Lost In The Water Interview

QUESTION 1: During the implementation phase of the project, were there any delays compared to the original schedule? If so, what were the main technical, administrative, or financial causes that affected the progress of the works?

ANSWER 1: It is specified that the works were entirely financed by CIPE for a total amount of 5 million euros.

The intervention was divided into three lots, corresponding to three different areas of the territory of Marsala. The first lot concerned the southern area, in the Amabilina district, along the road axis connecting the urban area with the southern outskirts of the city. The second lot involved the northern area, particularly between Provincial Road SP21 and the main road toward Trapani. In both cases, these were limited interventions focused mainly on the main pipelines and the most heavily used roads.

The third lot, relating to the historic center, was of a different and more complex nature. Here, works affected heavily frequented public streets, with inevitable difficulties related to traffic management, temporary closures, and excavation operations necessary for replacing the water network.

Regarding timing, there was a delay of about one year compared to the initial forecast. This delay can be considered typical for underground utility works, where complete and detailed knowledge of subsoil conditions is often lacking.

In Marsala's case, the situation is further complicated by the significant presence of underground cavities. For this reason, preliminary investigations were carried out using ground-penetrating radar technology, which allows analysis of the subsoil to identify cavities or pre-existing utilities that might interfere with excavation. The particular geological conditions of the area represented one of the main critical issues of the project.

Another difficulty was linked to the replacement of the existing water network. The previous infrastructure had estimated losses of around 50%: in practice, for every liter of water introduced into the system, about half a liter was lost. The objective of the intervention was precisely to eliminate these losses. However, during replacement operations, temporary service interruptions occurred in some parts of the city, necessary to connect the new network to the existing one and to minimize prolonged disruptions.

As for the final phase, permanent road resurfacing was carried out only after completion of works on each section, rather than progressively every hundred meters. This choice was dictated by both technical reasons and the need to await network testing. Only after verifying the absence of further leaks or issues was final asphalt paving completed, thus avoiding the risk of reopening the road.

In conclusion, despite difficulties related to subsoil conditions, operational complexity in the historic center, and the need to ensure service continuity, the intervention significantly improved the efficiency of the city's water network, drastically reducing losses and making the system more functional and sustainable.

QUESTION 2: Is the municipal water system currently equipped with real-time monitoring tools (e.g., remote control, smart sensors), or is the network still monitored through periodic checks and manual reports?

ANSWER 2: Currently, the municipal water system is equipped with tools that allow intervention in case of leaks, but it does not have a structured and continuous monitoring system covering the entire network. Checks are also carried out through manual inspections.

Specifically, there is no active technological system capable of detecting leaks in real time along the water network. The only monitoring effectively available concerns total consumption. For example, approximately 400 liters of water per minute are introduced into the system, representing the daily input. The output can be verified, but there are currently no tools allowing precise and immediate monitoring based on data from individual meters distributed throughout the territory.

As a result, detailed leak monitoring through systematic comparison between water input and actual recorded consumption is not currently active.

Regarding the possible role of the provincial integrated water authority (ATI), there is no certainty that it has already taken action in this regard. However, among the projects planned for upcoming funding is the introduction of smart meters capable of transmitting real-time water flow data to a central control unit. Implementing this system would require replacing meters across the entire territory. Although funding is planned, the intervention has not yet been implemented.

In theory, monitoring would still be possible using current tools by cross-analyzing billing data—summing cubic meters consumed and paid by users and comparing this to total water introduced into the network. However, this would be a complex, non-systematized process not supported by advanced technology.

In conclusion, while it is technically possible to monitor consumption and estimate discrepancies, there are currently no operational and technological conditions allowing precise and automated monitoring of leaks across the entire municipal water network.

QUESTION 3: What is the estimated average age of the water pipelines in the municipal territory, and to what extent does infrastructure obsolescence affect current water loss levels?

ANSWER 3: Regarding the average age of water infrastructure, a distinction must be made between old pipelines and those recently replaced. Older networks were built with materials more susceptible to degradation and direct soil contact. This resulted in limited durability, sometimes around ten years, with corrosion and perforation affecting both main pipelines and user connections.

New infrastructure is made of polypropylene (or other high-resistance plastic materials), characterized by very high durability. These pipes are tested to withstand high pressure and have a theoretically very long service life, in some cases described as “virtually unlimited,” if properly installed and maintained.

Since the municipal network does not operate under high pressure—generally around 3–4 bar and mainly gravity-fed—stress on pipelines is limited, further extending their lifespan.

Any leaks are more likely related to joints and connection points rather than the main pipeline material. However, even these components are now made with more reliable technologies, ensuring efficiency levels estimated at around 95%.

Therefore, while old infrastructure significantly affected water loss and overall efficiency, new pipelines ensure greater reliability and long-term durability.

It should also be emphasized that “losses” concern not only the public network but also domestic water use. Network sizing is based on parameters such as population and average daily per capita consumption. Unsustainable domestic practices (e.g., traditional high-flow fixtures or prolonged showers) significantly affect overall consumption.

Today, more sustainable solutions exist, such as dual-flush toilets, which allow modulation of water use. Awareness campaigns in schools and public contexts are also important in promoting responsible water use.

QUESTION 4: Have specific areas of Marsala's historic center been identified as more critical in terms of leaks, pressure discontinuity, or service interruptions? If so, what criteria are used for this mapping?

ANSWER 4: Regarding the mapping of the water network, it should be noted that it exists and can also be consulted in digital format, eliminating the need to print maps. What is important is to understand the criteria used for its creation and updating. The intervention you are monitoring covered approximately 30% of the city's water network, focusing on the historic center. In the suburbs, in addition to the main pipelines already mentioned, many residents of Marsala rely on private wells and are not connected to the public network. In the historic center, however, the distribution network is dense, and the modernization intervention, valued at approximately 2.5 million euros, allowed part of the old pipelines to be replaced with more durable and reliable materials, reducing losses and improving overall efficiency.

However, this intervention did not concern the remaining parts of the city: about two-thirds of the network still consists of older pipes, with joints prone to underground leaks. The strategic objective therefore remains to secure additional funds to complete the modernization of the entire city network. This would also include replacing traditional meters with computerized devices capable of more accurately monitoring water distribution and any losses across the territory.

QUESTION 5: How does the administration intend to use data and perceptions collected through civic participation tools, such as the survey we are conducting, to guide future decisions on water service management and planning?

ANSWER 5: Regarding civic participation and the water situation, Marsala generally experiences few supply problems. Unlike nearby cities, such as Trapani, where in some neighborhoods water is distributed only two days a week, Marsala does not face such prolonged interruptions. Any service disruptions have occurred only following breaks in the water network in the suburbs. In these cases, to ensure system safety, it was necessary to temporarily suspend supply to the city center. The interruptions were not due to a physical lack of water, but to technical reasons: in the old peripheral networks, especially those at greater depth (up to three meters), a pipeline break requires shutting off the supply, repairing the damaged joint, and gradually restoring water pressure to prevent further damage. During these operations, solid material can accumulate inside the pipes, which must be completely flushed before flow can resume. For this reason, interruptions could last two to three days.

A similar situation occurs in the suburban area of the Spagnola coastline, a region of tourist significance. Here the challenges are greater, especially during the summer months, due to the distribution network not yet being fully modernized and the technical difficulty of supplying the entire area from the well network. In other words, in this area the problem involves not only distribution but also water supply. Currently, Marsala is autonomous but not fully self-sufficient in terms of water. Supply mainly comes from public wells located in the Ciavolo and Scacciaianzo areas, which provide good quality water. This resource would be sufficient for the city's needs, provided the system is properly managed and maintained. However, during periods of high demand and in certain peripheral areas, water can start to run low or show critical issues.

To address these challenges, future interventions are planned, including connection to the Montescuro West aqueduct, a network originating from the Garcia Dam in eastern Sicily, which will bring water to the municipalities of Petrosino, Marsala, and Mazara del Vallo. This project will provide an additional water supply via aqueduct, complementing the municipal wells and

improving coverage, especially in the northern areas and along the coastline, such as Birgi and Cutisio, areas most prone to water shortages during the summer months.
QUESTION 6: Once the extraordinary funding phase (European or national) is concluded, what strategies does the Municipality intend to adopt to ensure ordinary and extraordinary maintenance of the network, preventing the interventions from losing effectiveness in the medium to long term? Mention any similar or complementary projects, citing, if applicable, local public plans or strategies that the project is part of (for example, the Sustainable Urban Mobility Plan, Strategy for Internal Areas, etc.).

ANSWER 6: Currently, management is handled by the individual municipal administrations. However, by law, there is a planned transition to a provincial-level operator (preliminary operator), tasked with coordinating and consolidating all interventions across the territory. In the coming years, therefore, the management of the water networks should be centralized under this external entity, which will be responsible both for extraordinary maintenance—particularly of the two-thirds of the city network that is still old—and for ordinary maintenance of the existing network.

Regarding the new network, ordinary maintenance is relatively straightforward, as these are modern, reliable pipelines without immediate issues. The main critical issue concerns the remaining portion of the network, made up of outdated infrastructure that requires extraordinary replacement works. The problem arises from the transition to centralized management: while each municipality previously managed its own territory autonomously, it was possible to plan interventions, secure the necessary funding (as in the case of the recent €5 million works), and act directly on the ground.

With provincial management, however, it is often unclear who has direct responsibility for interventions. This leads to delays or missed actions, negatively affecting maintenance and network efficiency. This represents a significant technical challenge. The Provincial Water Resources ATI, the entity meant to perform this role, has been in the process of formation and development for over 25 years but is not yet fully operational. Consequently, a paradoxical situation arises: the Municipality does not intervene because it considers it the ATI's responsibility, and the ATI does not intervene because it is not yet capable of operating in the territory.

QUESTION 7: In the medium term, will the network efficiency improvements and reduction of water losses mainly result in greater continuity of service (for example, towards a more stable 24-hour distribution), or are effects on containing user tariffs also expected?

ANSWER 7: Regarding tariffs and the management of the water network in Marsala, the current situation is as follows: the water is municipally owned, directly managed by the Municipality, and supplied to the network. The average tariffs currently applied reflect this autonomous management model, which allows costs to be contained while still ensuring service to citizens. With future management by the provincial ATI, the situation will change. The ATI will be responsible not only for potable water but also for the entire sewage system of the province. Consequently, future tariffs will inevitably be higher than the current ones, as they will need to cover necessary investments, extraordinary and ordinary maintenance, and all operational costs linked to unified service management. In other words, Marsala will benefit from an improved water network and completed distribution, providing more modern and reliable services. However, it is important to note that this improvement will also result in increased costs for users. Despite the greater efficiency of the network, projections indicate

that tariffs will rise because the ATI will need to fund both aqueduct and sewage system management across the entire provincial territory.

QUESTION 8: Does the project set specific numerical objectives for reducing water losses? For example, is there a percentage target for leakage to be achieved at the end of the interventions?

ANSWER 8: Regarding project targets, it should be noted that current PNRR projects define clear objectives and milestones to be reached, constantly monitored through IT platforms. For example, targets might include the number of students to be guaranteed access to schools or the area of new facilities to be constructed. This approach allows for precise monitoring of progress and achievement of results.

The situation differs for projects implemented in the past, such as the one under analysis, launched in 2017. At that time, there was less focus on targets and concrete outcomes. In the current monitoring platform, apart from the kilometers of water network completed—40.85 km—other significant indicators are either missing, zeroed out, or incomplete. For this reason, it is difficult to verify with certainty whether all the planned objectives were actually achieved. The correspondence between planned and completed kilometers, for example, does not allow for a precise analysis, especially since technical modifications occurred during the works.

Regarding funding sources, the project primarily used two types:

- **POFestre Funds** (European Community fund managed by the Sicilian Region), which have strict reporting and monitoring rules. However, for these funds, the Region often provided flexibility tools to overcome timing constraints while still ensuring project completion.
- **PSC Funds of the Sicilian Region**, which do not follow equally strict reporting rules, but in this specific case were not used: analysis shows payments made from PSC funds are zero.

In practice, nearly all expenditures—approximately €3.8 million—were covered by POFestre funds. Considering the total project cost was around €4 million, a residual of about €200,000 remains, which may be due to monitoring records that have not yet been fully updated.

QUESTION 9: During implementation, what were the main challenges encountered, for example archaeological constraints, complex authorization procedures, increases in raw material costs, or operational difficulties at construction sites, and how were they addressed?

ANSWER 9: The subsoil characteristics of Marsala present significant particularities, both from a geological perspective, with the possible presence of natural cavities, and from an archaeological perspective. For example, during works in Piazza delle Gasperi, construction was suspended for nearly a year due to the discovery of archaeological artifacts. It was necessary to secure the site, carry out photographic surveys, and perform detailed inspections before work could resume. This type of unforeseen event contributed to the overall delay of the project in that area. Another challenge concerns the presence of existing underground utilities, often unmapped, especially in areas that have been urbanized for decades. During excavation works, crews may encounter old sewer pipes or other utility lines installed up to 50 years ago, which had been buried without accurate documentation. Additionally, in recent

years, further utilities, such as fiber optic networks, have been added, further complicating construction activities. To reduce these issues in the future, more efficient solutions are being planned for new streets. An example is multi-utility underground ducts, which allow new services, such as fiber optics, to be installed without breaking the road surface again. In some sewer network projects, the cross-section of the new pipes has been designed to leave space for future utilities, anticipating needs that could not have been foreseen thirty years ago.

QUESTION 10: Considering that platforms like *A Scuola di OpenCoesione* already provide very detailed information but are little known and not always easily accessible to citizens, does the Municipality plan to create a public platform, or a dedicated section of the institutional website, that allows citizens to easily and immediately monitor the progress of works, the use of resources, and payments made to the companies involved?

ANSWER 10: The digitization of data related to the water network is currently significant, but managing this information requires care, especially for security reasons. For example, it is not appropriate to make public detailed information about pipe routes or diameters, because such data, if misused, could be exploited to damage the water system. Citizen reporting is managed differently. The Municipality's IT office aims to promote the use of open data and make as much information as possible available to encourage civic participation. However, in practice, these tools only partially function: for instance, even if a citizen reports a leak via an online platform, the report must be verified by an operator before being sent to the response team. Meanwhile, water continues to be lost, reducing the effectiveness of the action. In some cases, social networks prove to be more immediate: for example, if a citizen reports a leak on Facebook, the Municipality receives the communication and intervenes quickly. However, even in this case, the information can be inaccurate or difficult to verify. The municipal policy requires strict data verification to avoid incorrect reports, but this slows down the intervention process.

QUESTION 11: Which public decisions and administrative procedures gave rise to the project (e.g., which administrative act? which public call for proposals)? Which entities were involved in the initial design of the project and in what way (e.g., presentation events, public consultation moments, co-design meetings, etc.)? Were any groups of people affected by the project excluded from its definition?

ANSWER 11: The origin of the funding for the water network interventions in Marsala is particular and reflects a shift compared to the past. Previously, resources were often available first, and the project was then developed based on the funding available. Today, however, the correct approach is for the administration to start from planning: it is necessary to understand the needs of the territory, define the actions to be undertaken, quantify them economically, and identify the resources available through various channels, whether European, national, or regional. Currently, Marsala draws water from municipal wells, mainly located in the southern part of the territory. However, some of these wells present issues related to the presence of nitrates, due both to land use and the use of potentially harmful substances. Water quality is constantly monitored, allowing the identification of any exceedances of the permitted limits. In such cases, some wells are closed, temporarily reducing the city's water supply. Another critical issue concerns the water levels in the wells and the salinity of the water. Even with abundant rainfall in some years, supply levels can be insufficient to ensure a consistent flow, and saltwater intrusion represents a real risk. For this reason, the Basin Authority carefully monitors salinity through instruments installed in the wells. To address these issues and improve service efficiency, Marsala aims to develop innovative projects for the reuse of treated

wastewater. The San Silvestro municipal treatment plant, which collects all the city's wastewater, is authorized for the reuse of treated water. Currently, this water is discharged into the sea at a rate of about 400 cubic meters per hour. A ranked project for funding of approximately €10 million would allow this water to be used for non-food irrigation purposes, supplying greenhouses, floriculture, and other crops, thereby reducing pressure on municipal wells. From a planning and financing perspective, extraordinary interventions are often triggered in emergency situations, as happened in the past with the involvement of a delegated commissioner for municipalities in water crises. However, the most effective strategy is to prevent emergencies: understanding now the needs of the two-thirds of the network not yet covered, estimating the financial requirements, and planning interventions allows access to European or national resources in a planned manner, avoiding less efficient emergency measures.