

ARE WATER CHARGES & METERING THE SOLUTION TO IRELAND'S WATER INFRASTRUCTURE CHALLENGES?

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Mr Chairman, Ladies & Gentlemen.

Good Morning.

May I first thank the Local Government Division for their invitation to address the Annual Conference. It is a great honour for any member of Engineers Ireland to be given the opportunity to address our Annual Conference.

As the subject of my paper is water charges and metering, I feel that I must also thank the Minister for the Environment and his Department for choosing this week to bring the issue back into the spotlight.

This morning I have been asked to address the question posed on this slide:

“Are Water Charges & Water Metering the Solution to Ireland’s Water Infrastructure Challenges?”

The answer is Yes.

However, I have to talk for 30 minutes so we had better expand a bit on that.

INTRODUCTIONS

- Chartered Engineer

- Chairman - Cork Region Engineers Ireland
- Chairman - Transport & Infrastructure Cork Chamber
- Principal - Kevin J Murray & Co Ltd

- 20+ years experience as an Consultant Engineer
- 10+ years experience in Water Pricing in Ireland
- Non-Domestic Water Metering Programme
 - Implementation & Guidance Notes



First – Introductions are called for.

I am a Chartered Civil & Structural Engineer in private practice with over 20 years experience as a consultant engineer, the last 10 of which have been largely in the area of water pricing policy and metering implementation. I have been involved in the implementation of water metering for non-domestic customers in 14 local authority areas in Ireland, including the pilot project in Sligo and the National Notes for Guidance.

I am also the Chairman of the Cork Region of Engineers Ireland and Chairman of the Transport & Infrastructure Committee of Cork Chamber. I like Committees!

However my remarks today reflect my own personal opinions and are based on my experiences. These are not necessarily the views of Engineers Ireland, Cork Chamber; and certainly should not be presumed to reflect the views of the Government.

In presenting this paper I hope to add to the debate and aid the development of strategy towards the implementation of universal water charges and metering in Ireland.

WHAT ARE THE WATER INFRASTRUCTURE CHALLENGES?

- Tackle high-levels of unaccounted-for-water;
- Replace Victorian pipes;
- Anticipate climate change;
- Provide for an island population of 8m;
- Meet EU Water Quality Directives;
- Deliver an efficient service at reasonable cost;
- Water as a driver of Foreign Direct Investment;
- Fund the Water Services Investment Programme
 - and then some;
- Asset Management of Infrastructure
 - active water network computer models.



The title of this presentation contains the premise that there are water infrastructure challenges in Ireland.

Of course there are! And the announcement this week of the Water Services Investment Programme 2010-12 bears powerful evidence to the extent of the challenges we face. It is still worth listing some of those challenges:


- Ten years after the National Water Study we have failed to consistently resource programmes to get control of unaccounted-for-water. It is still too high.
 - We have to ramp up to replace the cast iron Victorian pipes in some urban centres. Even with recent investment we have not reached an acceptable 1% per annum replacement rate.
 - We must anticipate the effect of climate change on storm drainage and drinking water storage needs. We expect greater extremes of weather in future.
 - We must avoid EU penalties. We have invested heavily but the work is not complete.
 - We must deliver an efficient service at reasonable cost – some challenge as we import much of our energy for water treatment and delivery!
 - Ireland is an economy that depends on Foreign Direct Investment. That FDI looks for locations with a secure and dependable water supply. Those locations are getting fewer and fewer internationally.
- In summary, we have to fund the Water Services Investment Programme and then some!
- And we have to find ways of managing the infrastructure that we have – through asset management, live network models, and active leakage control.

WHAT IS COMMON TO THESE CHALLENGES?

○ Revenue Stream

- Capital Replacement Funds;
- Active Leakage Control Teams;
- Mains Rehabilitation Programmes;
- New Water Infrastructure

○ Monitor & Control

- Manage what we have to best effect;
 - Reduce wastage;
 - Capture leaks & Repair;
 - Responsible attitude to the use of water.
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But if we think about those challenges in a different way, we can describe them as being in two camps:

Revenue & Management.

There has to be a **revenue** stream to fund the infrastructure challenges - and we must have learnt that if the revenue is filtered through income tax and the Department of Finance then it is going to “evaporate”.

But, just as important as having a revenue stream, is to have the means to **manage** the water network. Aside from one or two notable examples, we simply do not have the means to manage water networks actively. We need more tools; more measurement points; better software – and the economy of scale to use those tools effectively.

Please be clear however, the responsibility for managing water does not rest solely with the local authority. The consumer is a partner on this journey and we must get to a position where everybody in society feels responsible for the management of the water on their private property as well.

WATER CHARGES & METERING

o Part of the Solution:

- A responsible relationship with the water we use;
- A valuable tool in the conservation of water;
- A revenue stream to invest in water infrastructure;
- A means to measure efficiency in service delivery.

o *So what are the challenges facing water metering?*



And so we come to my answer to part one of the question.

Universal water **charges** are part of the solution – They provide a revenue stream.

Universal water **meters** are part of the solution – They offer tools to help monitor and control the water network assets.

However – meters are not necessary for a revenue stream and charges without meters do little to help manage the network.

Water charges based on water metering; and meters that are recognised for their contribution to network management as much as being cash registers; is part of the solution to our infrastructure challenge.

So then, what are the challenges facing universal water metering?

WHERE ARE WE NOW?

- Sept 09: Commission of Taxation – Water Charges
- Dec 09: Budget indicates Domestic Water Charges for 2011.
- Jan 10: Minister for Environment – “Proposals to Cabinet within weeks; Begin Metering in 2011.”
- Feb 10: Minister for Finance – “Broaden Tax Base – Water Charges.”
- April 2010 – Proposals to Cabinet in 2 weeks?

Well, what has been achieved to date? What is our “status”?

We are not starting from scratch.

- As a nation we have substantially rolled-out metering of the non-domestic sector over the last few years. It has not been without its problems, but it does provide us with a good foundation – once we can learn from our successes and failures!
- In the Private Group Water Schemes the metering of domestic connections has been taking place for some time.

We have a starting point and ***we also appear to have political momentum.***

In August 2008 the introduction of domestic water charges was not envisaged in the lifetime of this Government. Mind you there were a few things that were not envisaged back in August 2008!

The Commission on Taxation reported in September 2009 and recommended the introduction of domestic water charges. By December 2009 the budget had indicated that water charges would be introduced by 2011, and further impetus was gained after the adverse weather of January 2010.

Only this week the Minister for the Environment has confirmed that he is bringing proposals to cabinet in a matter of weeks and that meters will be rolled-out from 2011.

SUMMARY OF CHALLENGES

- Learning the Lessons.
- Customer Identification – The Direct Route.
- The Free Water Myth.
- Procurement Models.
- Domestic & Non-Domestic Water.
- Programme, Resources & Cost.
- AMR & Smart Metering.
- Water Management Strategy.
- The Water Act v.2010



If that is where we are at, then the rest of this presentation will look at some of the challenges facing the implementation of universal water metering.


I have listed some of those challenges on this slide and I will now discuss them in turn.

In some cases I will not only talk about challenges but I will also offer some potential strategies to address those challenges. Don't expect these strategies to be "fully-formed" but I hope that they will give some idea of how things might be done; not necessarily how they will be done!

LEARNING THE LESSONS

- We have substantially completed a non-domestic metering programme across 34 local authorities.
 - Each local authority had its own approach;
 - A wealth of experience & knowledge – collectively;
 - “A house divided cannot stand”.

 - We need to draw together the lessons learnt from the non-domestic metering programme.
 - The stakeholders are not exclusive to local authorities

 - Proposal – A series of structured workshops in each of the WSNTG centres around Ireland.
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As I mentioned earlier, we in Ireland have substantially rolled-out a non-domestic metering programme over the last few years.

As part of that process, almost every local authority has taken a different variation on a theme:

- We have had design-build, private operators, client-managed, etc.
- We have different meters, different boundary boxes and different reading technologies. In Dublin we have an automatic reading system that has drawn UK water companies over to see the future of water metering!

We may be a bunch of contrary individualists or very good at tweaking a principle to suit our circumstances. Whatever, we have amassed a vast amount of experience; unfortunately it is scattered to the four fields.

We need to draw that experience together, and quickly!

We also need to recognise that the experience is spread across the industry.

My proposal is that we need to have a series of **structured workshops** in each of the Water Services National Training Group training centres around the country. We need to do this quickly while the memory of the non-domestic programme is fresh. The findings of those workshops should then be **captured in a report** to inform the development of a strategy for the implementation of universal metering.

CUSTOMER IDENTIFICATION

- A proposal to identify customers & connections
- Place the responsibility for the connection on the customer
- All supplies/connections must be licensed by the end of 2011. Apply now to your local authority!
 - Annual License Fee of €100 per Domestic Connection;
 - Higher License Fees for larger commercial connections.
- If a customer is found to have an unlicensed supply after Dec 2011, then it is considered to be theft.



I would like to now talk about Customer Identification. If you want to send a bill to a customer you need an address. If you want to put a meter on a property you need to know where to find the connection pipe.

Anybody who has been involved in the non-domestic water metering programme will know that those two little problems come under the heading “**non-trivial**”. I could use stronger language but there may be bankers present. These twin problems of **customers and connections** have proven to be the greatest challenge for many metering projects.

Undoubtedly we need to find the best ways of identifying customers and their connections if we are to have any hope of getting the meter installation done efficiently.

This is where **desk studies and pilot studies** will prove invaluable – **if** we are to follow traditional routes of procurement.

BUT – Perhaps we need to take a different perspective on this problem? Why should the responsibility lie with the local authority to establish who is taking water and how?

I am proposing that the customer should have the responsibility for the connection. The customer should take his rightful responsibility and obtain a license for her water supply connection.

Under this proposal the customer would be given a limited amount of time to apply for a license for every water connection into her property. The customer would have to identify the connection point (stop-tap) on the ground to receive the license. The local authority would be entitled to charge an annual license fee. Why isn't this the way it has always be done?

Finally, if a customer is later found to have an illegal connection (a connection for which he has not sought a license) it can be considered evidence of water theft and be subject to prosecution for the payment of penalties and assessed unpaid volumes of water.

THE FREE WATER MYTH

- Can you offer an allocation of free water to every domestic customer?
 - Drinking water costs money to produce – every drop;
 - Free water is a burden on the tax payer;
 - Free water is a subsidy for the wealthy;
 - Social Welfare system can protect the vulnerable.
- Is it technically feasible?
 - Huge administrative burden to evaluate the allocation
 - Per household
 - Per connection
 - Implications in the Non-Domestic (Institutional) Sector
 - Combined Domestic & Non-Domestic Customers



If we are to move to universal water charges and metering then we have to have a debate about the policy issues.

There are some challenges that are physical, like the whimsical plumbing “installations” that we can find buried in so many properties. We don’t need to invent new challenges that will be costly to implement and a barrier to efficiency.

As far as I am concerned, the idea that you would give a free allocation of water to everybody for an introductory period to “sugar the pill” is pandering to the baser instincts of the consumer. It sounds like a nice idea but in truth it is expediency of the worst sort. It will add time and cost to the process and it is not technically feasible with our quaint plumbing.

Drinking water is costly to produce to the high standards required of a “food”. Somebody has to pay for “free allocations”. Free water is a burden on the tax payer. Free water is a subsidy for the wealthy. We have a perfectly good social welfare system to protect the vulnerable.

If you were to give a free allocation of water you would have to establish the number of persons in each property; and the number of persons per each connection. This will place an unnecessary additional administrative burden on the project – which will be reflected in increased water rates for those that have to pay!

It will also create difficulties with the relationship between domestic and non-domestic customers, as multiple mixed-customer properties will see non-domestic customers get a benefit from the free-allocations given to domestic customers on the shared connection.

I would strongly urge the policy makers to think very carefully about introducing such a measure as a free water allocation.

PROCUREMENT MODELS

- PPP/DB/DBO Models recommended last time
 - Will this be a workable model for the domestic sector?
 - We need to look at other models before we start.

- Play to the strengths of the public & private sectors

- Three Stage Model:
 - Customer & Connection Identification -> Database
 - Civil Works (Boundary Box Installation) -> Framework
 - Meter/AMR Installation -> Menu of Technologies



What are the procurement challenges?

We are talking about a €500m-€1bn programme to be rolled out in 2-3 years. The challenges must be immense.

On the non-domestic metering programme the preferred route was to use design-build or design-build & operate models. While this had its advantages it also had its share of challenging hurdles; some of which have never been satisfactorily concluded. However, it is hard to find any procurement strategy that was entirely satisfactory or couldn't be improved.

We need to look at new models if we are to deliver this programme which is 5-times greater in scale. We need to play to the strengths of the public and private sectors. We also need to remain aware that local authorities have operational systems for metering and billing non-domestic customers now and we must integrate or replace those systems.

I am proposing a 3-stage model for consideration. At the centre of this model is a framework approach where 8 to 10 civil engineering contractors would be pre-qualified and would tender to install boundary boxes and meters in bundles of 5,000, 10,000 or 20,000. No contractor would be allowed have more than 3 contracts "live" at any time. This would incentivise the completion of projects rapidly so that (once finished one project) the contractor could go back on the list for the next group of projects. This would also remove the risk of one national contract that might not perform to expectations.

The bundles of customer details ready for meter installations would be prepared by each local authority using either their own resources or external service providers. The technology (boxes and meters) might be centrally procured on a national basis to get a common price for each local authority. Automatic meter reading (AMR) technologies may be optional extras under separate contracts as required locally.

DOMESTIC & NON-DOMESTIC WATER

- The introduction of Domestic Charges will have implications for Non-Domestic Customers
- Marginal & Average Capital Costs;
- Domestic Allowances;
- Pressure for full-cost recovery?
- Stormwater Charges?
- Lesson – Water network management is crucial for all customers, domestic & non-domestic



Let me turn to another challenge:- how we integrate the domestic water charges into the existing non-domestic charges model. There are a few “quirks” of the non-domestic charges that have to be addressed. Let me explain.

In the present model the water charges for non-domestic customers are based on the average operational costs of water services but only the **marginal** capital costs. That is the marginal additional cost once provision has been made for the domestic needs. This means that charges to businesses are lower by perhaps 15%-20% than they might otherwise be. Universal water charges are likely to be based on average costs only; and this will be an upward pressure on existing non-domestic charges.

A second issue in the present water pricing model is the domestic allowance of 225m³/annum allowed for any commercial customer that has a domestic component, for example a pub with an apartment overhead. Because this is a generous allowance it acts as a subsidy to those that have these mixed connections. If domestic customers are charged then the domestic allowance would be no more **and the subsidy would disappear**.

If you look at the amounts raised from the non-domestic sector annually (estimated at €250m) and the amount that might be raised on the same basis from the domestic sector (€450m), then it is evident that we would not have full cost recovery of the €1bn (plus) costs of water services. Will there be greater pressure for full cost recovery?

Will the balance be met from central government or will there be pressure to get full cost recovery by raising water charges? Will there be pressure to introduce stormwater charges?

The lesson here is that the integration of these new charges into an existing pricing model could exploit the weaknesses of the existing model. All customers will get more focussed on seeing that they get from their local authority the most efficient use of the revenues that are collected.

PROGRAMME, RESOURCES & COST

- Can we install meters in 3 years?
 - Not if we follow the same models as before.
- Boundary-box installation could be done in 3-yrs
 - Assume 900,000 boundary boxes
 - 300-350 2-person crews, plus management
 - External resources required
- FAS Training Course for Meter Installation
- How quickly can we prepare Customer Databases?
- Estimated costs between €500m and €1bn
 - Assumes an average cost of €400 per installation
 - Allow 20% more for AMR?



Let's talk about real engineering challenges now.

We are talking about the installation of 1.2m water meters in 0.9m new boundary boxes and 0.3m existing boundary boxes. We are talking about surveys and database development. We are talking about meter reading and billing technologies in each local authority.

The industry is suggesting that the meter installation could be done in 3 years with 300-350 2-person crews. We don't have that many experienced crews. No one contractor can provide those resources in Ireland. You might recall that I was earlier proposing a framework of contractors rather than a single national contract. A framework suits this resource issue.

I would like to see FAS working with industry to develop training courses so that we can create more metering crews from our unemployed construction sector. Otherwise we will be importing resources for this metering programme.


The implementation programme will depend on how long it will take to survey customers first and develop the database of customers. This is urgent and could start as soon as the Minister fires the start gun.

The estimated construction value of the metering programme is between €500m and €1bn, based on an assumed average meter installation cost (materials and labour) of €400. An allowance of 20% for automatic meter reading (AMR) would push the costs towards the upper bound.

AMR & SMART METERING

- Provision must be made for Automatic Meter Reading (AMR) technologies

 - Walk By / Drive By / Fixed
 - Marginal cost of reading;
 - Frequency of reading;
 - Accuracy of reading;
 - Out of Sequence reads;
 - Leakage Alerts;
 - Network Management.

 - Allow local authorities to proceed at their own pace
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Which is a good time to talk about Automatic Meter Reading or AMR.

A drive-by AMR has already been introduced in Dublin and Carlow and one or two other sites around the country. It has worked well in the projects that I have been aware of.


While AMR may still be too soon for some local authorities, provision must be made for the retrofitting of AMR into boundary boxes. And thought must be given to the location of the boundary box and the materials (such as metal lids) which would impact on transponder signal quality.

The issues that will influence the choice of meter reading technology (or biology) will include:

- What are the marginal costs of reading meters? What are the costs of the meter readers?
- What frequency of reading and billing is required? 2-monthly bills are becoming the norm.
- Basic human error causes confusion and cost with traditional eye-ball reading.
- Out of Sequence reading capability is often required to investigate leaks, etc
- Does the client want to use “leak-alert” technology? Identify & Repair leaks quickly.
- Does the local authority have the technology to use frequent meter reads to be part of dynamic and live network management models?

All of these questions have to be considered by the local authority before a decision is made on the meter reading technology. Indeed there is a software application available to help a local authority look at the cost-benefit analysis of automatic meter reading technologies.

WATER MANAGEMENT STRATEGY

- Why invest in Water Meters rather than apply a fixed charge?
 - The relationship between universal metering and the control of leakage
 - The value of AMR in rapid response to acute leakage events
 - All to form part of asset management based on functional network models
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I want to return to policy and ask why a local authority would want to invest in thousands of water meters rather than apply a fixed charge to all customers.

I have spoken about this in the past, but Ofwat in the UK has suggested that the water consumption difference between metered and unmetered customers is only 10%. i.e. 135l/hd/day and 150 l/hd/day respectively. The cost of metering is hardly justified if the difference between metered and unmetered customers is so low.

The real reason for universal metering lies in the control of leakage. There is plenty of evidence to suggest that a high proportion of unaccounted-for-water is on the private customer's side of the stop-tap. Water meters are the tools to identify customer-side leakage and to get it fixed. This is a far greater benefit and of greater cost-saving value than simply changing customer water usage behaviour.

Over and above normal water meters, the value of AMR is that it allows for rapid leakage alert and repair. More water saved than would otherwise have been lost.

As mentioned previously, all of these meters can then be used to inform asset management of the water supply system along with bulk meter telemetry – once set within live computer models of the water supply network.

THE WATER ACT v.2010

- Remove the ban on Domestic Water Charges.
 - Permit fixed-charges for 3-years.
 - After 3-years LA's can only charge on a meter.

- Do not waste the opportunity to address issues identified through the non-domestic programme:
 - Multiple occupancy – Who is the Customer?
 - Right to disconnect – No domestic preference.
 - You can't tie the hands of the utility provider.
 - Powers to license connections.
 - Place the responsibility on the consumer.



The Department of the Environment, Heritage & Local Government has said that the Water Act will have to be amended to remove the ban on domestic water charges.

While this is under consideration, there is a golden opportunity to strengthen the legislation to address other issues – some of which were identified under the non-domestic metering programme.

I understand from recent comments that the Minister does not envisage water charges before water meters are substantially rolled-out. However, the local authorities appear to need the revenue to address urgent water service issues. I would suggest that the local authority be permitted to charge a fixed rate for no more than 3 years (from 1 Jan 2011), but that they lose that right after 3 years. If meters have not been installed by then they lose the right to collect revenue from unmetered customers.

Amendments to the Water Act should also seek to strengthen the definition of who is the customer where there are multi-customer single connections. It should seek to strengthen the right to disconnect for non-payment. You can't tie the hands of a utility provider by removing the right to disconnect.

And returning to a point I made earlier, this would be an opportunity to introduce powers for local authorities to license connections; thus placing the responsibility back with the customer for his or her connection.

This is also an opportunity to ban under-sink macerators and introduce septic tank licensing.

CONCLUSION

Water Charges & Metering can be part of the solution
to Ireland's Water Infrastructure Challenges

- But only if we recognise the challenges to water
metering and deal with them.

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Ladies and Gentlemen,

I do believe that Water Charges and Metering can be part of the solution to Ireland's Water Infrastructure Challenges.

But only if we recognise the challenges to water metering and deal with them from the start.

And if I may leave you with one thought. 50% of people in the world have a poorer water supply than the Romans had 2,000 years ago. Here in Ireland we are very fortunate to have a readily available supply of raw water and we are obliged to manage it properly.

Thank you for your attention.

I would be pleased to answer questions at the Q&A session later or now at the discretion of our worthy Chairman.