



# Water Heater Asset Management Plan

15 May 2024

## Introduction

The practice of asset management aims to minimize the lifecycle costs of delivering infrastructure services and manage the associated risks while maximizing the value customers receive from the asset portfolio. Utilities Kingston has an Asset Management Policy which directs staff on the roles and responsibilities regarding asset management.

This document provides details on the specific asset management plan for the assets managed by Utilities Kingston in the water heater rental business.

The water heater rental business consists of municipally owned assets managed by Utilities Kingston. The business is competitive with private companies.

## Asset Category Details

### Summary of Assets in the Category

The water heater rental business consists of different types of water heaters, varying in capacity and fuel type. These assets are grouped into a single asset category called “Water Heaters.”

### Replacement Cost of the Assets in the Category

**Table 1: Replacement Cost of the Assets as of Dec 31, 2023**

Asset Category	Quantity in Service	Replacement Cost
Water Heaters	10,337	\$18,937,384

Replacement cost is determined using data from the last full calendar year of new install data.

**Table 2: Quantity and Cost of New Heaters 2023, as of Dec 31, 2023**

Number of Heaters Installed	Cost to Install Heaters	Cost per Heater
795	\$1,456,559	\$1,832

Therefore, to determine the replacement cost:  
 $10,337 \times \$1,832 = \$18,937,384$  as per the table above.

## Average Age of Assets in the Category

**Table 3: Average Age of Water Heaters as of Dec 31, 2023**

Asset Category	Average Age
Water Heaters	7 years 8 months

## Condition Assessment Methodology

Assessing the condition of the water heater assets is completed by analyzing the number of calls per in-service heater per year, and age of the water heaters.

Service calls reflect the volume of customer problems with water heaters operating as expected.

**Table 4: Water Heater Performance Matrix**

Number of Service Calls Per In-service Heater per Year	Performance Measure	Value Assigned to Performance
0.05 or less	Very Good	5
0.051 to 0.1	Good	4
0.11 to 0.15	Fair	3
0.16 to 0.20	Poor	2
0.21 or greater	Very Poor	1

The age of the assets is also used to determine the condition. Newer water heaters are expected to require fewer service calls than older heaters.

**Table 5: Water Heater Age Evaluation Matrix**

Age of Asset	Condition Contribution	Number of Assets	Value Assigned to Age
0-5 Years	Very Good	4,087	5
6-10 Years	Good	3,569	4
11-15 Years	Fair	1,501	3
16-20 Years	Poor	715	2
20+ Years	Very Poor	465	1

To establish the contribution of age toward the asset condition, the following formula is used:

Sum of (Value Assigned to Condition Contribution \* Number of assets at each level) divided by total number of assets.

To establish the water heater asset category condition, the value assigned to performance is multiplied by the value assigned to age to yield a total condition rating.

**Table 6: Asset Age Condition Contribution**

Age of Asset	Number of Assets	Value Assigned to Age	Number of Assets * Value Assigned to Age
0-5 Years	4,087	5	20,435
6-10 Years	3,569	4	14,276
11-15 Years	1,501	3	4,503
16-20 Years	715	2	1,430
20+ Years	465	1	465

**Table 7: Asset Age Condition**

<b>Total Value Assigned to Age</b>	41,109
<b>Total Number of Assets</b>	10,337
<b>Asset Age Condition</b> (Total Value Assigned to Age / Total Number of Assets)	4.0

Utilities Kingston has developed the following table to yield the overall condition assessment of the asset category.

<b>Value Assigned to Performance</b>	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
		1	2	3	4	5
		<b>Asset Category Age Condition</b>				

16 to 25 is Good Condition – low risk for adverse asset behaviour

8 to 15 is Fair Condition – continue to monitor

1 to 7 is Poor Condition – action required

## Current Condition Assessment

The most recent performance measure is 0.0658 service calls per water heater per year, yielding a performance measure of 4.

The most recent snapshot of asset age condition is 4.

Combining the performance measure with the Asset Category age condition yields an overall condition assessment of 16. Overall, the condition of the water heater assets is considered to be good.

Performance Measure	Asset Category Age Condition	Overall Condition Assessment
Good (4)	Good (4)	Good (16)

## Current Levels of Service

The water heater rental business operates within the regulatory requirements of the Consumer Protection Act, 2002, S.O.2002, c.30, Sched. A and the Sale of Goods Act R.S.O. 1990, c.S.1. As per O.Reg. 588/17 5.1.ii Utilities Kingston defines the level of service for the assets managed under this plan using a qualitative description and a technical metric.

### Qualitative Description

Utilities Kingston water heater rentals will provide hot water to customers when called upon and operate as per the manufacturer's specifications.

### Technical Metric

The number of after-hours service calls per in-service heater per year indicates the number of service calls while accounting for changing customer numbers. Service calls are customer contacts when a water heater does not operate as expected. Service calls are used to measure the overall health of the water heater fleet. Utilities Kingston has established the following table to evaluate the technical metric.

Number of Service Calls Per In-service Heater per Year	Performance Measure
0.05 or less	Very Good
0.051 to 0.1	Good
0.11 to 0.15	Fair
0.16 to 0.20	Poor
0.21 or greater	Very Poor

## Current Performance

As these assets perform an important role in a competitive business, one of the most relevant performance measures is the number of times a customer calls with a problem. The more customers call us with problems, we can infer greater problems with the assets in the field. To properly evaluate this over time, we need to account for a changing number of water heaters installed. The metric we monitor for this performance is the number of service calls, per in-service water heater, per year.

Number of service calls per in-service heater (last two years)

- 2023 – 0.0658 service calls per in-service heater per year – Good performance
- 2022 – 0.0824 service calls per in-service heater per year – Good performance

## Lifecycle Activities to Maintain Current Level of Service

Utilities Kingston operates the water heater rental business in a competitive market. The company operates in the same manner as its competitors, using a run-to-fail model. Water heaters are replaced when they fail to operate and technicians cannot repair them.

There is no planned maintenance program for water heaters, which are treated in financial reporting as having an estimated useful life of 10 years.

Water heaters are serviced when a customer reports they are not working.

When a service technician determines that a water heater is not repairable, the heater is replaced with a new one.

Risk in the water heater business is managed based on the impact of an asset's failure. The company faces financial risk from water heater failures that damage customer properties. Insurance claim totals have varied from \$6,000 to \$41,000 annually over the most recent five-year period. These numbers are monitored to determine patterns and trends in the data.

## Options for Lifecycle Activities

### Run to Failure

This business operates in a competitive industry with a run-to-failure model. Utilities Kingston strives to maintain service levels and rental rates available in the rental business's market. The company has run this model since its inception and is most familiar with it.

## Expected Growth

The water heater business does not grow as a direct function of population or economic growth in the service territory. Growth in the water heater business is tracked with three data points. The number of new customers that get a new heater installed represent net new assets to the company. The number of customers that exchange a heater represent existing customers with new heater assets installed due to failure. The number of customers that remove a heater represents the customers that the business loses in a year and no longer has an asset installed. Growth is forecasted based on three years of trending historical data.

- New Customer Installs 3-year average = 223 heaters
- Customer Exchanges 3-year average = 427 heaters
- Customer Removals 3-year average = 219 heaters

This represents an average of 650 new heaters installed per year and 219 heaters removed from service per year.

## Financial Strategy

Revenues from the water heater rental business are received as customers pay for their individual heaters via monthly rental charges. The operating and capital budgets for the water heater business are included in the operating and capital budgets prepared by Utilities Kingston and approved by the City of Kingston Municipal Council. The most recent financial forecast for operating expenses and capital investments are included on page 8. This comes from report 23-082 dated February 27, 2023 and is on page 79.

	<b>Operating Budget</b>	<b>Capital Budget</b>
<b>2024</b>	<b>\$823,967</b>	<b>\$1,600,000</b>
<b>2025</b>	<b>\$840,446</b>	<b>\$1,500,000</b>
<b>2026</b>	<b>\$857,255</b>	<b>\$1,500,000</b>
<b>2027</b>	<b>\$874,400</b>	<b>\$1,520,585</b>
<b>2028</b>	<b>\$891,888</b>	<b>\$1,550,797</b>
<b>2029</b>	<b>\$909,726</b>	<b>\$1,581,613</b>
<b>2030</b>	<b>\$927,921</b>	<b>\$1,613,045</b>
<b>2031</b>	<b>\$946,479</b>	<b>\$1,634,771</b>
<b>2032</b>	<b>\$965,409</b>	<b>\$1,667,226</b>
<b>2033</b>	<b>\$984,717</b>	<b>\$1,700,412</b>

This forecast will be updated again in late 2024 for the 2025 to 2039 time period.

The operating budget is used for sales, marketing, triage and repairs to water heaters that are not working.

The capital budget is used for water heater asset replacements and growth in the number of assets installed.

Increases in operating costs and capital costs due to inflation and material availability are monitored. Rental rates are adjusted annually to ensure Utilities Kingston collects sufficient revenue to ensure sufficient financial resources to manage, operate and maintain the water heater business.



## Data Sources

- Utilities Kingston Asset Management Policy
- All Asset Export from CityWide 2023
- Hot Water Tanks Analysis 2024
- 2023 HWT service orders in CIS
- Insurance claims history
- Alliance After Hours Call Categories 2022, 2023
- O.Reg. 588/17
- O.Reg. 193/21
- City of Kingston Council Report 23-082