012), *To Venice by Sea*, pp. 163-170.
- Gelinas, M. et al. (2013), "Sediment resuspension by ship wakes in the Venice Lagoon", *Journal of Coastal Research*: Vol 29/1, pp. 8-17.
- ITF/OECD (2015), "The Impact of Mega-Ships", International Transport Forum, Paris, <http://www.itf-oecd.org/impact-mega-ships>
- Masiol, M. et al. (2014), "Interannual heavy element and nutrient concentration trends in the top sediments of Venice Lagoon (Italy)", *Marine Pollution Bulletin*, Vol.89, pp. 49–58.
- Mazzolin, L. (2015), *Materiali d'Informazione, La nostra storia e le nostre lotte Grandi Navi Fuori dalla Laguna ! Selezione di Documenti, foto, appunti (2002-2014), Ambiente Venezia.*
- Musu, I., A. Rinaldo (2014), *Il Porto de Venezia, Commissione di Studio sui Problemi di Venezia, Vol 1, Istituto Veneto Di Scienze, Lettere ed Arti, editor Ruggero Ruggolo.*
- OECD (2015), *The Governance and Regulation of Ports: The Case of Italy*, OECD Publishing, Paris. DOI: <http://dx.doi.org/10.1787/5jrw1khtxts1-en>
- Patti, S., S. Pillon and S. Liguori (2013), "Metodi e modelli per l'indagine scientifica su emissioni e concentrazioni in atmosfera risultati principali per la laguna di Venezia", APICE Project Report.
- Parnell, K. E. et al. (2015), "Ship-induced solitary Riemann waves of depression in Venice Lagoon", *Physics Letters A* 379, pp.555–559.
- Policy Research Corporation (2009), "Tourist facilities in ports; the economic factor", commissioned by European Commission, DG for Maritime Affairs and Fisheries.
- Premuda, M. et al. (2011), "Evaluation of vessel emissions in a lagoon area with ground based Multi axis", *Atmospheric Environment*, Vol. 45, pp.5212-5219.
- Rapaglia, J. et al (2015), "Ship-wake induced sediment remobilization: Effects and proposed management strategies for the Venice Lagoon, *Ocean & Coastal Management*", Vol 110, June 2015, pp. 1–11.
- Risposte Turismo per Venezia Terminal Passeggeri (2011), "Il porto e la città: Uno studio per rilevare i comportamenti della domanda crocieristica a Venezia relativamente alla mobilità pre e post crociera".
- Risposte Turismo per Venezia Terminal Passeggeri (2012), "Venezia e l'Adriatico: un esame della rilevanza del porto veneziano per i traffici crocieristici e le ricadute economiche nell'intera area adriatica".
- Risposte Turismo per Venezia Terminal Passeggeri (2012), "Il Coinvolgimento Del Tessuto Produttivo Veneziano nella Crocieristica: Una mappatura delle aziende di Venezia e della sua provincia interessate dalla produzione crocieristica".
- Rodin, A. et al. (2015), "Numerical simulation of the propagation of ship-induced Riemann waves of depression into the Venice Lagoon", *Proceedings of the Estonian Academy of Sciences*, Vol. 64/1, pp. 22–35.

- Sarreta et al. (2010), “Sediment budget in the Lagoon of Venice, Italy”, *Continental Shelf Research*, Vol. 30, pp.934–949.
- Somers Cocks, A., T. Morel et al. (2009), *The Venice report: Demography, tourism, financing and change of use of buildings*, Cambridge University Press, Cambridge.
- Soriani, S. et al (2006), "L'importanza della crocieristica per Venezia", Centro Ideas.
- Tattara, G. and G. Fabbri (2014), Venezia, La Laguna, Il Porto et Il Gigantismo Navale: Libro Bianco sul perché le grandi navi debbono stare fuori della laguna.
- Tattara, G. (2013), *E solo la punta dell'iceberg! Costi e ricavi del crocierismo a Venezia*, Note di Lavoro, Università Ca' Foscari Venezia, Dipartimento de Economia.
- Tattara, G. (2014), “Il Porto de Venezia, Commissione di Studio sui Problemi di Venezia”, Vol 1, Istituto Veneto Di Scienze, Lettere ed Arti, editor Ruggero Ruggolo.
- Testa, S. (2011), *E le chiamano navi*, Corte Del Fontego Editore.
- Testa, S. (2014), *Reversing Course*, Corte Del Fontego Editore.
- Toscano, G. (2011), "Distribution and seasonal variability of trace elements in atmospheric particulate", *Chemosphere*, Vol. 85/2011, pp. 1518–1524.
- Unesco (2011), "Culture and development in Venice: From restoration to revitalization?", The Future of Venice and its Lagoon in the context of Global Change, Workshop n°3, Unesco, Venice.
- Worlds Monument Watch (2014), Cruise Tourism Initiative: Venice, Italy.

Cruise Shipping and Urban Development

The Case of Venice

The city of Venice (Italy) is a major cruise destination. Cruise shipping brings in passengers and their money, but also air pollution, visual impacts and concerns about the lagoon. So does the city ultimately benefit from this form of maritime tourism, and is the cruise shipping boom Venice has experienced sustainable? This report aims to bring more clarity to these controversial issues by assessing the various impacts cruise shipping has had in Venice. It analyses policies in place and provides recommendations on how to increase the net benefits from cruise shipping to Venice.

This report is part of the International Transport Forum's Case-Specific Policy Analysis series. These are topical studies on specific issues carried out by the ITF in agreement with local institutions.

International Transport Forum

2 rue André Pascal
75775 Paris Cedex 16
France
T +33 (0)1 45 24 97 10
F +33 (0)1 45 24 13 22
Email : contact@itf-oecd.org
Web: www.itf-oecd.org