HOT/COLD WATER & GAS METERING & BILLING REQUIREMENTS

Overview

When designing residential high rise and commercial developments with multiple stratums, hydraulic consultants are often asked "how does the metering system work and how do people get bills for their usage?". Perhaps what is more important is whether the occupier is paying their fair share of the common property usage.

In this article I will focus on the metering and billing concept for cold water services and natural gas and hot water services in multipurpose high rise buildings with a centralised commercial hot water plant. To explain how the concept works I have used a sample project which includes two residential towers (with stratums) as well as a group of retail tenancies on ground floor as a third stratum.

Cold Water

A publication issued by Sydney Water in September 2014 enforces a new MLIM (multi-level individual metering) policy. This is applied to all residential apartments across the Sydney metropolitan region. Individual metering for drinking water will improve billing equity in multi-level developments. In addition to drinking water, there are other usages such as ancillary amenities (waste rooms, shared bathrooms, car washes, roof garden waters, pools, irrigation, etc.) which need to be taken in account by strata or building managers as strata levies. How the bill gets shared will be discussed later in the diagrammatic.

Gas and Hot Water

On 1st July 2015 a new Volume Boundary (VB) tariff was approved for annual gas loads under 50TJ. Changes to the tariff include:

- On boundary meter required for MD/HR (medium density high rise) buildings
- Individual metering for each unit no longer required
- The VB can be used by energy intermediary or as part of a hybrid solution (for example, providing natural gas for high rise cooktops in combination with individual metering for hot water)
- Hybrid options available (individual metering for hot water. Boundary metering for all other gas usage)

Individual metering for gas and hot water in MD/HR buildings will continue to be offered by Jemena.

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HOT/COLD WATER & GAS METERING & BILLING REQUIREMENTS

Table 1 - MD/HR Metering Options Analysis

	ADVANTAGES	DISADVANTAGES
Volume Boundary Metering for MD/HR	• No individual gas meters required for each unit (space and ventilation advantages) • Simpler configuration	• Retailer and/or energy intermediary responsible for allocating charges to the end consumers • Customer loses choice of retailer and visibility of usage
Individual metering for MD/HR	• Individual gas meters mean full consumer choice of retailer and paying for own usage (clear allocation)	• Individual gas metering required for each unit (space and ventilation implications)
Hybrid – individual metering for hot water and boundary metering for cooktop etc.	• No individual gas meters required for each unit (space and ventilation advantages) • Customer can choose own retailer for hot water (metered via hot water meters) which makes up ~90% of gas consumption	• Customer loses choice of retailer (Body Corporate chooses) for non-hot water consumption (but this is only ~10% of average load)

STANDARD COLD WATER METER SCHEMATIC METERING AND READING CONCEPT

Notes:

- This Schematic is diagrammatic (not showing any pumps or tanks).

- All fixtures, equipment and pictures are diagrammatic. Actual device may be different to what is shown.

- Name and number of ancillary rooms (private purposes shared rooms) may differ project to project.

Meter reading concept for residential apartments:

- Data from Authority meters are sent to the collector boxes as radio signals via a simcard located inside the meter. Meters are battery operated.

- Data from collector boxes will be received by the main collector (AC or DC powered).

- Data from the main collector will be captured wirelessly by Sycney Water. Phone number and internet to be provided for the main collector.

Meter reading concept for retail (mobile meter reading):

- Data from authority meters are sent as a radio signals and will be captured by walk in or drive-by by Sydney Water.

- Data from the mobile reader will be sent to Sydney Water database.

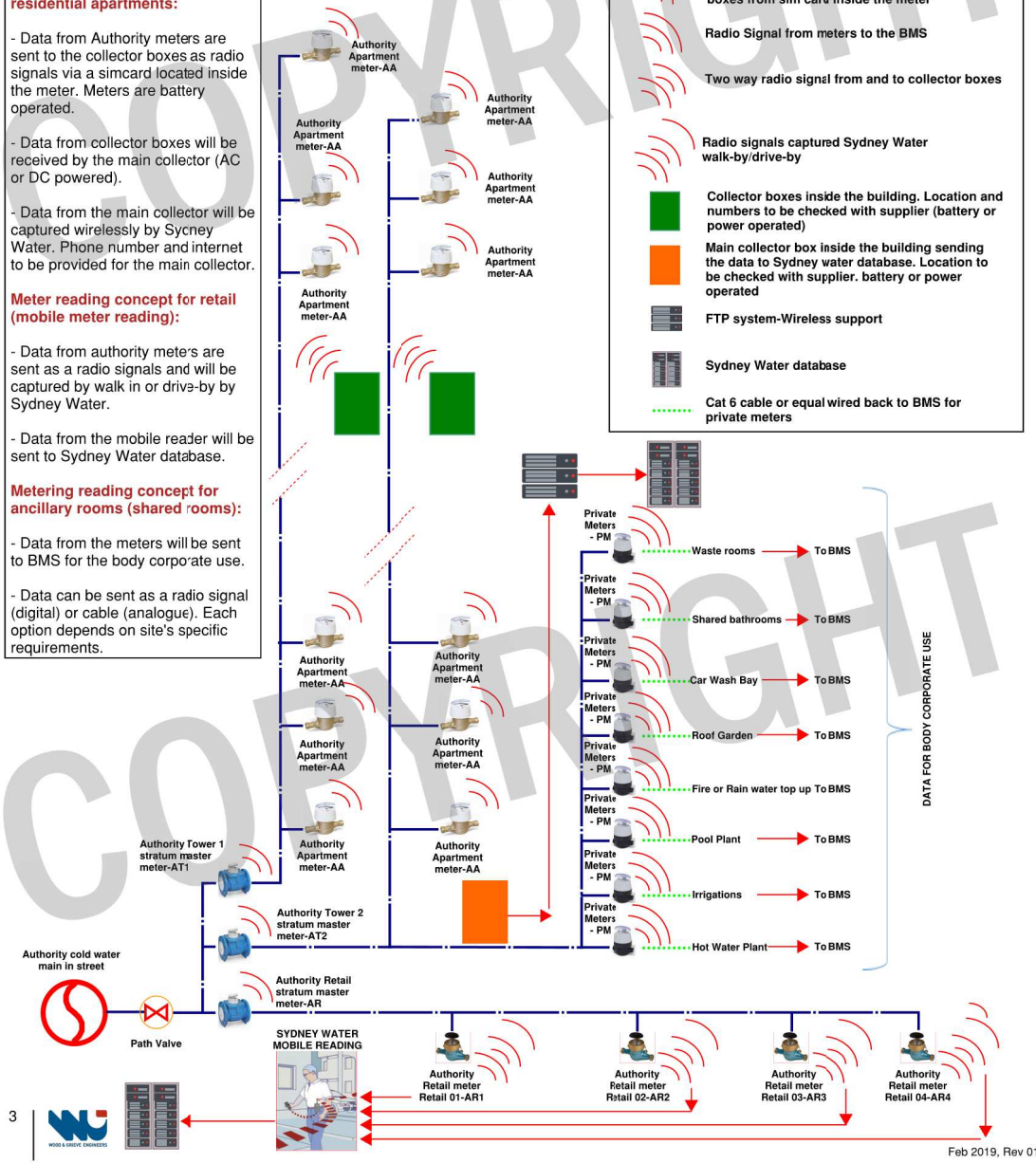
Metering reading concept for ancillary rooms (shared rooms):

- Data from the meters will be sent to BMS for the body corporate use.

- Data can be sent as a radio signal (digital) or cable (analogue). Each option depends on site's specific requirements.

Legend:

- Authority residential apartment meter
- Authority stratum master meter
- Private meters
- Radio signal from authority meters to collector boxes from sim card inside the meter
- Radio Signal from meters to the BMS
- Two way radio signal from and to collector boxes
- Radio signals captured Sydney Water walk-by/drive-by
- Collector boxes inside the building. Location and numbers to be checked with supplier (battery or power operated)
- Main collector box inside the building sending the data to Sydney water database. Location to be checked with supplier. battery or power operated
- FTP system-Wireless support
- Sydney Water database
- Cat 6 cable or equal wired back to BMS for private meters



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STANDARD COLD WATER METER SCHEMATIC FOR BILLING CONCEPT FOR 3 STRATUMS

Notes:

- This Schematic is diagrammatic (not showing any pumps or tanks).

- All fixtures, equipment and pictures are diagrammatic. Actual device may be different to what is shown.

- Name and number of ancillary rooms (private purposes shared rooms) may differ project to project.

Legend:

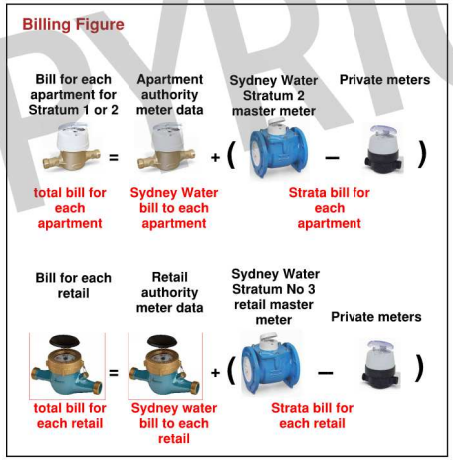
- Authority residential apartment meter
- Authority stratum master meter
- Private meters

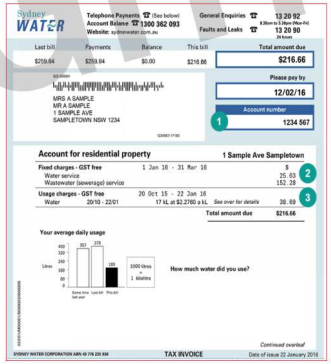
Billing concept for residential apartments:

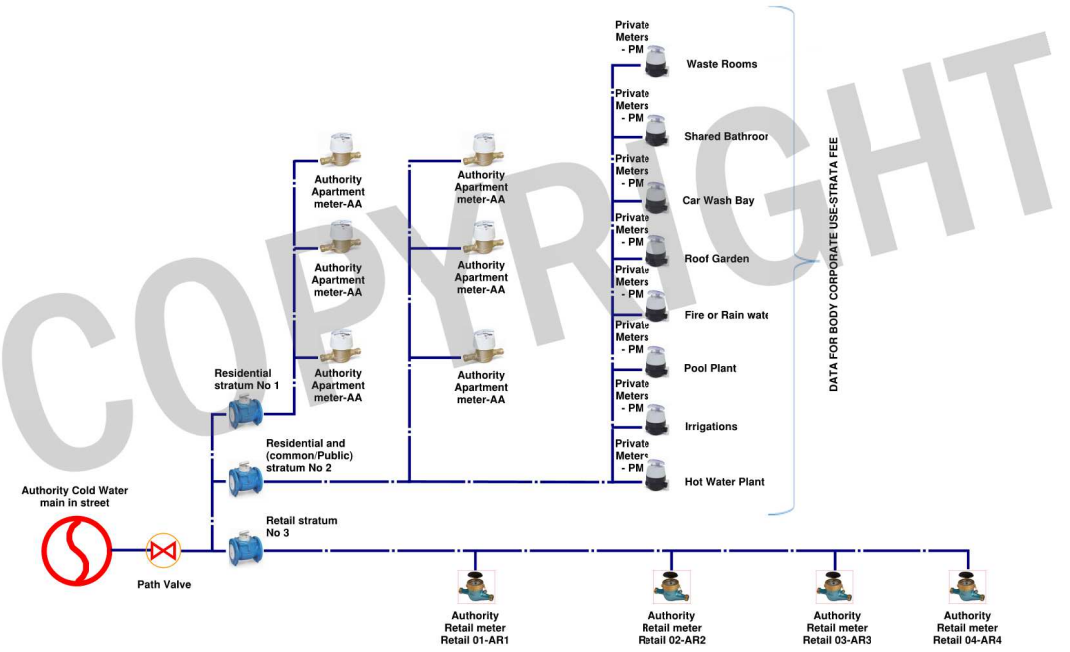
- The cold water bill for each apartment would consist of the actual meter reading usage plus strata fee based on the proportion of the water consumed as measured by the private meters.

- Total cold water usage supplying the hot water plant is proportionally shared amongst the residences (as a strata fee).

Billing Figure







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STANDARD GAS AND HOT WATER METER SCHEMATIC (Jemena Traditional)
METERING AND READING CONCEPT (CENTRALISED HOT WATER PLANT)

Notes:

- This Schematic is diagrammatic (not showing any pumps or tanks).

- All fixtures, equipment and pictures are diagrammatic. Actual device may be different to what is shown.

- Hot Water return pipes, loops and pumps are not shown in the general schematic.

Meter reading concept for residential apartments:

- Data from each residential gas and hot water meter including the cold water check meter will be sent to the MDL which is capable of maximum 32 points(meters) via the Cat 5 cable.

- Data from each MDL will be sent in series to the next MDL via the Cat 6 cable.

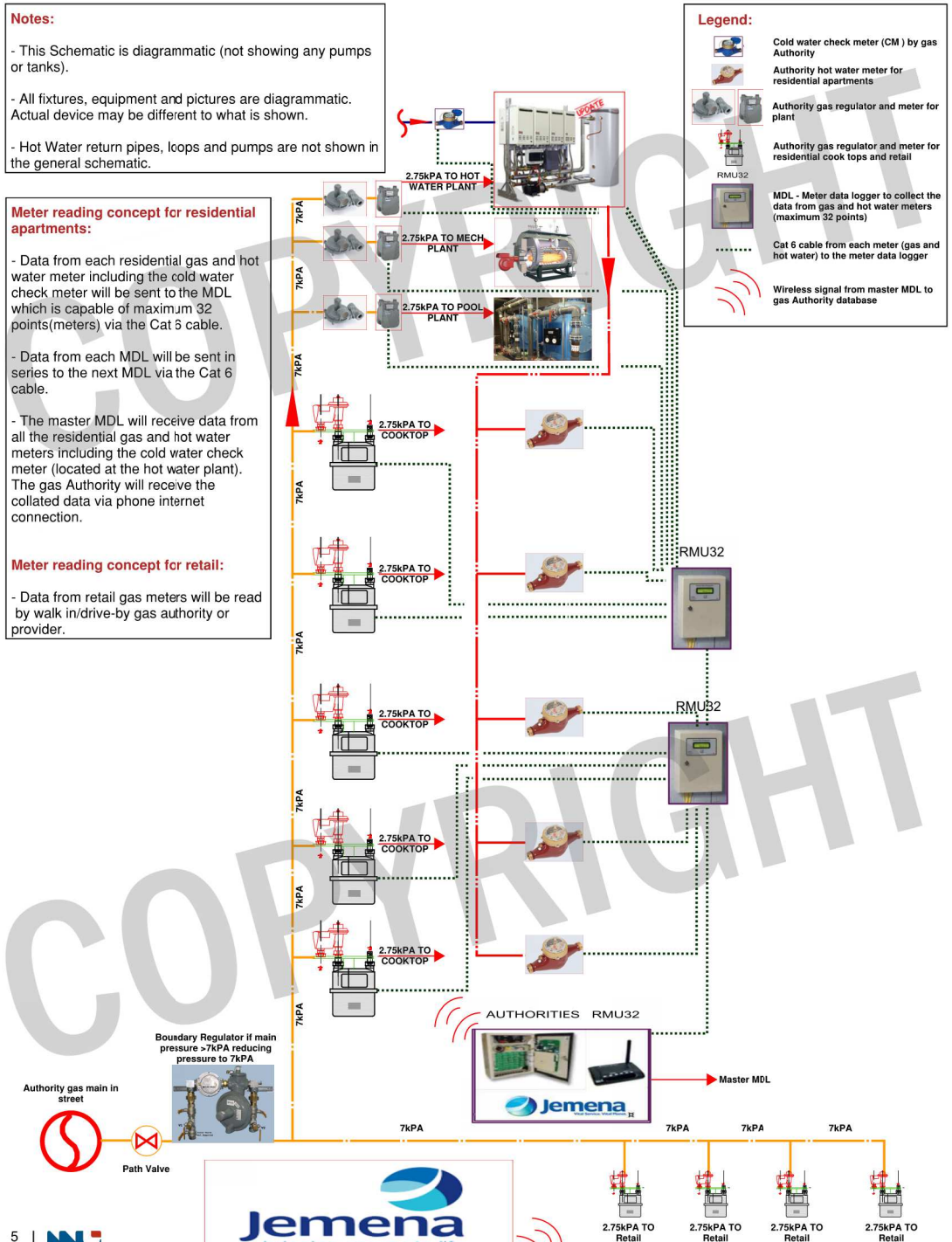
- The master MDL will receive data from all the residential gas and hot water meters including the cold water check meter (located at the hot water plant). The gas Authority will receive the collated data via phone internet connection.

Meter reading concept for retail:

- Data from retail gas meters will be read by walk in/drive-by gas authority or provider.

Legend:

- Cold water check meter (CM) by gas Authority
- Authority hot water meter for residential apartments
- Authority gas regulator and meter for plant
- Authority gas regulator and meter for residential cook tops and retail
- RMU32 — MDL - Meter data logger to collect the data from gas and hot water meters (maximum 32 points)
- Cat 6 cable from each meter (gas and hot water) to the meter data logger
- Wireless signal from master MDL to gas Authority database



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STANDARD GAS AND HOT WATER METER SCHEMATIC (Jemena Traditional)
BILLING CONCEPT (CENTRALISED HOT WATER PLANT)

Notes:

- This Schematic is diagrammatic (not showing any pumps or tanks).

- All fixtures, equipment and pictures are diagrammatic. Actual device may be different to what is shown.

- Hot Water return pipes, loops and pumps are not shown in the general schematic.

Billing concept for residential apartments:

The Authority charges for each apartment consist of the following:

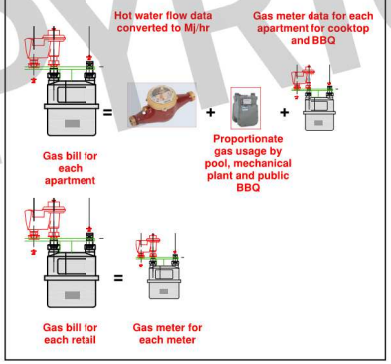
- Actual gas usage consumed in each apartment.

- Proportionate cost of gas usage for common plant and equipment (e.g. pool, mechanical and public BBQ).

- Actual gas usage required to heat a volume of hot water as measured by apartment authority hot water meter.

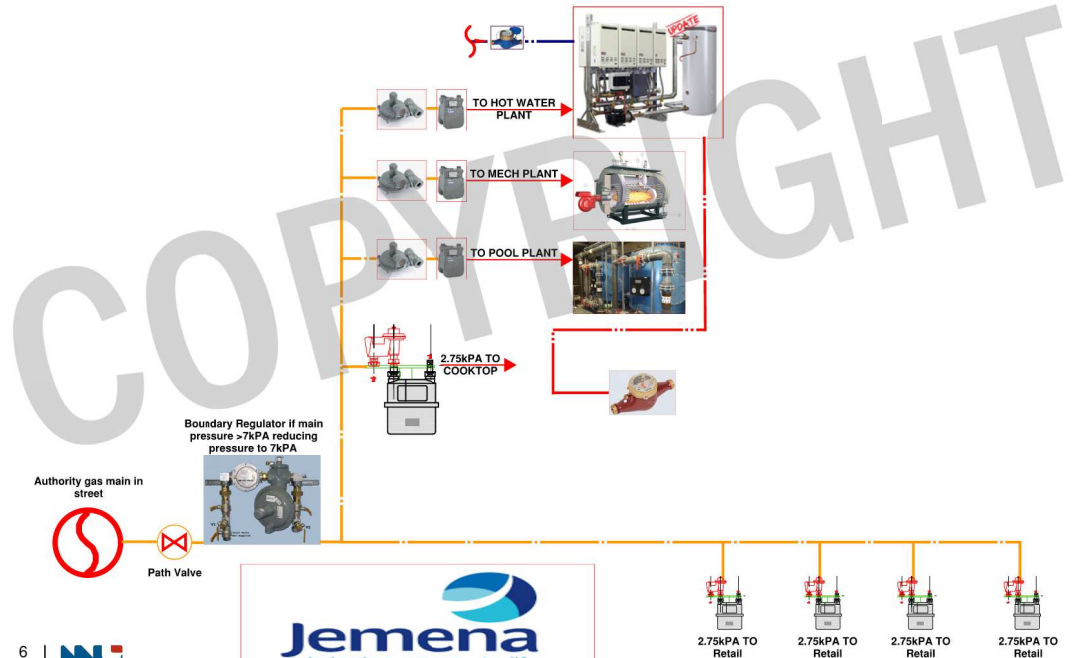
- Tenants likely have the choice of selecting their energy provider.

Billing Figure



Legend:

- Cold water check meter (CM) by gas provider
- Authority hot water meter for residential apartments
- Authority Gas regulator and meter for residential cook tops and retails



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GAS AND HOT WATER METER SCHEMATIC (Jemena Hybrid)
FOR METERING AND READING CONCEPT (CENTRALISED HOT WATER HEATER)

Notes:

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- All fixtures, equipment and pictures are diagrammatic. Actual device may be different to what is shown.

- Hot Water return pipes, loops and pumps are not shown in this general schematic.

Legend:

- Cold water check meter (CM) by gas authority
- Authority hot water meter for residential apartments
- Authority gas regulator and meter for plant
- Authority gas regulator and meter for residential cook tops and retail
- MDL - Meter data logger to collect the data from gas and hot water meters (maximum 32 points)
- Cat 6 cable from each meter(gas and hot water) to the meter data logger
- Wireless signal from master MDL to gas authority database

Meter reading concept for residential apartments:

- Data from each residential gas and hot water meter including the cold water check meter will be sent to the MDL which is capable of maximum 32 points(meters) via the Cat 6 cable.

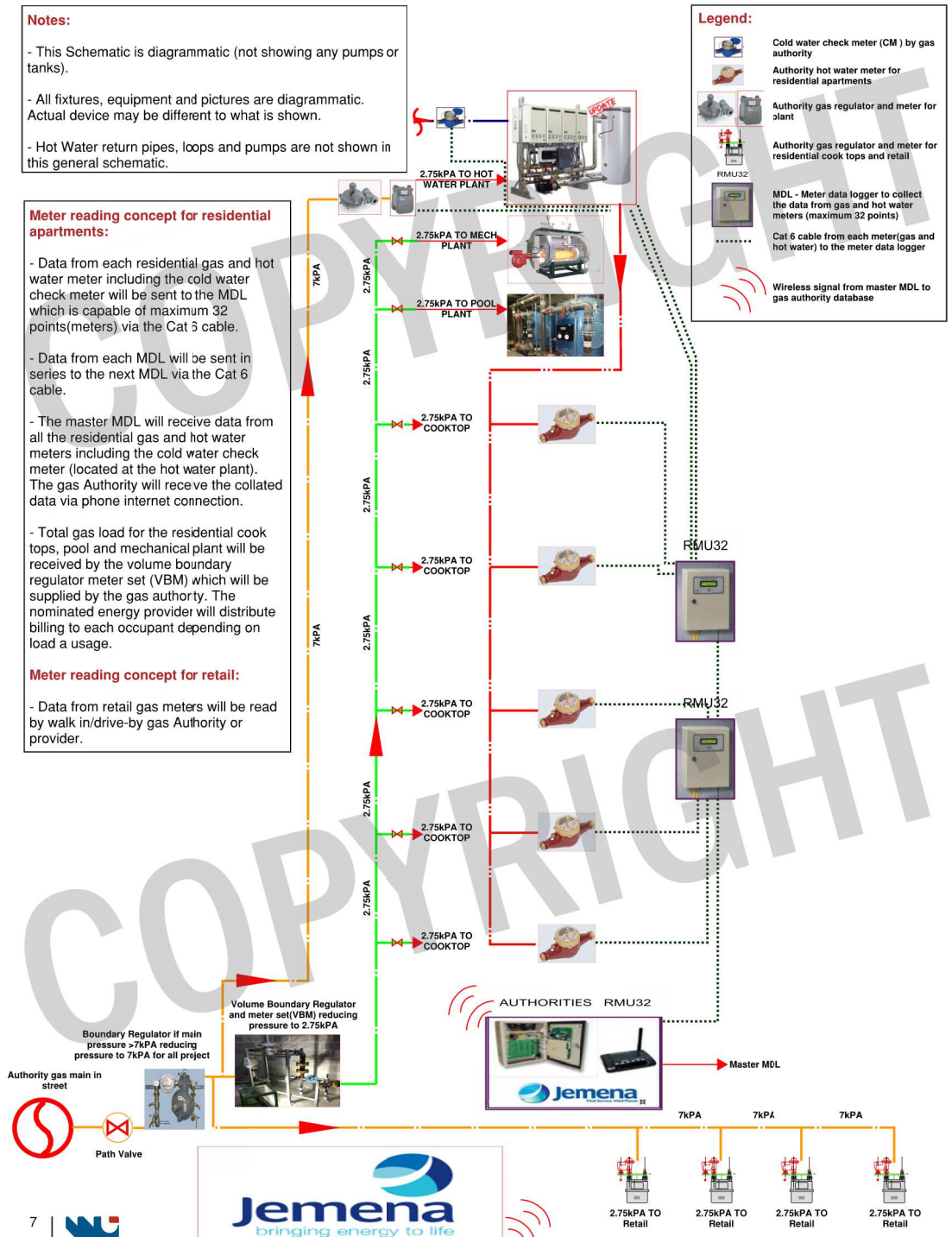
- Data from each MDL will be sent in series to the next MDL via the Cat 6 cable.

- The master MDL will receive data from all the residential gas and hot water meters including the cold water check meter (located at the hot water plant). The gas Authority will receive the collated data via phone internet connection.

- Total gas load for the residential cook tops, pool and mechanical plant will be received by the volume boundary regulator meter set (VBM) which will be supplied by the gas authority. The nominated energy provider will distribute billing to each occupant depending on load a usage.

Meter reading concept for retail:

- Data from retail gas meters will be read by walk in/drive-by gas Authority or provider.



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STANDARD GAS AND HOT WATER METER SCHEMATIC (Hybrid)
BILLING CONCEPT (CENTRALISED HOT WATER PLANT)

Notes:

- This Schematic is diagrammatic (not showing any pumps or tanks).

- All fixtures, equipment and pictures are diagrammatic. Actual device may be different to what is shown.

- Hot Water return pipes, loops and pumps are not shown in the general schematic.

Legend:

- Cold water check meter (CM) by gas provider
- Authcrity hot water meter for residential apartments
- Authcrity Gas regulator and meter for retail

Billing concept for residential apartments:

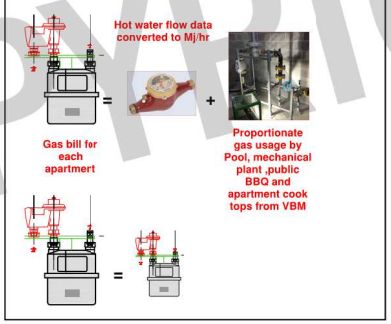
The Authority charges for each apartment consist of the following:

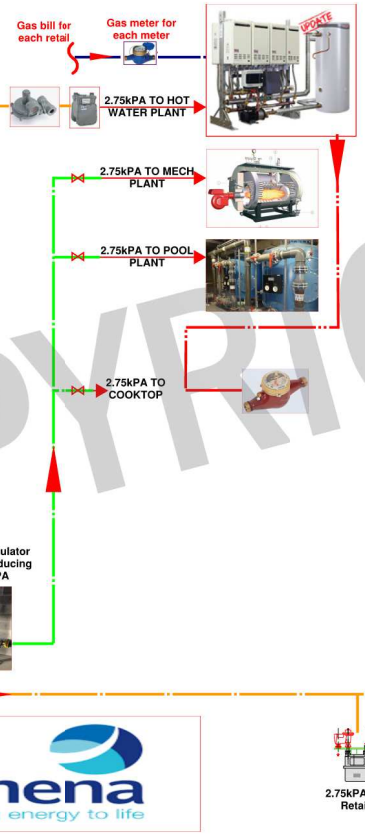
- Proportionate cost of gas usage for common plant and equipment (e.g. pool, mechanical and public BBQ) and apartment cook tops.

- Actual gas usage required to heat a volume of hot water as measured by apartment Authority hot water meter.

- Tenants likely have the choice of selecting their energy provider.

Billing Figure





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STANDARD GAS AND HOT WATER METER SCHEMATIC (Embedded) METERING AND READING CONCEPT (CENTRALISED HOT WATER PLANT)

Notes:

- This Schematic is diagrammatic (not showing any pumps or tanks).

- All fixtures, equipment and pictures are diagrammatic. Actual device may be different to what is shown.

- Hot Water return pipes, loops and pumps are not shown in this general schematic.

Meter reading concept for residential apartments:

- Data from each residential gas and hot water meter including the cold water check meter will be sent to the MDL which is capable of maximum 32 points (meters) via the Cat 6 cable.

- Data from each MDL will be sent in series to the next MDL via the Cat 6 cable.

- The master MDL will receive data from all the residential gas and hot water meters including the cold water check meter (located at the hot water plant). The energy provider will receive the collated data via phone internet connection.

- Total gas load for the residential cook tops, pool , hot water plant and mechanical plant will be received by the volume boundary regulator meter set (VBM) which will be supplied by the energy provider. The nominated energy provider will distribute billing to each occupant depending on load a usage.

Private meters for plants:

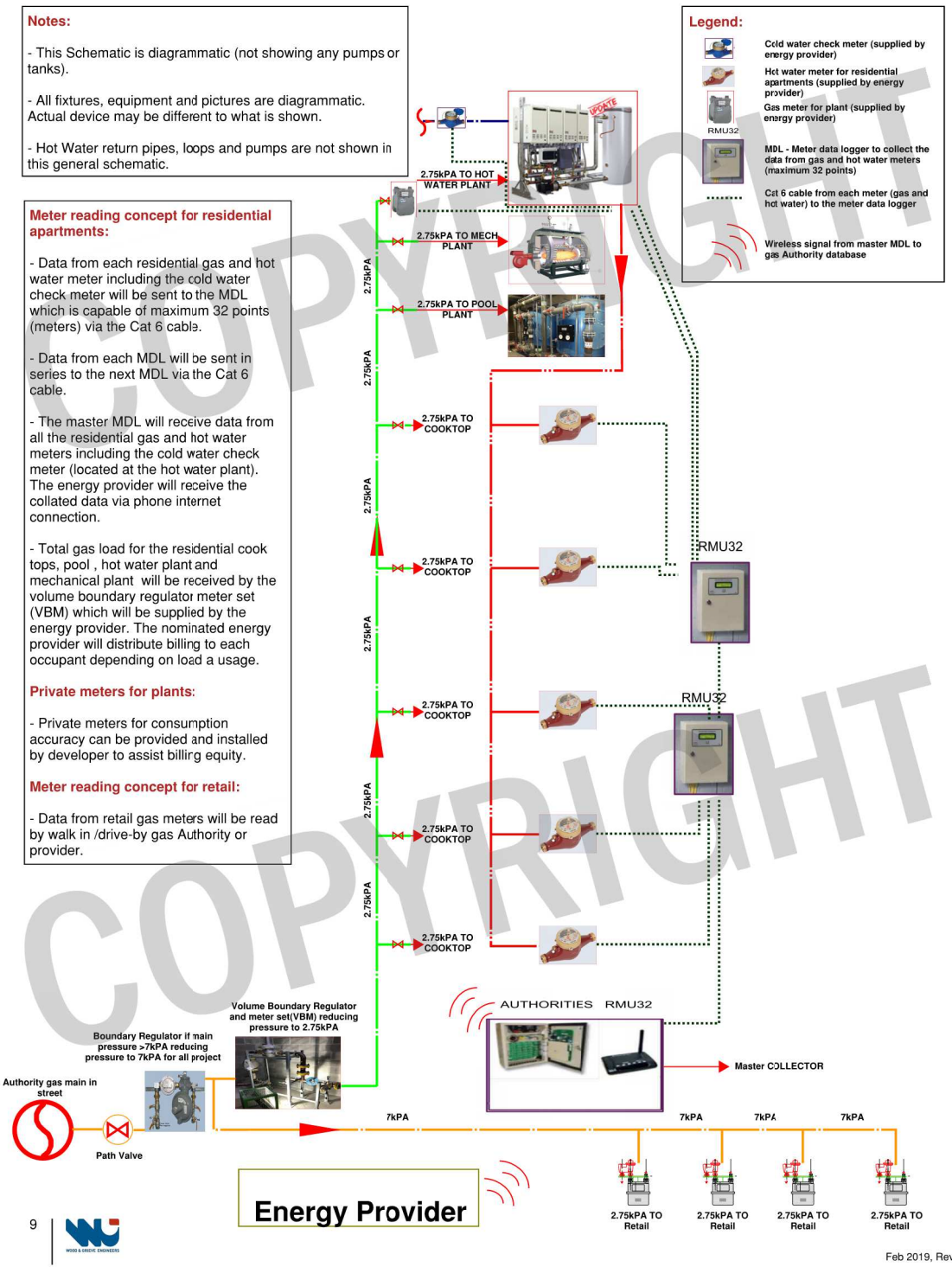
- Private meters for consumption accuracy can be provided and installed by developer to assist billing equity.

Meter reading concept for retail:

- Data from retail gas meters will be read by walk in /drive-by gas Authority or provider.

Legend:

- Cold water check meter (supplied by energy provider)
- Hot water meter for residential apartments (supplied by energy provider)
- Gas meter for plant (supplied by energy provider)
- MDL - Meter data logger to collect the data from gas and hot water meters (maximum 32 points)
- Cat 6 cable from each meter (gas and hot water) to the meter data logger
- Wireless signal from master MDL to gas Authority database



STANDARD GAS AND HOT WATER METER SCHEMATIC (Embedded) BILLING CONCEPT (CENTRALISED HOT WATER PLANT)

Notes:

- This Schematic is diagrammatic (not showing any pumps or tanks).

- All fixtures, equipment and pictures are diagrammatic. Actual device may be different to what is shown

- Hot Water return pipes, loops and pumps are not shown in the general schematic

Billing concept for residential apartments:

The gas charges for each apartment consist of the following:

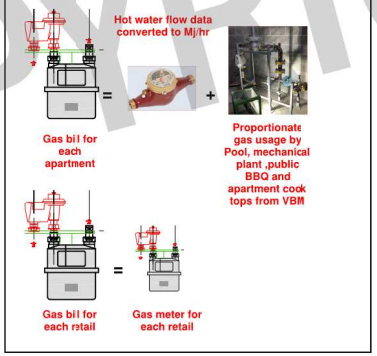
- A set fee per quarter nominated by energy provider (dependant on the number of fixtures).

- Proportionate cost of gas usage for common plant and equipment e.g.(Pool, mechanical and public BBQ) and apartment cook tops

- Actual gas usage required to heat a volume of hot water as measured by apartment hot water meter.

Individual tenants have no choice of selecting their energy provider. The total building energy provider can be changed by the Body Corporate. This may/will have capital cost implication (refer to embedded provider contract).

Billing Figure



Legend:

- Cold water check meter (CM) by gas provider
- Hot water meter for residential apartments by energy provider
- Authority Gas regulator and meter for retail