



Project No Flow

A report on non-consuming
meters on occupied SPIDs



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Project No Flow

Report on Non-Consuming Meters on Occupied SPIDs

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Foreword by Wave

Project No Flow (ref: 2022-R2-005) is funded by the Market Improvement Fund. The Market Improvement Fund was set up to fund innovative projects that will benefit the non-household water market and its customers. The fund is overseen by the Strategic Panel (including project selection, funding allocation and progress of work) and administered by MOSL.

Project No Flow is a collaboration between Wave and consultants Occutrace investigating the condition of meters used in the Non-Household (NHH) market. Wave was pleased to sponsor Project No Flow because of their ongoing concerns that many meters appeared to be broken, and if this is proved to be correct, then this would mean customers are not receiving their correct bills, potential leaks are not being identified and opportunities for water efficiency savings are being missed. This study was undertaken to improve water measurement accuracy, optimise revenue collection, and ensure customer satisfaction, as well as to provide the industry with valuable insights into the issues around why meters would be zero consuming.

The Wave/Occutrace work involved taking a sample of 1618 supply point IDs (SPIDs) with meters showing to be non-consuming and are suspected to be broken. Basic checks will indicate that each SPID would have the expectation to have consumption going through their meter. The initial basic checks involved, company type and previous usage history. The project overall delivered a body of evidence highlighting the findings and photographs of these 1618 SPIDs over an extended period.

Wave’s role in the project was to verify the findings and then analyse the data and produce a factual report from the evidence. This report will be published and shared with all parties of interest including MOSL, Ofwat, CCW, Wholesalers and Retailers. Once the report has been published, MOSL will support Wave by making it an agenda item at the User Forum and welcome questions and feedback.

Executive Summary

Occutrace, a specialised water industry service provider, conducted the Market Improvement Fund project (Ref 2022-R2-005) to assess and identify Non-Consuming Meters in the water retail market.

The Market Improvement Fund project (Ref 2022-R2-005) has been developed to assess and identify Non-Consuming Meters that exist in the water retail market. A random sample of 2,000 Occupied SPIDs, as registered in CMOS, were selected without distinction between internal and external meters, considering all premises as occupied as per Wave’s billing systems.

The task was to locate, read, and assess these meters’ conditions based on the location and customer information provided by Wave, the project sponsor. The project yielded 1,618 final outcomes, revealing valuable insights:

- 1,017 meters were successfully located and visually appeared to be in good working condition.
- 169 meters exhibited visible damage or degradation to the meter, preventing successful reading, or testing of consumption.
- 31 unrecorded exchanges of meters were observed. i.e., the meter in situ was different to what was in CMOS.
- In 401 instances, premises or meters were inaccessible, which hindered testing.

These high-level numbers provide only a glimpse of the full story. Throughout this report, a detailed analysis of the data uncovers deeper insights.

The key findings from the work are divided into the following groups:

Grouped Outcome	Key features
Meter Confirmed OK 277 (17.1%)	<p>Description: Meters were found and appeared to be in a readable condition with no obvious meter body damage. Further stop tap tests confirmed that any consumption is being recorded.</p> <p>Reasons:</p> <ul style="list-style-type: none"> • Found & Read Consumption Confirmed <p>Suggested corrective action: Retailers review current meter reading data/operations to establish if any systemic or behavioural issues exist that have caused erroneous information to be imported into the market.</p>

<p>Meter Problem Established 494 (30.5%)</p>	<p>Description: Meters found to be physically damaged, or another malfunction established following a tap test</p> <p>Reasons:</p> <ul style="list-style-type: none"> • No Consumption Confirmed (71%) • Other Visible Damage (15%) • Water Ingress (8%) • Glass Smashed (2.4%) • Dirt in Dial (2%) • Other (1.6%) <p>Suggested corrective action: Retailers to review operational processes to establish and record these issues using SKIP codes and proactively manage them to resolution via raising a bilateral request, Wholesalers to action the bilateral request within the SLA period.</p>
<p>Unable to confirm Operational 847 (52.4%)</p>	<p>Description: Multiple Reasons</p> <p>Reasons:</p> <ul style="list-style-type: none"> • Meter not accessible (46%) • Premises Vacant (27%) • Unable to Stop Tap Test (17%) • Other (10%) <p>Suggested corrective action: Retailers to ensure occupancy data is accurate and up to date, wholesalers to review placement and type of meters to always ensure access to assets regardless of occupancy status.</p>

Examples of headline recommendations

Market next steps and recommendations from this work are:

- Wave and Occutrace to present their findings to the Strategic Panel’s Metering Committee.
- Wave and Occutrace to present their findings to the whole market.
- Trading parties will be encouraged to take ownership and use the findings to proactively work together to reduce the volume of broken meters.
- Wholesalers to include the report findings as part of their asset replacement / Smart metering roll out plans for the NHH market. Wholesalers to review their existing meter asset replacement programs to ensure ageing meters are considered in early roll-outs of smart meters or general replacement programs.
- MOSL to use this report and its findings and conclusions to direct and support future strategic metering review projects and use these insights in the National Metering Strategy project.
- MOSL to share findings with the Market Performance Committee (MPC), the Market Performance Framework (MPF) Review and the Data Assurance Service to inform decisions and drive reductions in zero consuming meters.

Introduction and Background

Project No Flow (PNF) was initiated as a Market Improvement Fund project (ref: 2022-R2-005) in response to a request from Wave to Occutrace, to investigate 1618 supply points (SPIDs) with meters that were zero consuming and suspected to be broken across all Wholesaler areas. The aim was to gather evidential data that highlights the condition of Non-Household (NHH) meter assets throughout the market. This data includes identifying the number of broken NHH meters, identifying patterns such as age and manufacturer, and capturing other relevant information. The insights derived from this project would inform the design for market improvements.

The findings will be extrapolated across the industry to establish a source of evidential data showing the condition of meter assets and the extent to which dumb (i.e., manually read) meters are contributing to the lack of accurate consumption data in the market. MOSL data shows that there are currently 147,603 (11%) meters in the Non-Household (NHH) market showing zero consumption (i.e., no consumption between two-meter reads).

Wave established that the root cause of these problems is there are many ageing meters which are becoming increasingly likely to fail. Many Wholesalers do not have proactive meter replacement programmes for NHH meters and therefore are reliant upon Retailers raising a B1 form to request a meter repair or replacement using the market processes. The current market processes are insufficient to address the needs of customers because they are failing to ensure meters are working and consumption data is provided.

From this, the aim is to identify the point at which a particular meter is likely to fail. This would be identified by age, manufacturer, size etc. This can then be translated into market improvements which can be designed to ensure that consumption data is always reliably available to all NHH customers. This may include the introduction of new obligations (through the MPF) for Wholesalers to undertake an annual meter check on all NHH meters to ensure they are accessible and functioning correctly to meet a market 'meter asset standard.' This idea is under consideration by the Metering Committee currently as a potential 'quick start' project.

Please note industry standards of project governance were maintained throughout the delivery of Project No Flow with Fortnightly progress review meetings between Wave and Occutrace with MOSL providing support. Wave were also present on some site visits and regular updates to the Strategic Panels Metering Committee and the MOSL User Forum were conducted.

The Project No Flow Dataset

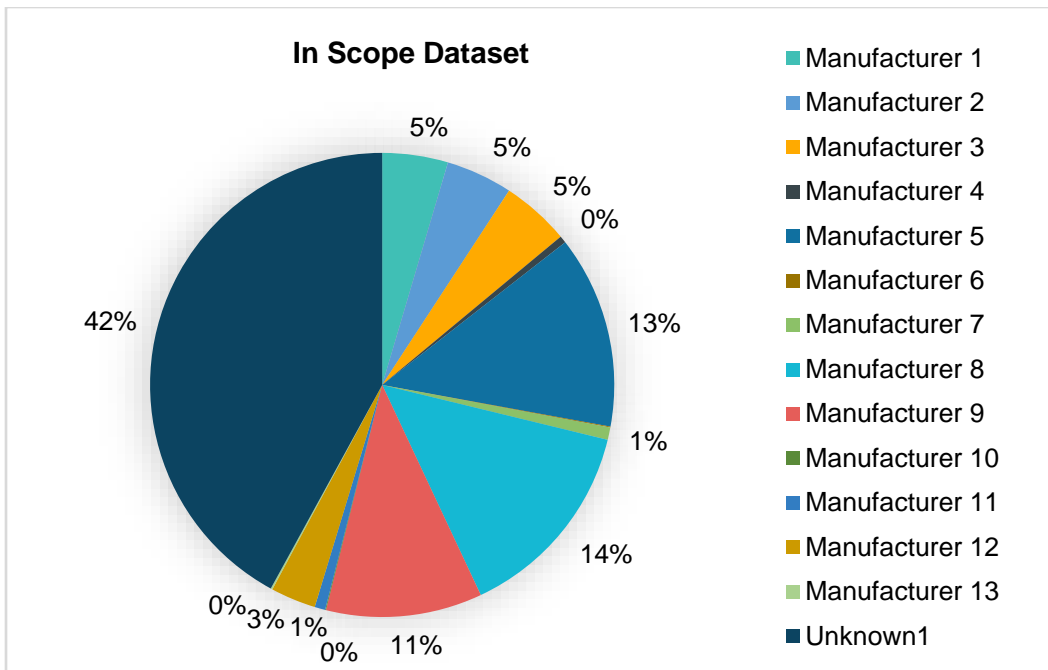
A random sample of 1618 Occupied Supply Point IDs (SPIDs) registered in the Central Market Operating System (CMOS) were selected. Notably, unlike previous initiatives, no differentiation was made between internal and external meters, as all premises were considered occupied based on Wave's billing system data. This approach aimed to ensure fairness and avoid singling out any specific suppliers of equipment, whether they be existing or legacy providers.

To maintain confidentiality and neutrality, the decision was made to anonymise the details of meter manufacturers in the analysis. However, it is important to note that the detailed findings and outcomes will be shared with the individual manufacturers. This approach allows for collaboration and transparency while minimising potential biases.

A table displaying the number of manufacturers and their prevalence within the sample is provided below. Notably, the highest number of occurrences is attributed to 'unknown1', indicating instances where the meter manufacturer could not be identified. This finding demonstrates the importance of collecting accurate and complete data to ensure comprehensive analysis.

The data used in this study was exported from CMOS by Wave. Within the sample, 680 instances (42%) lacked sufficient information to determine the meter manufacturer. This emphasises the significance of accurate and complete data collection processes to support effective analysis and decision-making.

Meter Manufacturer	Number
Manufacturer 1	74
Manufacturer 2	75
Manufacturer 3	77
Manufacturer 4	8
Manufacturer 5	217
Manufacturer 6	1
Manufacturer 7	14
Manufacturer 8	230
Manufacturer 9	176
Manufacturer 10	1
Manufacturer 11	12
Manufacturer 12	51
Manufacturer 13	2
Unknown1	680
Total	1,618



The data selection criteria for this study were simple. Occupied Supply Point IDs (SPIDs) were considered if they had 3 or more meter reads showing no consumption. This criterion aimed to target cases where meters were in use but not recording any consumption, indicating potential issues with their functionality.

With Occutrace’s specialised expertise, data was segmented into regional work groups to efficiently conduct visits, make appointments, and establish the occupancy status of the selected SPIDs and assess the performance of their associated meters.

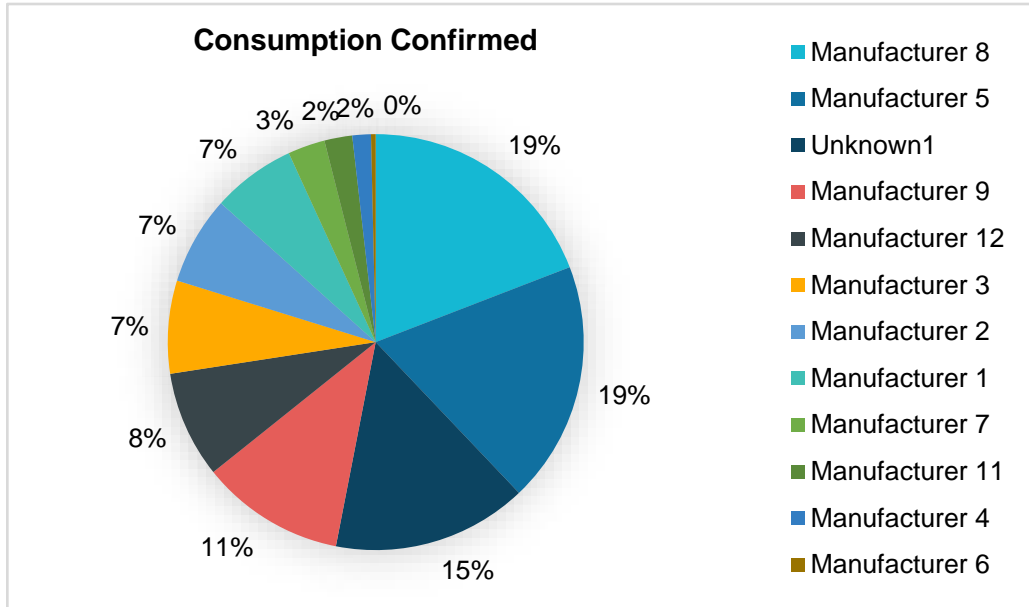
Through thorough investigations, Occutrace determined the following results:

- Out of the analysed meters, 277 (17.1%) were found to be operating as expected, accurately recording consumption data within acceptable parameters.
- In the case of 494 meters (30.5%), issues were identified that affected their efficacy or structural integrity. These concerns suggest potential underlying problems that may impact the accuracy or reliability of the recorded consumption.
- Amongst the sample set, a majority of 847 meters (52.4%) could not be conclusively confirmed for several reasons. These factors included premises being vacant or customers being unable or unwilling to perform stop tap tests on the water supply. As a result, the accuracy of these meters could not be definitively determined.

These findings provide valuable insights into the condition and performance of the analysed meters, shedding light on issues such as non-functioning or unreliable meters within the market. It allows for targeted actions to address these problems and improve the overall quality and accuracy of consumption data.

Consumption confirmed

To ensure transparency and provide a comprehensive report, below are charts and tables displaying the outcomes and several perspectives regarding the meters' readings and recorded consumption.



Anon – Meter Manufacturer	Number
Manufacturer 8	53
Manufacturer 5	52
Unknown1	42
Manufacturer 9	31
Manufacturer 12	23
Manufacturer 3	20
Manufacturer 2	19
Manufacturer 1	18
Manufacturer 7	8
Manufacturer 11	6
Manufacturer 4	4
Manufacturer 6	1
Total	277

Unable to confirm operational

From the onset of this initiative, Wave and Occutrace recognised that certain meters would be inaccessible or unable to be tested, leading to an incomplete dataset.

Nonetheless, the findings illustrate a significant outcome, indicating the need for improvements beyond metering operations. For instance, ensuring accurate occupancy status is essential, not merely from a meter access perspective, but also from a debt management standpoint.

This underscores the importance of a comprehensive approach to market improvements, considering a range of factors that impact the reliability and accuracy of consumption data.

Unable to confirm Operational	Number	%
Meter Visually OK	386	45.5%
Meter Not Found	187	22%
Access Issue	183	22%
Unrecorded Exchange	31	3.5%
Asset Issue	30	3.5%
Premises Issue	13	1.5%
Customer Issue	8	1%
Health Safety	7	1%
Chamber Issue	2	0%
Total	847	100%



This meter is visually okay but did not record any consumption.



This meter is an older meter, estimated to be installed in 1987. It's visibly okay and is confirmed to not be recording consumption.

Meter problem established

One of the most concerning discoveries from the analysis of the located and tested meters (771 in total, with confirmed consumption and established meter problems) is that 64% of them, corresponding to 494 meters, were found to be degraded to the extent of non-functionality.

This finding has substantial implications across various dimensions:

1) Customer Impact: Non-functional meters can lead to inaccuracies in billing and consumption measurements, potentially causing financial hardships for customers and eroding trust in Retailers, Wholesalers, and the market. Customers are unable to benefit from water efficiency savings (because these cannot be identified) and overall suffer poorer service.

2) Wholesale Settlement: Inaccurate metering can affect wholesale settlement processes, leading to discrepancies in the allocation of costs and revenues amongst market participants. This may introduce financial uncertainties and challenges in the water market. The situation is further compounded if there is a leak. A key factor applied by Wholesalers when assessing leakage allowances is the time taken to identify the leak and get it fixed. Without any consumption data, leaks go undetected for prolonged periods and Wholesalers are reluctant to apply leakage allowances for equally lengthy periods. This can result in a leakage allowance being declined for all or part of the affected period leaving the customer dissatisfied and looking to the Retailer to provide a leakage allowance on the basis that the Retailer should have provided meter reads which would have identified the leak. This leaves Retailers in a difficult position because they have no money from which to provide leakage allowances for customers. Overall, the customer is left very dissatisfied.

3) Water Demand Data Models: The non-functionality of a sizeable portion of meters undermines the reliability of water demand data models. These models are vital for understanding water usage patterns, forecasting future demand, and making informed decisions regarding infrastructure investments and resource planning.

Meter Problem Established	Number	%
No Consumption Confirmed	351	71%
Other Visible Damage	75	15%
Water Ingress	40	8%
Glass Smashed	12	2.4%
Dirt in Dial	9	2%
No Supply to Trough	2	0.5%
Disconnected	2	0.5%
Tampered With	1	0.2%
Backwards Consuming	1	0.2%
Leaking	1	0.2%
Total	494	100%

To provide additional context and granularity on the top 3 categories:

- Outcomes achieved throughout the project – we have established that meters are failing mechanically with no physical problem with the meter.
- The meter ages vary but the data is suggesting the highest number of meters fail between 11 and 15 years.

Chart shows the count of meter fails

Meter age (yrs)	Man 1	Man 2	Man 3	Man 4	Man 5	Man 6	Man 7	Man 8	Man 9	Grand Total
1-5		2	11		1	1		4	1	20
6-10		4	23			34			6	67
11-15	21	9	12		1	42		1	8	94
16-20	16	5	21	7		4	1		4	58
21-25			1	11			17		7	36
26-30			2				37		5	44
31-35							7			7
Total	37	20	70	18	2	81	62	5	31	226



CMOS Data Quality

The primary purpose of Project No Flow was not to conduct an audit of market data quality. However, as Occutrace also found during a previous project (Project Looking Glass) reporting on LUM, an assessment could be made as to the accuracy and completeness of the CMOS data used to underpin the delivery of the project. Occutrace observed some reoccurring factors with data accuracy throughout PNF, too.

There are three specific items of market data discussed below:

- Occupancy Status
- Location information
- Unrecognised Meter exchanges

Occupancy Status

A field survey of 1618 SPIDs from Wave found that 232 (14.3%) were vacant, despite being initially indicated as occupied.

Overall Conclusions

Project No Flow has sought to establish hard facts and real-world evidence about meters that are not recording consumption. This is to help the market understand the volume of potential zero consuming meters out there. Zero consuming meters are a problem, but the scale of the problem has not been evidenced until now. This project has highlighted the issues that come with meters that are not recording consumption and these issues affect customers, Retailers and Wholesalers. Extrapolating this sample of 1618 across the industry (where 147,603 meters show zero consumption) indicates that 30.5% (which is more than 44,000 of zero-consuming meters) could be broken. 17.1% (which is more than 25,000 zero consuming meters) are working properly with consumption recording accurately, yet the market data is potentially wrong. 52.4% (which is more than 76,000 zero consuming meters) cannot be confirmed as operational because there is a problem with some element. These issues will need a long-term fix. That said, like any complex problem, it can be tackled in a coordinated manner, with multiple solutions running in parallel to tackle the various problems and deliver the desired end goal.

Here are the top 9 conclusions reached in conducting the data analysis and report preparation:

1. A significant percentage of zero consuming meters had been zero consuming for a prolonged period. Retailers need to adjust their working practices to include consumption checks collaborating with their customers where necessary to raise bilateral forms.
2. Wholesaler asset management / meter replacement programs are not consistent and, in some cases, have no programme at all. We need to understand what part Wholesalers play and where their responsibility starts and ends.
3. The split between meters that were broken and those that are genuinely zero consuming is approximately 60/40.
4. Accuracy of the meters across manufacturers varied significantly, which calls into play reliability.
5. CMOS Data Quality has been questioned again. The accuracy and completeness of such data, especially around occupancy, became a reoccurring factor throughout the project. This clearly means trading parties are not always updating CMOS.
6. Not all customers would allow stop tap tests to take place with the worry they were going to be receiving large catch-up bills, calling into question the Retailers' knowledge and urgency around identifying the meter problem. Can the retailers do more to educate their customers here?
7. Do we need more understanding as to why a meter would stop recording consumption? (Potential future project)
8. Tackling the Zero consuming meters problem will require a highly collaborative approach, with MOSL, Ofwat, Strategic Panel, Retailers, Wholesalers, and their operational and meter reading service providers, all working together towards a common goal of accurate and timely meter reads with the customer being at the forefront.
9. Some properties were genuinely zero consuming because they were a flat above the shop or a secondary supply for the business. The question is, should these meters still be in the market or be disconnected?

Noted below are four potential areas that could form the basis for future Metering Committee or Industry projects aimed at addressing issues inherent within the meter condition assessment space:

Proactively working to prevent future broken meters.

- **Introduction of a meter asset management program**
 - *Wholesalers are currently working towards a smart meter future, but this is going to take 15-20 years to roll out. In the interim, a proactive meter asset management program needs to be conducted whereby each Wholesaler visits each zero-consuming meter every 3 years for meters over 5 years old to check that it is accessible and working correctly.*
- **Replacement of broken meters with smart / remote reading technology**
 - *When a zero consuming meter is identified, replace the meter with a smart-enabled meter (technology depending).*
- **Tackling specific CMOS data quality weaknesses**
 - *A targeted meter asset data quality improvement project (as described by the Roles and Responsibilities Strategic Project Phase 2) could be initiated to enrich CMOS data and make it a viable 'single source of the truth'. Specific areas to tackle, based on the experience from PLG, would be Property Address, Meter Location Code, Meter Location Notes and Meter X, Y Coordinates. This could also form part of the current MOSL/Industry Data Assurance Service. Such a project should also review the processes currently in place for updating these data items within CMOS to ensure that retailers and wholesalers are both able to improve and manage their data quality code obligations on an ongoing basis.*
- **Introduction of new measures for retailers identifying zero consuming assets**
 - *Evidence suggests meters are zero consuming for a prolonged period. Consideration should be given to how these meters effect the wider market including the customer. Should a dashboard exist to indicate the Wholesaler/Retailer combinations to show the results of volume of zero consuming meters identified, B1 bilats raised, meters replaced (SLA) and VA applied. This should have a market wide audience, especially with leakage and water demand models.*



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