

# GHOST BUSTERS

A bottom up approach to the  
elimination of Ghost Vending

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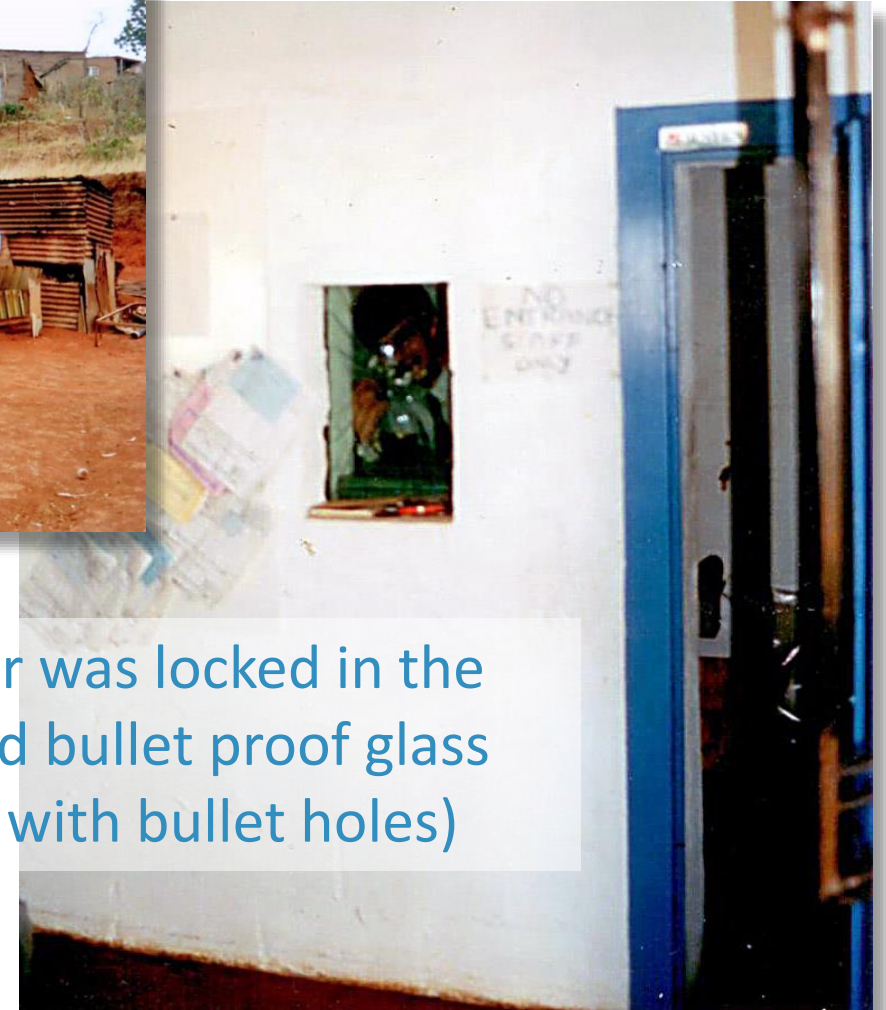


# It's been a long journey...

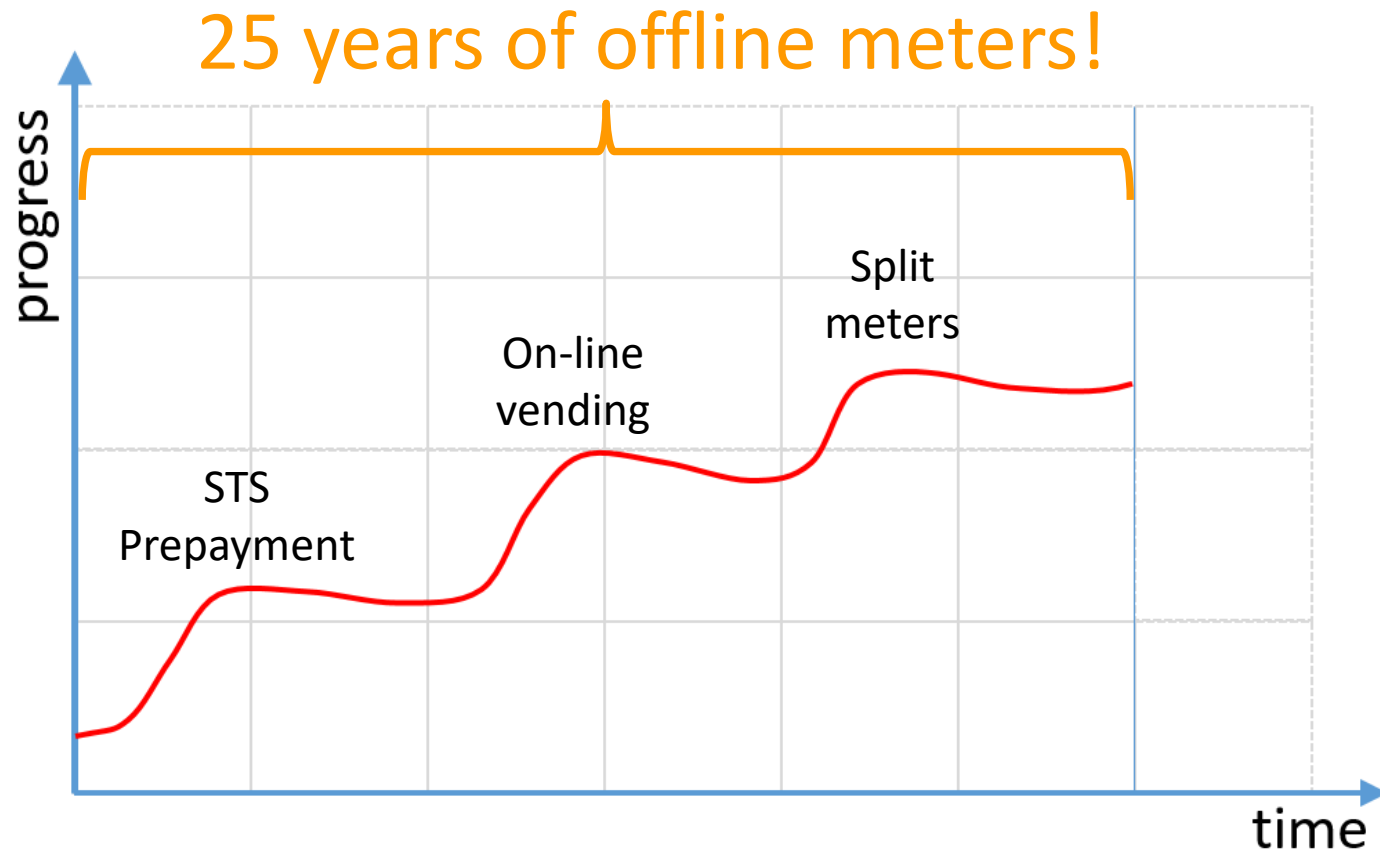
Some of the first STS meter installations in Pietermaritzburg in 1995.



The vendor was locked in the safe behind bullet proof glass (complete with bullet holes)



# And progress has not been a straight line...

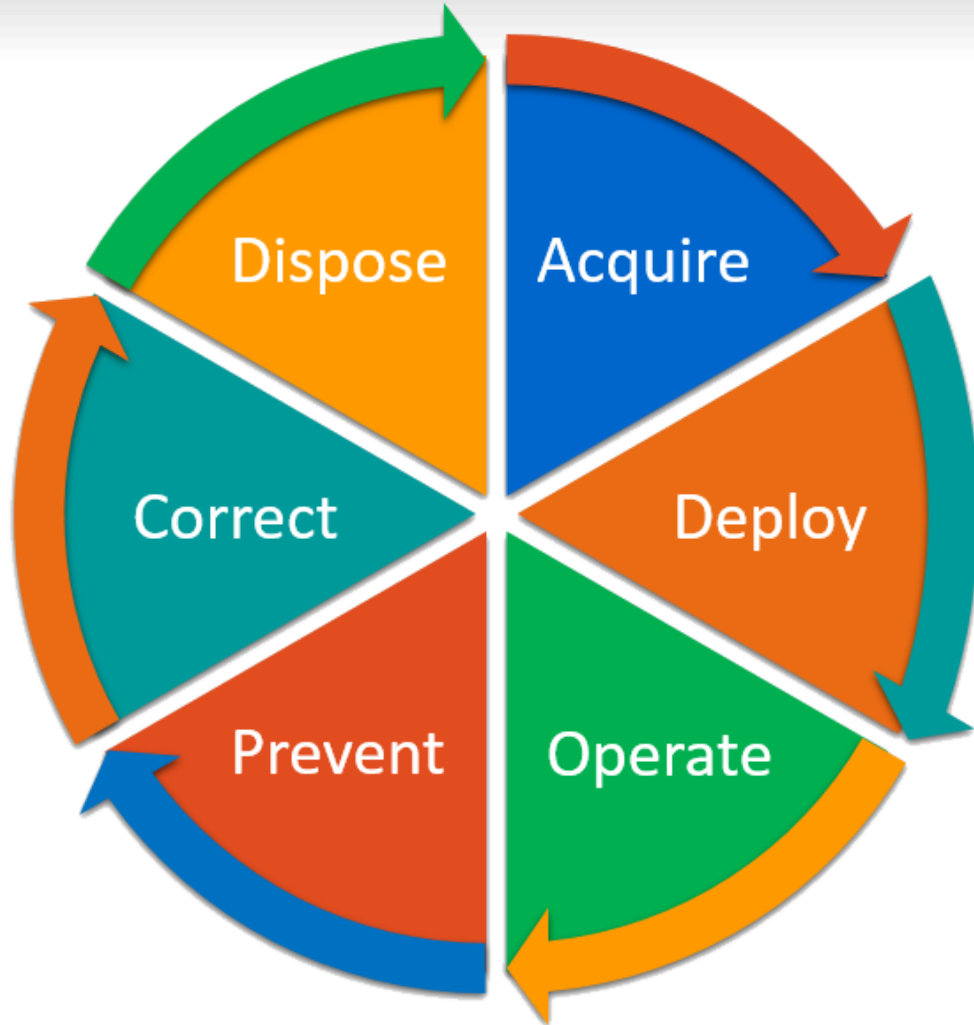


Steady progress has been made, with improvements in technology periodically bringing about rapid progress.

Astonishingly, during all this time prepayment meters have remained off-line and “invisible”.

Many issues persist, waiting for a cost-effective, on-line solution.

# The Total Cost of Ownership (TOC) Wheel



Progress can be measured in a variety of ways.

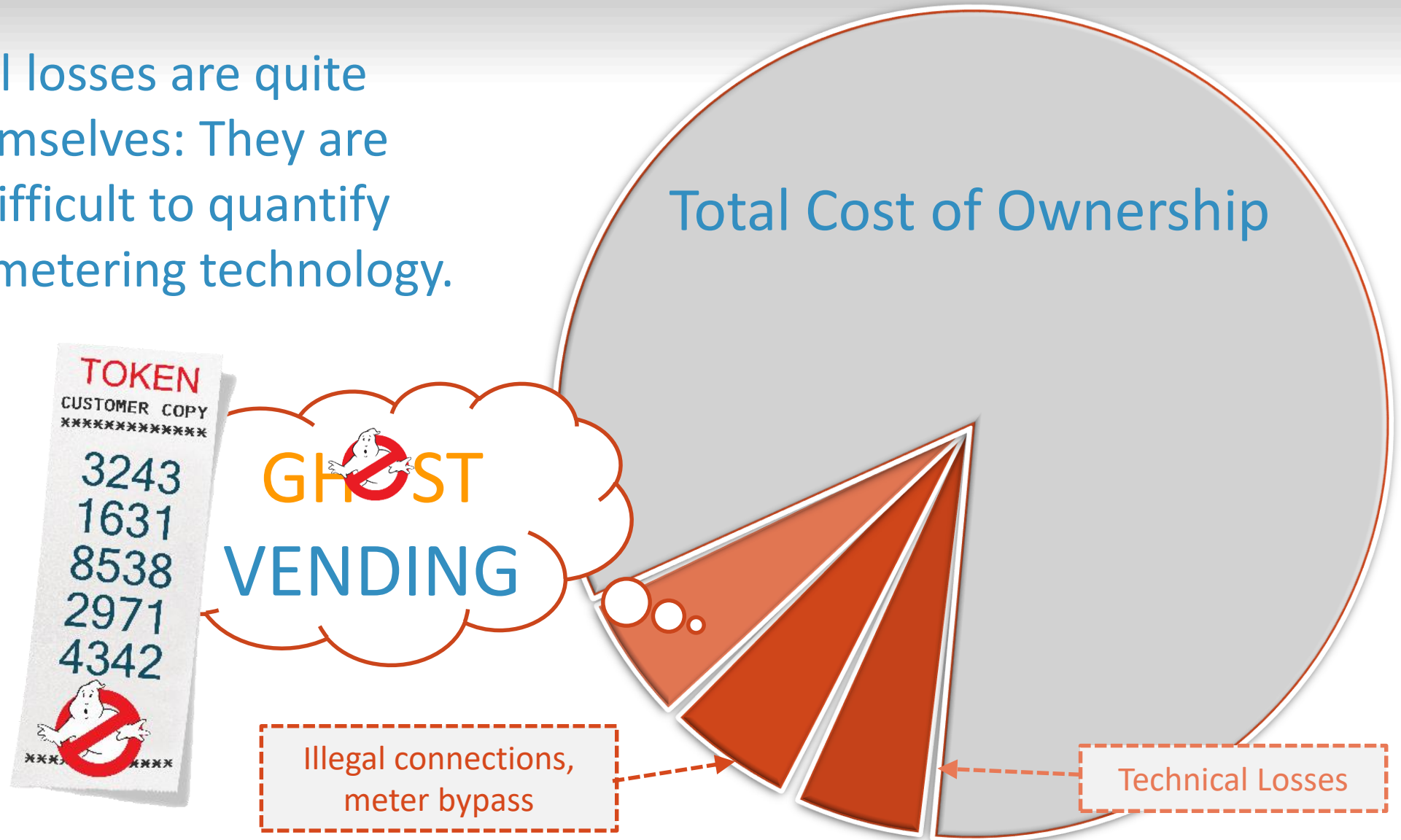
One method is to ensure that the value delivered by a utility's assets and operations increases **MORE** than the total cost of ownership to the utility.

A vital aspect in this regard is the reduction\prevention of losses, both technical and non-technical.



# Non-technical losses

Non-technical losses are quite “ghostly” themselves: They are particularly difficult to quantify with off-line metering technology.

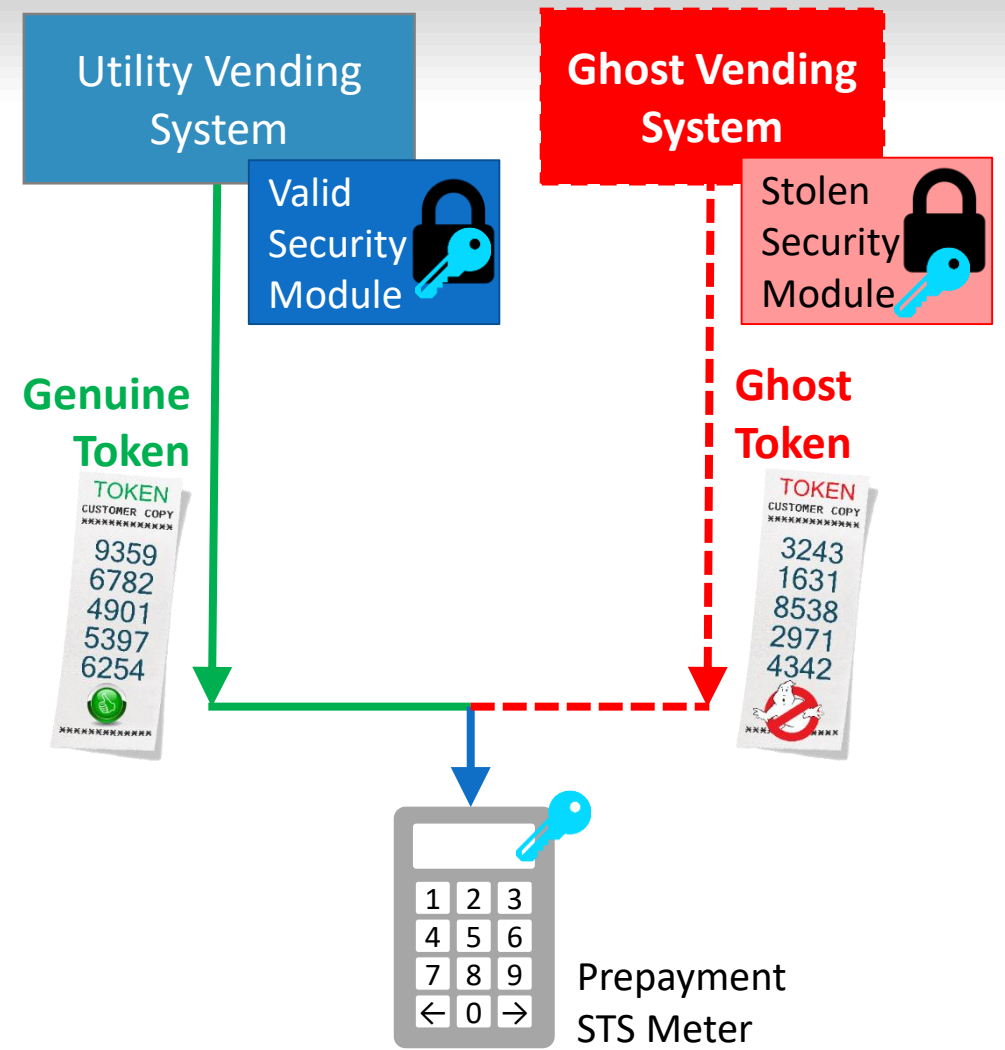


# What is Ghost Vending?

Ghost Vending is the **fraudulent** generation and purchase of prepayment tokens from a stolen off-line vending system or security module.

Ghost tokens are offered for sale to consumers at a discount to the cost of genuine tokens.

A STS meter is oblivious to the source of the token (as long as the STS key is valid), and either token is accepted by the meter.



# Why is it difficult to prevent?

- It is difficult to establish the extent and prevalence of ghost vending because:
- There is **no event triggered** to alert the Utility to the occurrence of ghost vended tokens.
- Participating consumers are **complicit** with the Ghost vendors.
- Meters are **off-line**, and in any case **cannot distinguish between genuine and ghost vended tokens**.
- Ghost Vendors are notoriously difficult to **locate**.
- There is difficulty in obtaining **proof** for prosecution.

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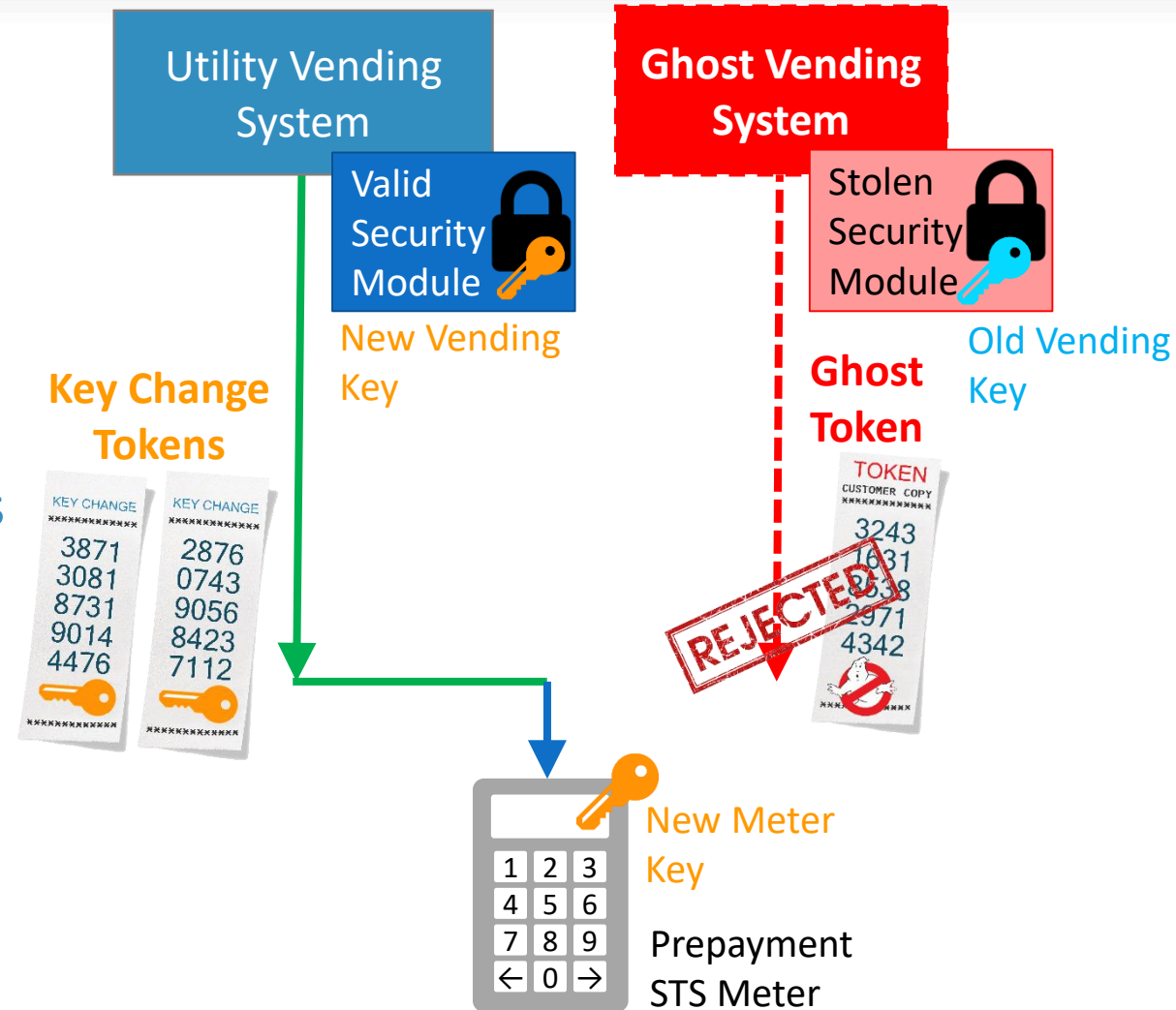
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"Oh, that's the looming specter of dwindling profits.  
Just ignore him."

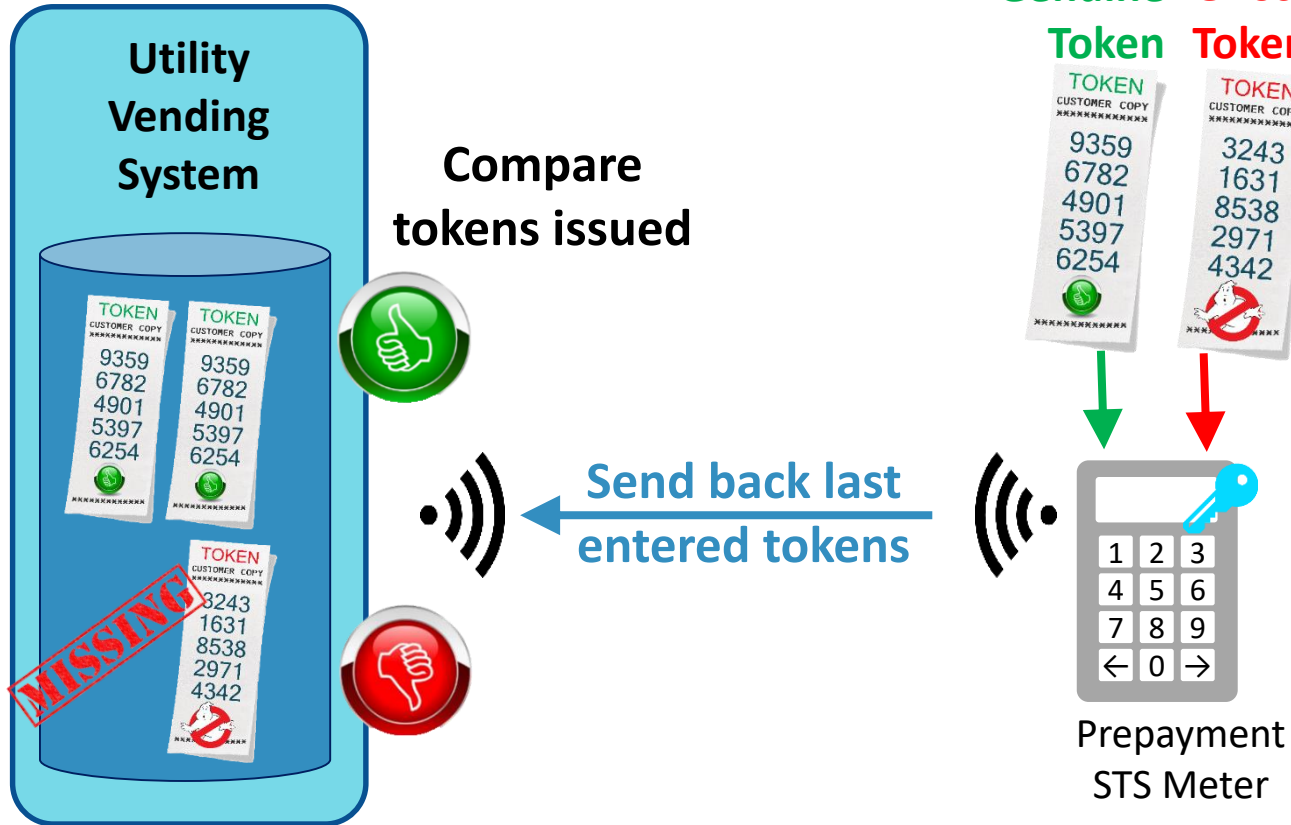
# The “top down” approach

- One solution has been to change the vending key on which each meter key is based.
- This invalidates further entry of ghost tokens because the ghost vending systems will not have access to the new vending key.
- Unfortunately the **logistics** involved in this approach are considerable, which is why it has been largely avoided.
- Furthermore the process unduly **inconveniences** the majority of law abiding consumers.



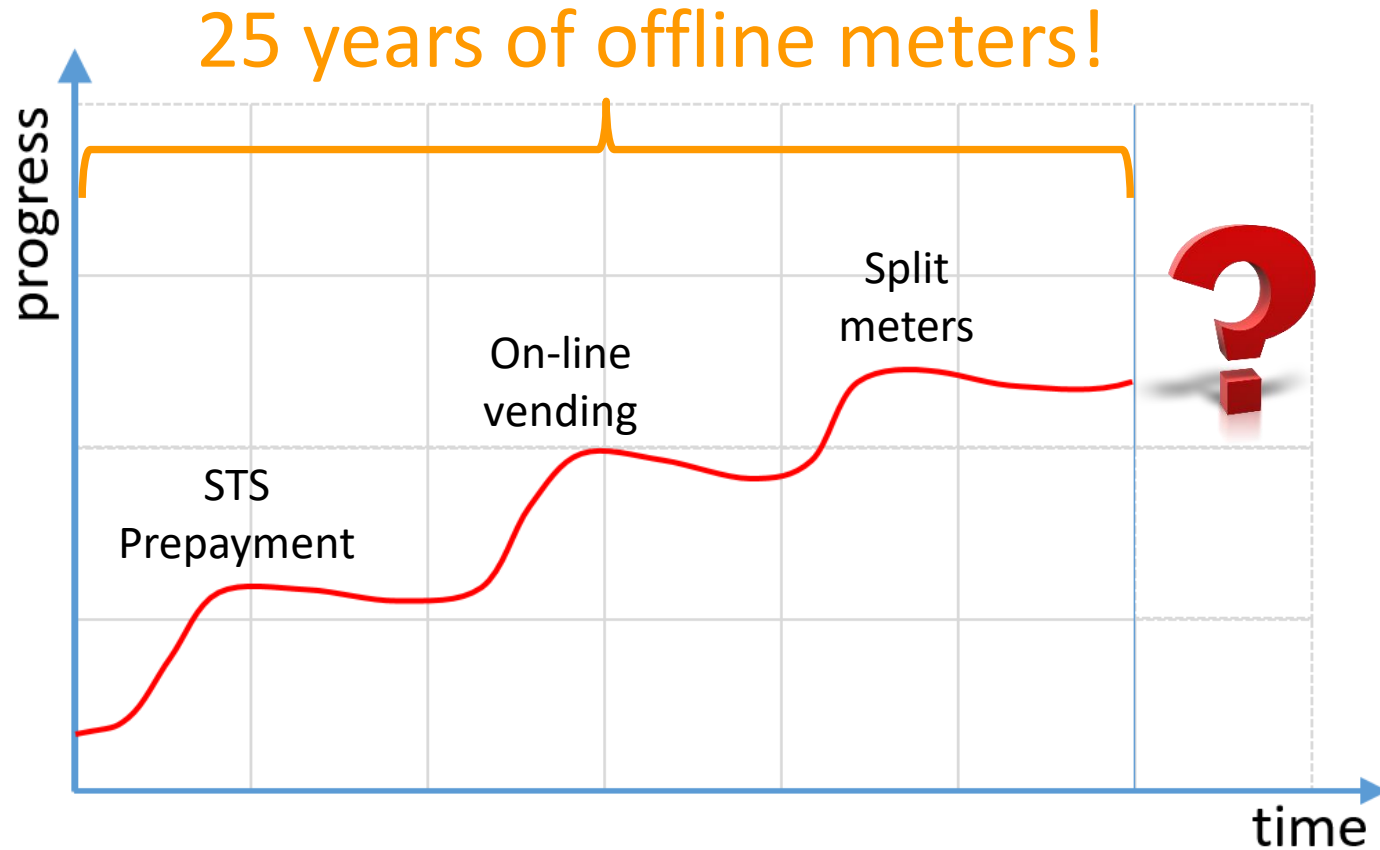


# Ghost “busting” – a bottom up approach



- Every STS prepayment meter records the last credit token[s] entered into the meter.
- Furthermore a utility’s vending system keeps a record of every credit token it has issued.
- Ghost tokens would of course not be present on the utility’s vending system.
- By retrieving the last tokens entered into the meter it would be easy to identify ghost tokens through a simple exception report since they would not be present on the vending system!

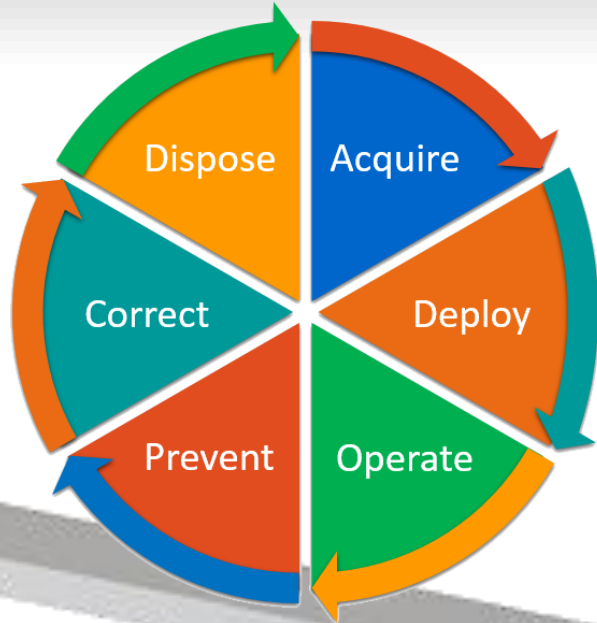
# But existing meters are off-line?



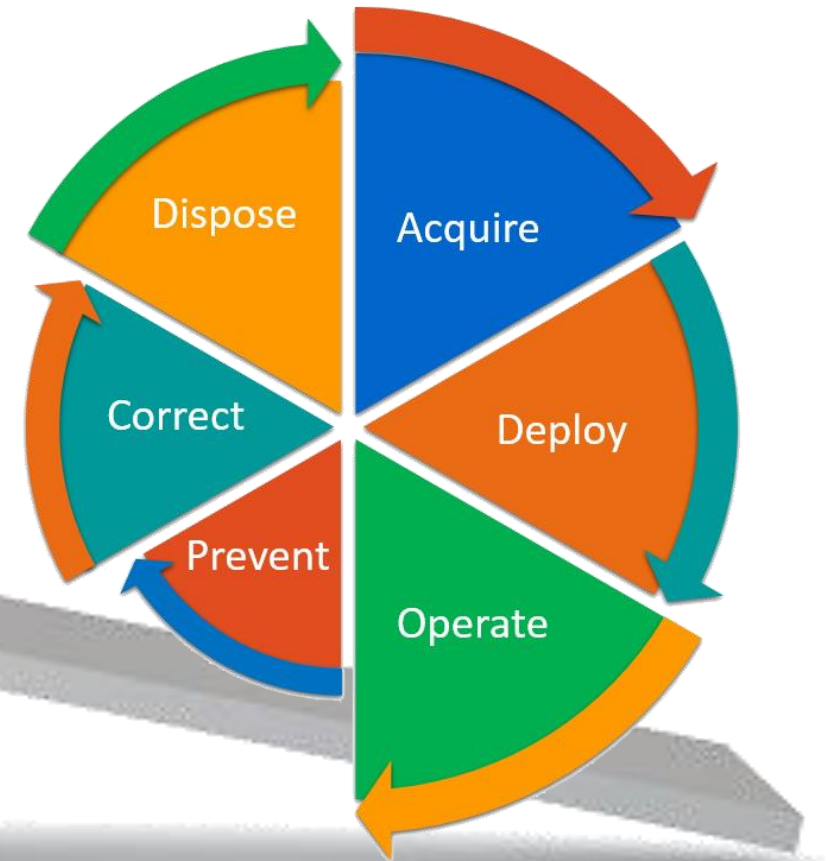
Like so many current issues, ghost busting awaits a cost-effective on-line solution for the existing meter install base.

But on-line metering solutions have been around for a while. Why have such solutions not yet been well adopted in emerging markets? Will this be different in the future?

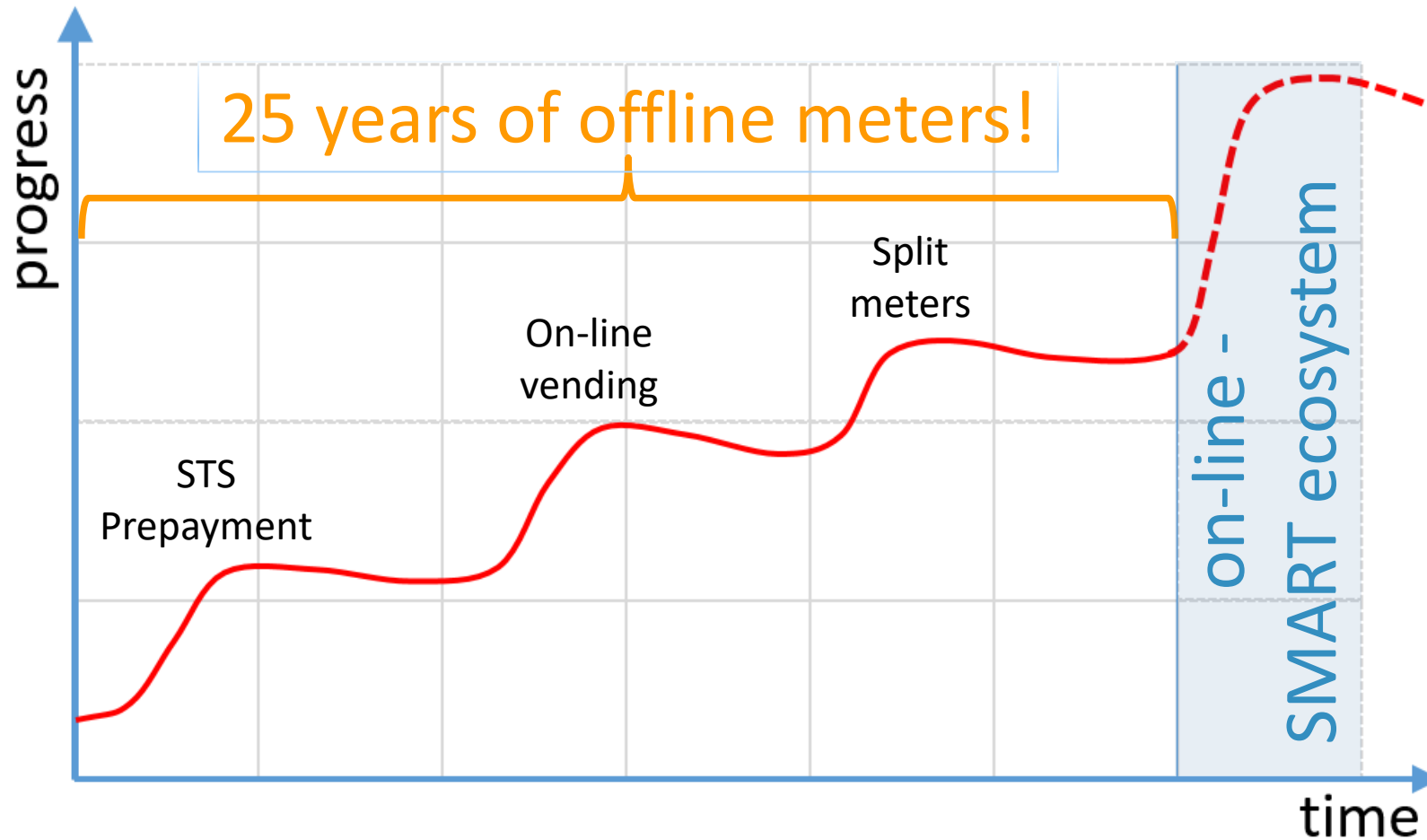
# “Smart” did not align with the TCO...



Technology advancement is not useful if it reduces the cost in one segment at the expense of another segment!



# Are we there yet?



Tremendous progress can be achieved with on-line metering (AMI) ...

... BUT only if the business case is economically viable!

This means we need to make the existing meter install base “smart” without having to replace existing meters.

# The stars are aligning...



STS ASSOCIATION

STS 101-2   NRS 049-2



**IEEE**  
*Internet of Things*



802.11ah HaLow

Long Range Wifi

**LoRa** Alliance

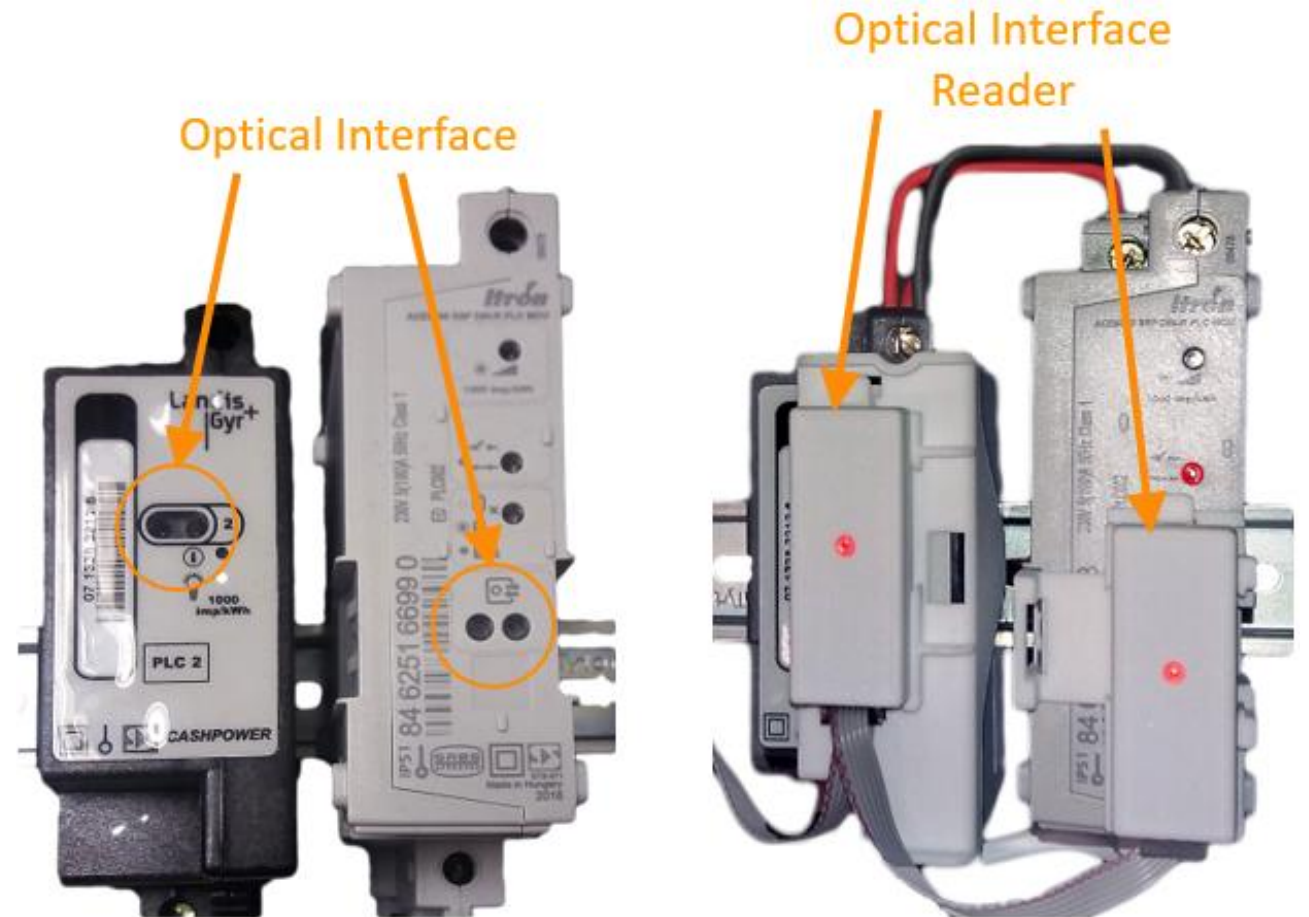
**iNGENU**



# Off-line meters can become on-line

Driven by the **internet of things**, the lower cost of communication and devices now facilitates the retrofitting of **legacy, off-line STS meters** to enable on-line “smart” capabilities.

For example, the standard optical port (IEC 62055-52 or IEC 62056-21) facilitates meter agnostic AMI capabilities for legacy off-line meters.



# Remote revenue protection is possible

- By enabling legacy STS meters with on-line communication, utilities can detect ghost tokens.
- Readings and alarms can be received to enable revenue protection and reduce other non-technical losses.
- Credit and Engineering tokens (including Key Change Tokens), can be sent directly to targeted meters.
- Consumers can also benefit by being able to remotely monitor their consumption, credit their meter and receive FBE tokens.



Don't be afraid of the GH 

Thank You

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