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May 8, 2007

British Columbia Utilities Commission
6th Floor, 900 Howe Street
Vancouver, BC
V6Z 2N3

Attention: Mr. R.J. Pellatt, Commission Secretary

Dear Sir:

Re: Terasen Gas Inc. – Tariff Changes to allow for Thermal Metering

Terasen Gas Inc. ("Terasen Gas" or the "Company") is seeking approval for changes to Rate Schedule 1 and the General Terms and Conditions ("GT&C") of its Tariff on a pilot project basis (the "Application"), for a new program designed to encourage the efficient use of gas for space heating applications in Vertical Subdivision developments.

The changes to Rate Schedule 1 and the GT&C will allow for the measurement, allocation and individual billing of energy use, from thermal energy hydronic heating systems, on an individual per suite basis within the Vertical Subdivision developments. Due to changes in the market place Terasen Gas is seeing more Vertical Subdivisions using electric baseboards rather than natural gas for heating purposes. In addition, the BC Energy Plan (the "Energy Plan") released February 27, 2007 highlights a number of options and policy directions aimed at both encouraging efficient use of energy and ensuring that the right fuel is used for the right activity at the right time. It is the Company's view that the introduction of thermal metering will address both the market conditions and the Energy Plan by providing a viable and affordable energy option for customers to use gas for space heating applications.

Project Purpose

Terasen Gas is of the view that the introduction of individual metering for suites heated with a central hydronic system will provide value to residents of these Vertical Subdivisions, the property management companies responsible for strata management, as well as all core customers.

Through consultations with developers and property managers Terasen Gas has discerned that the use of central hydronic systems is often discouraged by property managers and developers of vertical subdivisions in favour of electric baseboard heating. In current building design, central hydronic heating system costs are recovered through strata fees whereas electricity costs are always individually metered. As a result, there is a bias towards electricity heating in Vertical Subdivisions driven by consumer demand to manage and control their own energy use (and discourage free-ridership within a complex) as well as

the perceived competitive advantage that comes through reducing the costs that must be included in monthly strata/condo fees.

Terasen Gas believes that it remains important for consumers to have reasonable choices with regards to their energy sources, and to have effective measurement and management tools to encourage conservation and optimal use of resources. Without the ability to control energy consumption and costs, natural gas heating in Vertical Subdivisions becomes a less viable and desirable option. Despite the housing boom in British Columbia and particularly in the multifamily segment, Terasen Gas has been unsuccessful in capturing the space heating load in many of the more high-density new developments, with electricity being the energy choice of many developers. Terasen Gas believes that natural gas is the best fuel for space heating applications in all residential and commercial developments. With thermal metering, new developments could choose gas fired central heating and be individually metered and served with no negative impact to other service classes.

Lastly, providing sustainable energy management and encouraging conservation and demand side management are also key values driving the development of this pilot program and Terasen Gas' Application. Policy Item No. 4 of the Energy Plan states, *"Explore with B.C. Utilities new rate structures that encourage energy efficiency and conservation",* further the Energy Plan states, *"all utilities are encouraged to explore, develop and propose to the Commission additional innovative rate designs that encourage efficiency, conservation…"*

Terasen Gas is of the view that without the ability to provide individual suite occupants with a mechanism to be aware of and manage their own energy consumption there is little incentive to conserve. In the absence of individual metering, the overall total energy used is divided between all suite occupants or owners usually based upon square footage. Simply put, those customers who consume less than the average within the development subsidize those who use an above average amount of energy. Studies in Europe suggested that when residents are given direct control over their energy bill, consumption can be reduced by up to 30%[1] (article included as Attachment 1). Thermal metering would allow British Columbians within the Terasen Gas service area who value a sustainable, conservationist approach to residential development an option that links with their desire to take control of their energy usage using a fuel, natural gas, which is a very efficient heating source and thus also behaving in a manner consistent with the objectives of the BC Energy Plan.

In European markets district energy systems and hydronic heating are common place and energy prices have been historically much higher than those experienced in North America. Europeans have adopted thermal metering to ensure that individual users only pay for their consumption and do not subsidise other residents in their buildings.

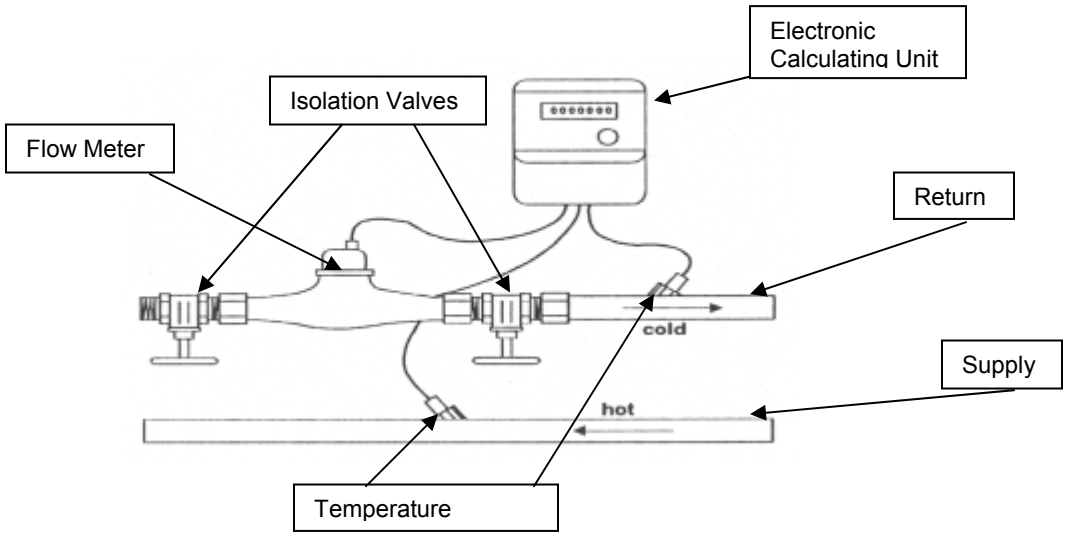
> *"In Denmark, it is mandatory to pay for heat and other utilities like water and electricity according to consumption. Therefore, all district heating installations are equipped with energy meters and heat allocators.."* [2]

[1] Tom Onno, *Background Report for Preparation of a Canadian Standard on Thermal Energy Meters for Hydronic Heating/Cooling Systems. Natural Resources Canada, April 2005*
[2] http://www.dbdh.dk/dkmap/development.html

Thermal Metering Description

Thermal metering can be defined as the energy consumed through the measurement of the flow of water and the change in temperature required to heat a given space. Thermal metering is the only accurate method to allocate individual suite usage available to buildings using central hydronic systems thereby allowing customers to gain control over their energy consumption and usage.

A thermal meter compares the variance in temperature of hot water entering and exiting an apartment or suite that is used for hydronic heating. To accomplish this, a temperature sensor is installed on the hot water supply pipe of the heating system. On the return pipe a flow meter and temperature sensor is installed to measure the amount of water used in the space for heating as well the temperature of the water leaving the space. The thermal energy is calculated on the measured differential temperature between the inflow and return flow, the measured water quantity, as well as internal table correction for density and enthalpy.



Project Implementation

Thermal metering requires that a developer install a gas fired hydronic heating system as the only source of heating for the building. The developer assumes the entire cost of the hydronic heating system which is ultimately incorporated into the selling price of the individual units within the Vertical Subdivision.

The installation and commissioning of the thermal meters needs to be done by qualified contractors and Terasen Gas crews with each installation consisting of a flow meter, isolation valves, an Electronic Calculating Unit, and temperature sensors in accordance with Canadian Standards C900-06. The maintenance of the thermal meters is not expected to be considerable as there are no moving parts in the meters. Terasen Gas personnel will perform maintenance such as battery replacement every 12 years.

The thermal meters will be read using current meter reading technology. Meter readers will use the existing "handheld meter reading device" to manually read the meters. The handheld device will contain all thermal meter readings for a particular building along with the main gas meter's reading. All the thermal meters in the complex will be aggregated together to determine the total number of BTUs used. Each suite's consumption will represent a percentage of the total gas consumption for the building. This will be calculated as follows:

Energy Calculation:

The formula to determine the energy used to heat the suite is calculated as follows:

GJ's = Flow x ΔT x k

Where: ΔT = Change in Temperature.
k = Correction Factor (Fluid Density x Specific Heat)
(Calculated Factor is automatically calculated by Energy Meter)

Individual customer's portion of gas consumed =

$$\frac{\text{Individual's GJs}}{\text{Total GJs measured}}$$

This percentage will then be multiplied by the total number of gigajoules used by the complex as measured by the gas meter going into the building to determine the individual strata unit's portion of the gas used to heat the complex. Common load such as heating the lobby, recreation facilities and common rooms will be included in the calculation and prorated accordingly.

Gas consumed by the individual suite =

Total gas consumed x Individual suite's % of total consumption

Individual bills will then be produced for each of the thermal meters based on the percent of Gas consumed by the main gas meter.

For example:

Total monthly Gas consumed by vertical subdivision =	100GJ
Percent calculated for customer X =	2.00%
GJ's used by customer X =	2.00 GJ

Monthly charges under Rate Schedule 1 at present rates:

Basic Charge		$10.94
Delivery Charge	2 GJ x 2.773 =	$5.546
Commodity Charge	2 GJ x 8.552 =	$17.104
Total Monthly Charge		$33.59

Project Forecast and Scope

Terasen Gas proposes to change the wording in Rate Schedule 1 to allow customers receiving thermal energy to be charged under this schedule. The proposed changes to the rate schedule (included as Attachment 2) will be restricted to customers who receive heat energy via a gas fired hydronic heating system with heat energy metered by thermal meters. Additionally the proposed changes to the GT&C which are also required are included in Attachment 3).

A typical vertical subdivision has approximately 40 units, each of which require on average 25GJ/year for heating purposes, for a total of 1,000 GJ per building per year. Based upon this size of development and load, the development will recover slightly more than their cost of service (included in Attachment 4 is the Cost of Service study). However, developments may have either higher or lower consumption, or fewer or more units. Due to the pilot project nature of the proposal, and the uncertainty with consumption and developments opting for thermal metering service, Terasen Gas would connect all thermal metered developments, as per the tariff, for the duration of the pilot project. After which, Terasen Gas would be able to better determine average consumption and cost of service impacts.

The option for thermal energy customers to receive service under Rate Schedule 1 must be available before any developer will consider implementing a hydronic heating system with thermal metering; as such Terasen Gas does not believe that there will be any customers receiving this service in 2007. Terasen Gas is hopeful that 2-5 developments per year, beginning in 2008, will include thermal metering as a viable option.

Pilot Project Life Cycle

Terasen Gas believes that the thermal metering option should be available on a pilot project basis with the project being reviewed after five years. Terasen Gas' billing system will be able to uniquely identify the customers receiving thermal meter service and therefore will be able to determine the number of customers receiving service, the capital and O&M costs required to serve the customers as well as energy consumption on a per unit and per building basis. At the end of five years Terasen Gas proposes to review the thermal metering option to determine if it is cost effective and if the option is desired by the marketplace and at that time make a submission to the Commission regarding the future of the program. If it was determined that the pilot program should be closed at that time, options to ensure the current customers continue to receive service might include, but are not limited to, one of the following options:

1. Move the customers out of Rate Schedule 1 into a new closed rate schedule. Terasen Gas would therefore continue to provide service to the customer, but no new customers would be able to access the service; or

2. Sell the metering service to the building strata. Terasen Gas would then bill the strata for the gas consumed through the large meter. The strata would be responsible for billing each unit based upon the energy consumption as measured by the thermal meters.

Conclusion

Terasen Gas is seeking approval from the Commission for changes to Rate Schedule 1 and the GT&C of its Tariff that will allow for the measurement, allocation and individual billing of energy use, from thermal energy hydronic heating systems, on a per suite basis. The changes will be on a pilot project basis with Terasen Gas reviewing the project after five years. Redline and clean copies of the affected Tariff pages are included for Commission review and endorsement.

If you have any questions related to this information, please do not hesitate to contact Jason Wolfe at (604) 592-7516 or Shane Hiebert at (604) 592-7452.

Yours very truly,

TERASEN GAS INC.

Original signed by: Tom Loski

For: Scott A. Thomson

Attachments

Attachment 1

The installation of meters leads to permanent changes in consumer behaviour

Mr. Lars Gullev, Managing Director, VEKS

Mr. Michael Poulsen, Operation Manager, Albertslund Fjernvarme

A reduction in consumption of up to 30% has been registered after the transition from joint to individual metering. The reduction in consumption occurs rapidly – usually one to two years after the transition to individual metering – and the reduction is maintained in the subsequent years. Consumers must be provided with detailed information well ahead of the transition to individual metering if a rapid reduction in consumption is to be achieved. The introduction of metering is a prerequisite if district heating consumers - be they members of building associations or people in dense/low dwellings - are to be motivated to invest in energy-saving activities. This article is an updated version of the article "The installation of meters leads to changes in consumer behaviour" from News from DBDH 3/1999.

Background

The expansion of the municipality of Albertslund, located to the west of Copenhagen, took off at the beginning of the sixties. Prior to 1963, the area contained only the villages of Herstedøster, Herstedvester and Vridsløselille, as well as a number of farms and nurseries. As the municipality grew, the first steps towards the building of Albertslund Fjernvarme (the local district heating plant), were taken in 1963. The introduction of a district heating system guaranteed a source of cheap heat for the consumers who were connected to the network. In addition, it offered the possibility of exploiting the surplus heat from the municipal waste incineration plant which became operational in 1969. The explosive expansion of the municipality meant that by 1974 the capacity of the heating plant had increased to 149 MW. The share of the district heating production which did not originate from the waste incineration plant was based on fuel oil.

Albertslund's highest point and landmark, the plant's two 86 meter high funnels are decorated by the local artist Mr. Billy Suhr.

Sandfilter for polishing of the treated circulation water from the RO equipment. In the same pipe is the pH measuring equipment placed. The treated circulation water of the system adjusted to a pH level between 9,8-10,1.

Albertslund Fjernvarme was set up as a municipally owned company, unlike the majority of the district heating companies in Denmark, both then and now.

As fuel oil was so inexpensive at the end of the sixties and the beginning of the seventies, it did not make sense economy wise to install meters in the homes of consumers. The district heating charge applied at the time was very simple: consumption was calculated on the basis of the floor area (in square meters) of the individual building in relation to the total floor area supplied by Albertslund Fjernvarme.

In the beginning of the seventies, 92% of the Danish energy consumption was based on imported oil. Therefore it came as a shock to the country when Denmark, along with the rest of Western Europe, fell prey to the serious oil supply crisis that dominated the winter of 1973/74. One immediate consequence of the supply crisis was a threefold increase of the price of oil over the course of just six months.

In both 1974 and 1977 the municipality of Albertslund issued reports which showed that potential savings in the consumption of district heating were not thought to warrant the additional costs associated with the introduction of a meter-based charging system, regardless of the dramatic increases of the price of imported oil. The reports concluded that the introduction of other energy-saving measures would be more profitable in economic terms than the installation of meters. The municipality therefore prepared an ”Energy Saving Plan” in which all aspects of buildings supplied with district heating were examined in detail. A list of possible energy-saving measures was prepared, out of which the following may be mentioned:

- Sealing of gaps.
- Additional insulation provided by secondary glazing.
- Reinsulation of outer walls and/or roof.
- Insulation of external cellar walls to approx. 1 meter below the ground.
- Outdoor temperature-dependent control with night/weekend reduction.
- Adjustment of heating systems.
- Regulation of room temperature by means of radiator thermostats.
- Regulation of room temperature by means of room thermostats that start and stop the heating system.
- Increased recirculation/periodic operation of ventilation systems.
- Replacement of hot-water tanks.

Legally, however, Albertslund Fjernvarme was unable to force individual district heating consumers to implement the suggested energy-saving measures. There was insufficient motivation to invest in the energy-saving measures, since the existing settlement charge was not based on individual consumption in individual homes.

The introduction of meters was therefore necessary if the energy-saving measures were to be put into place. The district heating consumption could be measured using the branch pipe that leads to the individual building, or using an area reading taken from the branch pipes that supply a group of buildings such as a housing estate. The delimitation of an area reading was defined as follows: ”The area delimited by a branch pipe with one decision-maker for the implementation of energy-saving measures”.

In areas with building associations and owner-occupied flats, the readings would be taken from the main branch pipes (joint settlement). For other consumers, the readings would be taken where the branch pipes were connected to the individual properties (individual settlement). In cases of joint settlement, it was up to the individual building association to distribute the costs amongst the individual homes. Building associations usually chose to distribute consumption according to the floor area of the individual home in relation to the total floor area of the apartment block. This ”charge” was simple to administer, but it did not motivate individual consumers to reduce their heat consumption.
Following the installation of a total of 2,400 meters in 1981, Albertslund Fjernvarme changed its system on January 1, 1982, when a two-part charge was introduced:

- A fixed charge designed to ensure that the fixed costs of the heating plant were covered regardless of the district heating consumption. The charge was set as a fixed sum/m^2 of connected heated area.
- A variable charge designed to cover the variable costs of the heating plant. The charge reflected the consumer’s registered consumption.

Experience
The following sections focuses on the heat consumption of a number of representative dwellings during the period 1991–2005, in order to establish whether the location of the meter (i.e. the use of joint or individual metering) affects the behaviour of consumers and thereby the heat consumption.

The following use of the term “individual metering” refers to the measurement of heat consumption in individual households, using either energy meters or evaporation meters located on radiators. The behaviour of consumers in individual households will thereby be directly reflected by the individual readings and, consequently, the amount paid by the consumer. The term “joint metering” applies in all other cases.

The figures given here cover consumption resulting from heating and the production of hot domestic water. The figures for consumers have also been adjusted according to the numbers of degree days to reflect the yearly mean consumption, thereby enabling direct comparisons to be drawn.

The buildings are characterised by having either joint metering for the entire period, or by having changed from joint metering to individual metering over the course of the period. The study focuses on three types of buildings:

- Dense/low owner-occupied dwellings (terraced houses)
- Dense/low rented dwellings (terraced houses)
- Multi-storey buildings

Dense/low owner-occupied dwellings (Figure 1)
In this case, the buildings were Platanparken (160 houses) and Elmehusene (106 houses). They are identical in terms of their construction time, size and ownership. This enables any potential differences between the settlement method and consumption to be seen clearly. The only difference between the two developments is that Platanparken had individual metering for the entire period. Elmehusene had joint metering until July 1,1995, when individual metering was introduced. In both cases, heat consumption is based on

Circulation pumps from VEKS, to the Albertslund 50 MW heat exchanger

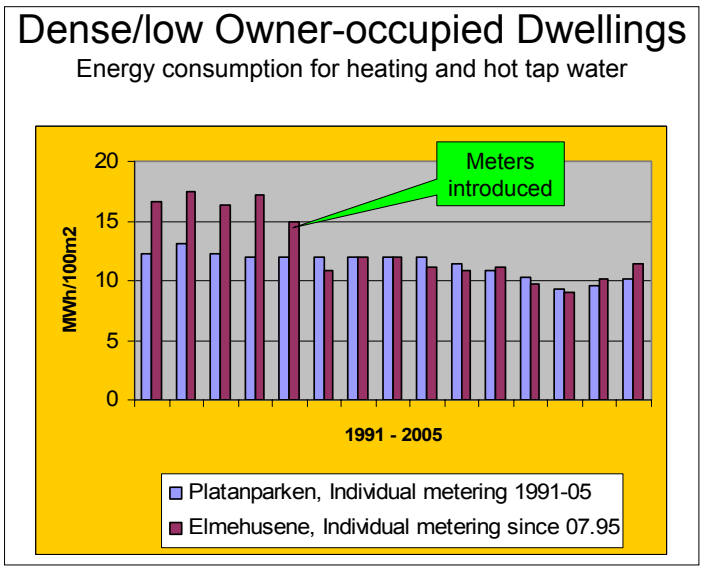


Figure 1: Dense/lov owner-occupied dwellings

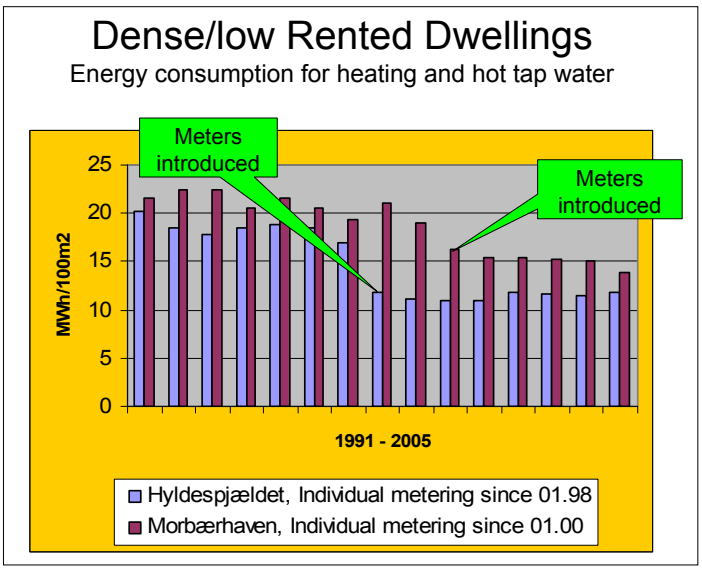


Figure 2: Dense/lov rented dwellings

the readings taken from the main meter. The results show clearly that the consumption figures for Elmehusene (joint metering) were significantly higher (up to 44%) than those associated with Platanparken during the period before 1995. Following the introduction of individual metering at Elmehusene, the consumption was significantly reduced and is now on par with the consumption at Platanparken. Since 1991, the consumption at Platanparken has been reduced by 17%. At Elmehusene, however, it was reduced by 31%. The introduction of individual metering has therefore resulted in a significant reduction in consumption.

Dense/low rented dwellings (Figure 2)
The buildings in this case were Hyldespjældet (390 houses) and Morbærhaven (1,063 houses). Hyldespjældet had joint metering until the end of 1997, when the houses switched to individual metering. On the other hand, the buildings at Morbærhaven had joint metering for the entire period.

The results clearly show that the consumption at Hyldespjældet fell by 31% in comparison with the consumption in 1997, following the introduction of individual metering in 1998. Over the entire period from 1991, consumption has been reduced by more than 42%. The consumption at Morbærhaven has been reduced by around 28% since the introduction of meters in 2000. The fact that it was possible to reduce consumption at Hyldespjældet by more than 42% and at Morbærhaven by more than 36% since 1991 must be seen in light of the fact that the consumption in 1991 was relatively high. This created a good basis for a reduction.

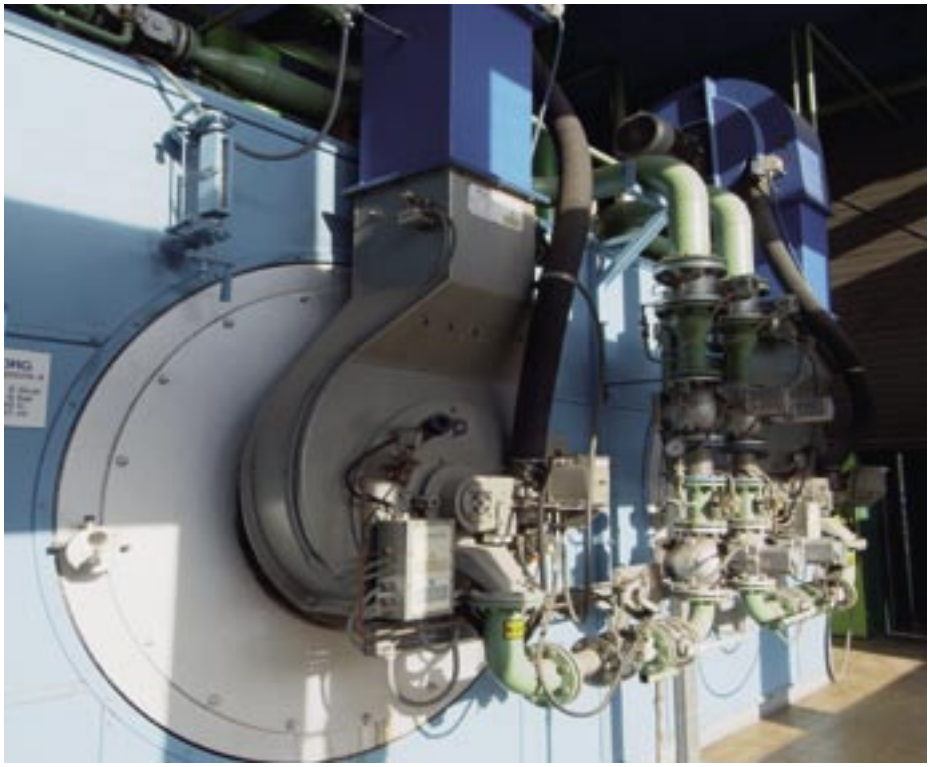
Multi-storey dwellings (Figure 3)
The buildings in this case were Topperne (383 houses), Albertslund Nord (224 houses) and Banehegnet (184 houses). Topperne had joint metering until the end of 1992 when individual metering was introduced. Both Albertslund Nord and Banehegnet had joint metering until the end of 1995 when individual metering was introduced.

Once again, the results speak for themselves. Consumption is reduced following the transition to individual metering, with the reduction appearing at the latest two post-transition years. The reduction was highest in the case of Topperne, with a registered drop in consumption of 21% from 1992 to 1994. A drop of 15–17% from 1995 to 1997 was registered in the case of the other two developments. All three developments noted a further reduction up till 2005.

Summary
A reduction in consumption of up to 30% can be registered following the transition from joint to individual metering. The reduction becomes apparent relatively quickly, usually one or two years after the transition to individual metering, and it is maintained in the subsequent years. It is also possible to conclude that houses which have identical consumption figures in connection with joint metering show sizeable variations of up to 20% following the transition to individual metering. It is therefore impossible to calculate the exact expected reduction in consumption following the transition to individual metering. However, a drop of at least 15–17% is a realistic result.

The speed with which the reduction in consumption is registered following the transi-

Combined oil and gas boilers; if needed the boilers can be converted to using pulverized coal as well



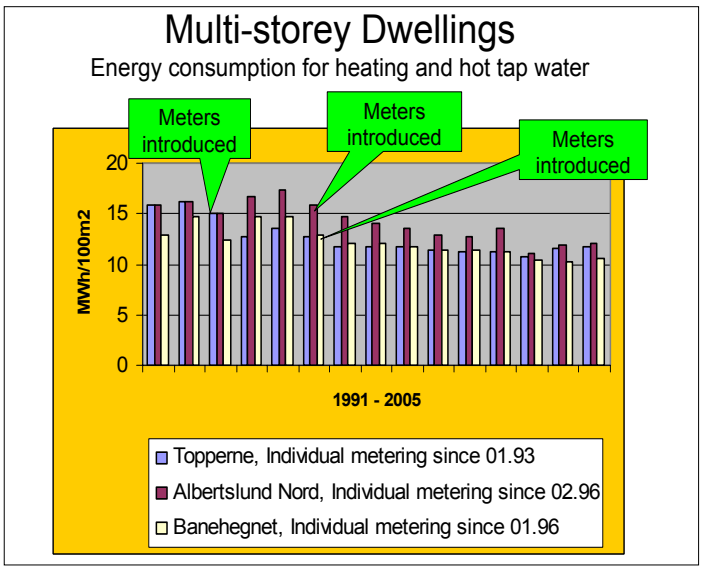


Figure 3: Multi-storey dwellings

Part of the deairraitor system, the pump and the heat exchanger

tion to individual metering depends on a number of factors, including the quality of the information given to consumers before the transition to individual metering.

When a general requirement to reduce energy consumption exists, and if district heating consumers - be they housing associations or members of other consumer categories - are to be motivated to invest in energy-saving activities, it is absolutely vital that metering is introduced. Only if the consumers themselves feel that they benefit from the advantages achieved by investing in energy-saving measures, will they choose to make such investments.

For further information please contact:

Albertslund Varmeværk

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Attachment 2

Rate Schedule 1: Residential Service

Available

This Rate Schedule is available in all territory served by Terasen Gas, provided adequate capacity exists in Terasen Gas' system.

Applicable

This Rate Schedule is applicable to firm Gas supplied at one Premise for use in approved appliances for all residential applications in single-family residences, separately metered single-family townhouses, rowhouses, condominiums, duplexes and apartments and single metered apartment blocks with four or less apartments. This Rate Schedule is also applicable to thermal energy supplied by a Gas fired hydronic heating system (where hydronic heating is the primary heating source) and measured by a thermal meter for one premise of a Vertical Subdivision where the thermal meter is used to apportion the gigajoules of Gas consumed for hydronic heating.

Table of Charges

	Lower Mainland Service Area	Inland Service Area	Columbia Service Area	
Delivery Margin Related Charges				
1. **Basic Charge** per Month	$ 10.94	$ 10.94*	$ 10.94*	R
2. **Delivery Charge** per Gigajoule	$ 2.736	$ 2.736	$ 2.736	
				O
3. **Rider 3** per Gigajoule	$ (0.108)	$ (0.108)	$ (0.108)	C/R
4. **Rider 5** per Gigajoule	$ 0.145	$ 0.145	$ 0.145	
Subtotal of per Gigajoule Delivery Margin Related Charges	**$ 2.773**	**$ 2.773**	**$ 2.773**	R

Attachment 3

Terasen Gas	Means Terasen Gas Inc., a body corporate incorporated pursuant to the laws of the Province of British Columbia under number 368681.
Terasen Gas System	Means the Gas transmission and distribution system owned and operated by Terasen Gas, as such system is expanded, reduced or modified from time to time.
Thermal Energy	Means thermal energy supplied by a Gas fired hydronic heating system (where hydronic heating is the primary heating source), and measured by a thermal meter, to premises of a Vertical Subdivision where the thermal meter is used to apportion the gigajoules of Gas consumed by the Gas fired hydronic heating system among the premises in the Vertical Subdivision.
Vertical Subdivision	Means a multi-storey building that has individually metered units and a common Service Header connecting banks of meters, typically located on each floor.
Year	Means a period of 12 consecutive Months.
10^3m^3	Means 1,000 cubic metres.

17. ~~Section Reserved for Future Use~~ Thermal Energy

17.1 ~~[Intentionally deleted]~~All references to Gas shall be deemed to include a reference to Thermal Energy, for example, Gas Service shall be deemed to include the delivery of Thermal Energy through a Meter set. Notwithstanding the foregoing, the meaning of Gas Distribution System shall be deemed not to include a hydronic heating system that delivers energy to Residential Customers but shall include the meters that measure the amount of energy by Residential Customers in a Vertical Subdivision.

Attachment 4

TERASEN GAS INC.
THERMAL METERING
40 UNIT BUILDING, INCREMENTAL COST OF SERVICE

Line No.	Particulars	1 2007	2 2008	3 2009	4 2010	5 2011	6 2012	7 2013	8 2014	9 2015	10 2016
1	**SUMMARY: RATE BASE / REVENUE REQUIREMENT**										
2	Rate Base - Mid-Year										
3	Gas Plant in Service	$ 19,664	$ 39,585	$ 40,099	$ 40,614	$ 41,129	$ 41,644	$ 42,159	$ 42,674	$ 43,189	$ 43,703
4	Accumulated Depreciation	-	(969)	(2,919)	(4,896)	(6,898)	(8,925)	(10,979)	(13,058)	(15,163)	(17,294)
5	Net Plant	19,664	38,617	37,180	35,719	34,231	32,719	31,180	29,615	28,025	26,409
6											
7	Deferred Charges	-	-	-	-	-	-	-	-	-	-
8	Working Capital	-	-	-	-	-	-	-	-	-	-
9	Total Rate Base	$ 19,664	$ 38,617	$ 37,180	$ 35,719	$ 34,231	$ 32,719	$ 31,180	$ 29,615	$ 28,025	$ 26,409
10											
11	Capital Structure										
12	Debt	64.99%	65%	65%	65%	65%	65%	65%	65%	65%	65%
13	Equity	35.01%	35%	35%	35%	35%	35%	35%	35%	35%	35%
14	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
15											
16	Rate of Return										
17	Debt	6.82%	6.82%	6.82%	6.82%	6.82%	6.82%	6.82%	6.82%	6.82%	6.82%
18	Equity	8.37%	8.37%	8.37%	8.37%	8.37%	8.37%	8.37%	8.37%	8.37%	8.37%
19											
20	Earned Return										
21	Debt	$ 872	$ 1,712	$ 1,648	$ 1,584	$ 1,518	$ 1,451	$ 1,382	$ 1,313	$ 1,242	$ 1,171
22	Equity	576	1,132	1,089	1,047	1,003	959	914	868	821	774
23	Return on Rate Base	1,448	2,844	2,738	2,630	2,521	2,409	2,296	2,181	2,064	1,945
24											
25	Cost of Gas	2,131	6,392	8,522	8,522	8,522	8,522	8,522	8,522	8,522	8,522
26	Operating & Maintenance Expense	1,343	2,695	2,703	2,703	2,703	2,703	2,703	2,703	2,703	2,703
27	Depreciation & Amortization Expense	-	1,938	1,963	1,989	2,015	2,041	2,066	2,092	2,118	2,144
28	Property Taxes	-	23	77	160	188	188	188	188	188	188
29	Other Revenue	(1,700)	(1,700)	(50)	(50)	(50)	(50)	(50)	(50)	(50)	(50)
30	Income Tax Expense	(116)	707	704	683	693	702	710	716	722	727
31											
32	Total Incremental Revenue Requirement	$ 3,106	$ 12,897	$ 16,657	$ 16,637	$ 16,591	$ 16,515	$ 16,435	$ 16,352	$ 16,267	$ 16,179
33											
34	Wt. Avg.Cost of Capital	7.364%									
35											
36	Total Incremental Revenue	$ 5,440	$ 13,695	$ 16,509	$ 16,509	$ 16,509	$ 16,509	$ 16,509	$ 16,509	$ 16,509	$ 16,509
37											
38	Total Incremental Revenue Deficiency / (Surplus)	$ (2,334)	$ (797)	$ 148	$ 128	$ 82	$ 5	$ (74)	$ (157)	$ (242)	$ (331)
39											
40											
41	20 year NPV - deficit/(surplus)	**(3,886)**									

11	12	13	14	15	16	17	18	19	20
2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
$ 44,218	$ 45,040	$ 45,862	$ 46,377	$ 46,892	$ 47,407	$ 47,922	$ 48,437	$ 48,951	$ 69,110
(19,450)	(21,633)	(23,856)	(26,120)	(28,410)	(30,726)	(33,068)	(35,435)	(37,828)	(40,247)
24,768	23,408	22,006	20,257	18,482	16,681	14,854	13,001	11,123	28,863
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
$ 24,768	$ 23,408	$ 22,006	$ 20,257	$ 18,482	$ 16,681	$ 14,854	$ 13,001	$ 11,123	$ 28,863
65%	65%	65%	65%	65%	65%	65%	65%	65%	65%
35%	35%	35%	35%	35%	35%	35%	35%	35%	35%
100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
6.82%	6.82%	6.82%	6.82%	6.82%	6.82%	6.82%	6.82%	6.82%	6.82%
8.37%	8.37%	8.37%	8.37%	8.37%	8.37%	8.37%	8.37%	8.37%	8.37%
$ 1,098	$ 1,038	$ 976	$ 898	$ 819	$ 739	$ 659	$ 576	$ 493	$ 1,280
726	686	645	594	542	489	435	381	326	846
1,824	1,724	1,620	1,492	1,361	1,228	1,094	957	819	2,125
8,522	8,522	8,522	8,522	8,522	8,522	8,522	8,522	8,522	8,522
2,703	5,929	2,703	2,703	2,703	2,703	2,703	2,703	2,703	2,703
2,169	2,195	2,252	2,277	2,303	2,329	2,355	2,380	2,406	2,432
188	188	188	188	188	188	188	188	188	188
(50)	(50)	(50)	(50)	(50)	(50)	(50)	(50)	(50)	(50)
731	706	749	750	751	750	749	747	745	647
$ 16,088	$ 19,213	$ 15,984	$ 15,882	$ 15,778	$ 15,670	$ 15,560	$ 15,448	$ 15,333	$ 16,567
$ 16,509	$ 16,509	$ 16,509	$ 16,509	$ 16,509	$ 16,509	$ 16,509	$ 16,509	$ 16,509	$ 16,509
$ (422)	$ 2,704	$ (525)	$ (627)	$ (732)	$ (839)	$ (949)	$ (1,061)	$ (1,177)	$ 58