EB-2022-0222
Technical Conference

EGI 2024 Rates Rebasing
Panel 4

FRPO Compendium

March 27, 2023

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario (FRPO)

Interrogatory

Reference:

Ex. 2, Tab 6, Schedule 2, pg. 32

Preamble:

EGI evidence states: *Create alignment in the organization by establishing an asset management policy, strategies and objectives that link to company strategic priorities.*

We would like to understand better the strategic priorities which figure prominently in this section.

Question(s):

Are there any management incentives tied to an increase of capital installation completion?

a) Are there any management incentives tied to reducing actual capital invested?

Response:

There is no unique incentive specifically for management that is tied to capital installation completed or reduction in capital invested. All non-union employees of Enbridge's Gas Distribution and Storage business unit receive a short term incentive based on a scorecard that includes a metric tied to EBITDA from growth capital. For the purpose of calculating the metric, growth capital is defined as regulated or unregulated organic growth or M&A capital that requires approval from the enterprise CEO or EI Board of Directors, of which Enbridge Gas invested capital is a subset.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario (FRPO)

Interrogatory

Reference:

Ex. 2, Tab 6, Schedule 2, pg. 115-117 & Appendix A, pg. 9

Preamble:

EGI evidence on p. 115 states: *Erin Township investment is replacing Aldyl-A PE pipe that is prone to slow crack growth (SCG) due to its known material and manufacturing flaws (large inner bore spherulitic structures and surface oxidation of the inner surface). The presence of stress intensification factors (for example, rock, service connections, and bend radius) can accelerate SCG and lead to loss of containment. Erin Township has seen several loss of containment Aldyl-A crack failures (see Figure 5.2-59), due to rocky soil where rocks create a stressor on the pipe that accelerates the cracking failures. This is a multi-year investment that will replace about 13.2 km of Aldyl-A mains and service pipe. See Appendix A, Pg. 9 for additional detail on this investment.*

We are trying to reconcile this above evidence with that found in Section 5.2.3.6.5.1 while striving to seek the additional information in the Appendix A reference.

Question(s):

Please provide additional information on the number of loss of containment failures by providing the number and year of these failures.

a) Please provide a map that shows the location of these failures along the subject pipeline.

b) Using Section 5.2.3.6.5.1, please provide some form of threshold or metrics that triggers EGI to shift from responding to loss of containment periodically to initiate the process of replacement.

c) Please correct the reference or provide the evidence that was intended in the Appendix A reference as page 9 refers to the Wabuno Compressor.

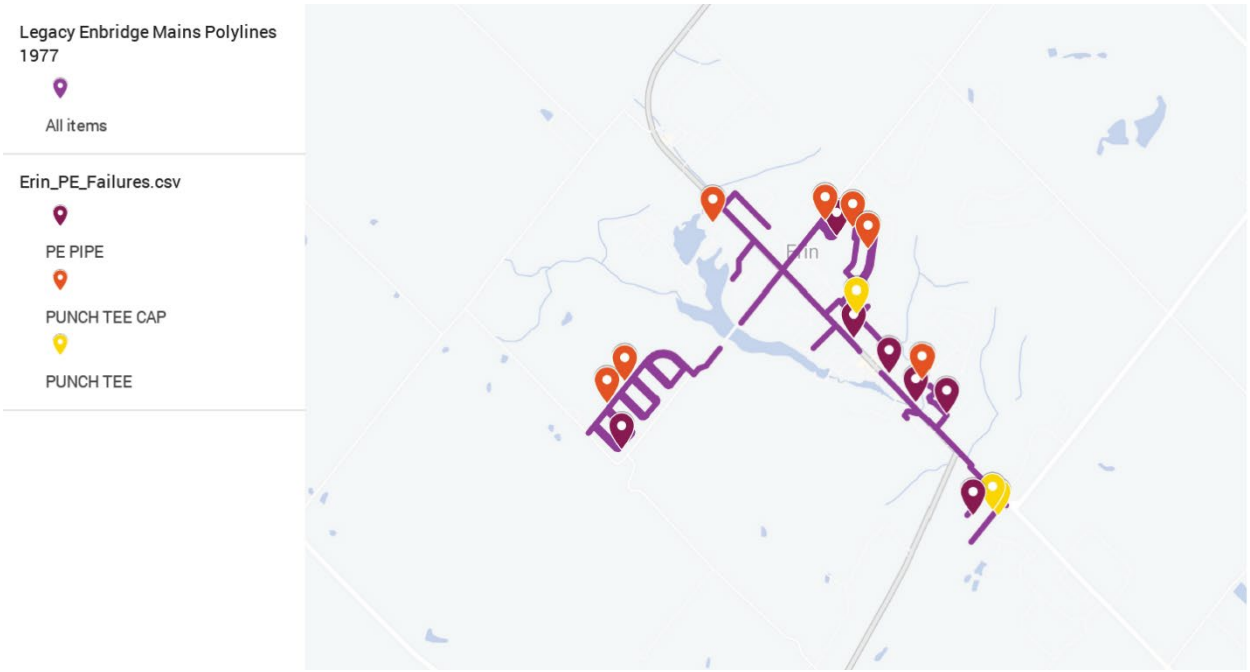
Response:

Table 1 sets out the number and year of the referenced failures.

Table 1

Year	PUNCH TEE	PUNCH TEE CAP	Service Pipe	Main Pipe	Grand Total
2007				1	1
2012				1	1
2014				1	1
2016				1	1
2017		4			4
2018	2		1		3
2019			1		1
2020	1	2	1		4
2021		1			1
Grand Total	**3**	**7**	**3**	**4**	**17**

a) Please see the map.



b) There is not a specific metric or trigger Enbridge Gas uses to determine that a reactive repair program is more appropriate than a pipeline replacement to address the risks associated with an asset. Enbridge Gas may employ one or more of the Risk Analysis tools provided at Exhibit 2, Tab 6, Schedule 2, page 50 of 288, Section 4.2.2 to analyze untreated Risk. Once a risk is analyzed treatment options are compared using the Value Framework in Copperleaf and other qualitative factors to evaluate replacement projects against reactive repair programs.

c) The AMP is a stand alone document with its own page numbering. Page number 9 is the correct number with respect to page numbering used in the base document for Appendix A as shown in the bottom right-hand corner of each page. Exhibit 2, Tab 6, Schedule 2, Appendix A, page 10 is the correct reference in this Application. The page numbers assigned to Appendix A as evidence, are 1 + the page number assigned to the base document.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario (FRPO)

Interrogatory

Reference:

Ex. 1, Tab 12, Schedule 1, Attachments 1 & 2

Preamble:

We would like to understand the role of project and cost management for the projects included in these attachments.

Question(s):

Please file the Post Construction Financial Report for the London Lines (EB-2020-0192)

a) If not available, please file a breakdown of the budgeted costs and actual costs to this point.

b) Is EGI applying for the inclusion of the London Lines in rate base?

   i. If so, what evidence does the Board have to ascertain the appropriateness of inclusion of the London Lines cost?

c) Please file EB-2020-0181 Exhibit I.FRPO.28.

   i. Please explain the Value Measures associated with this project.

   ii. In context of those measures, please explain the priority placed on the project.

d) Prior to the project being undertaken, the feed from the Byron Transmission Station to the London Lines was removed. Please file all internal communications (emails, requisitions, studies) that pertain to the removal of that feed to the London Lines.

Response:

In its Decision and Order approving the London Lines Replacement Project[1] (the "Project"), the OEB included a Condition of Approval regarding the Post Construction Financial Report. The OEB directed that the report should be produced and filed no later than fifteen months after the in-service date, or, where the deadline falls between December 1 and May 31, the following June 1. The OEB went on to direct that the Company file a copy of the Post Construction Financial Report in the proceeding where the actual capital costs of the Project are proposed to be included in rate base or any proceeding where Enbridge Gas proposed to start collecting revenues associated with the Project, whichever is earlier.

As the in-service date for the Project was December 10, 2021, Enbridge Gas is not required to file its Post Construction Financial Report until June 2023. However, as part of its 2021 Rates (Phase 2) Application[2], the Company sought and received approval for incremental capital module (ICM) funding of $124.0 million for the portion of total Project costs forecasted to go into service in 2021.

a) A breakdown of actual costs compared to budgeted costs is set out in Tables 1 to 4 for the mainline, stations, services and abandonment components of the Project. Actuals are shown as of December 31, 2022, and do not take into account forecasted costs of remaining work scheduled in 2023.

Table 1: Project Mainline Costs

	BUDGET	**ACTUALS** (as of December 31, 2022)	**VARIANCE**
Particulars ($000's)	**Mainline**	**Mainline**	**Mainline**
Materials	5616	5329	287
Construction and Labour	77321	63032	14289
Contingencies	11402	0	11402
Interest During Construction	867	733	134
Estimated Incremental Project Capital Costs	95206	69094	26112
Indirect Overhead	21881	14739	7142
Total Estimated Project Capital Costs	117087	83833	33254

[1] EB-2020-0192
[2] EB-2020-0181

Actual costs for construction of the mainline are less than the original filed budget. The budgeted amount was based on the information available at the time of the LTC filing. As the project was developed, efficiencies were found that allowed for easier installation resulting in lower overall costs. Additionally, specialized equipment was secured that allowed for greater daily production rates during installation.

Table 2: Project Stations Costs

	BUDGET	**ACTUALS** (as of December 31, 2022)	**VARIANCE**
Particulars ($000's)	**Stations**	**Stations**	**Stations**
Materials	1823	3191	(1368)
Construction and Labour	8221	15397	(7176)
Contingencies	1310	0	1310
Interest During Construction	142	130	12
Estimated Incremental Project Capital Costs	11496	18718	(7222)
Indirect Overhead	2640	4058	(1418)
Total Estimated Project Capital Costs	14136	22776	(8640)

Actual costs for construction of stations were higher than the original filed budget. At the time of the LTC filing, the scope of the station installation and abandonment requirements were not fully developed. Issued for Construction drawings were not available to inform the original budget, and many drawings had not yet been initiated, leading to greater uncertainty regarding costs associated with the station work. For instance, without stamped drawings, material costs could not be accurately estimated. Similarly, contractors were unable to provide accurate pricing because the necessary reference materials were not available. Additionally, ongoing delays due to procurement challenges related to the COVID-19 pandemic extended the station installation schedule from one year to two years, resulting in increased costs.

Table 3: Project Services Costs

	BUDGET	ACTUALS (as of December 31, 2022)	VARIANCE
Particulars ($000's)	**Services**	**Services**	**Services**
Materials	125	126	(1)
Construction and Labour	4005	8841	(4836)
Contingencies	619	0	619
Interest During Construction	49	102	(53)
Estimated Incremental Project Capital Costs	4798	9070	(4272)
Indirect Overhead	991	2016	(1025)
Total Estimated Project Capital Costs	5789	11085	(5296)

Actual costs for construction of customer services were higher than the original filed budget. At the time of the LTC filing, the list of services needing to be replaced was not yet finalized. The total number of services that were installed exceeded the number expected, resulting in increased costs. Additionally, multiple contractors needed to be secured to complete different portions of the work, and the work itself was more complex than originally expected due to the length of some services and site conditions during some of the installations.

Table 4: Project Abandonment Costs

	BUDGET	ACTUALS (as of December 31, 2022)	VARIANCE
Particulars ($000's)	**Abandonment**	**Abandonment**	**Abandonment**
Materials	0	15	(15)
Construction and Labour	19776	3989	15787
Contingencies	2633	0	2633
Interest During Construction	0	155	(155)
Estimated Incremental Project Capital Costs	22409	4005	18404
Indirect Overhead	4677	904	3773
Total Estimated Project Capital Costs	27086	4909	22177

Actual costs for abandonment were less than the original filed budget because the majority of abandonment work has not commenced so the costs have not yet been realized.

b) Yes, the Company is requesting to include the Project in rate base as part of the current Application.

   i. Please see response at part a). The OEB previously reviewed and approved the Company's application requesting leave to construct the Project, including the forecasted costs of the same (EB-2020-0192). Similarly, the OEB previously approved ICM recovery of $124.0 million of Project costs in 2021 rates (Phase 2) (EB-2020-0181).

c) The Company's responses to FRPO's interrogatories as part of its 2021 Rates (Phase 2) application proceeding are already a matter of public record made available via the OEB's website (RESS) at: https://www.rds.oeb.ca/CMWebDrawer/Record/700810/File/document

   i. Please see response at Exhibit I.2.6-FRPO-44, including Attachment 1, page 8 for the Value Measures associated with the Project. Please note the Investment Summary report is forward looking, and only considers expenditures still in plan in the value assessment.

   ii. While the value framework was applied to this Project to understand how its value compared to other investments included in the optimized plan filed in EB-2020-0181, Exhibit C, Part 2, Schedule 3, the Project was assigned a time constraint and therefore was not optimized among other value driven investments. Please see Exhibit 2, Tab 6, Schedule 2, Page 46, Table 4.1-2, which explains that investments exceeding an established risk upper threshold are categorized as Mandatory. As stated in EB-2020-0192, Exhibit B, Tab 1, Schedule 1, page 14, Paragraph 31:

> The risk assessment also identified that some segments of the London Lines have a high risk rating for Customer Loss. This is primarily for sections where the twin pipelines cannot be isolated independently to effectively manage customer outages on the system.

   High risks exceeding the established risk upper threshold require treatment. Therefore, while this investment was not identified as "Must Do" in the investment summary report, it was treated as mandatory during the optimization and review exercises for Enbridge Gas' 2021 to 2025 Asset Management Plan.

d) The need for the Project was previously examined and approved by the OEB. Enbridge Gas respectfully declines to provide the correspondence requested by FRPO since it is not relevant to the Company's request to include the OEB-approved costs of the Project in its forecast rate base as part of the current Application.

Nonetheless, Enbridge Gas has provided further context below regarding the historical development and circumstances that led to the Project.

The City Gas Company ("City Gas"), which was formed in 1864, provided manufactured gas to the City of London. Union Gas Limited ("Union Gas") purchased City Gas in 1930, and in 1935 installed a pipeline (the London South Line) from Dawn, ON to London, ON. The completion of this project marked the introduction of natural gas for the first time into the City of London. Due to the overwhelming demand for natural gas in London, a twin pipeline (the London Dominion Line) was installed in 1936, these two pipelines were thereafter referred to as the "London Lines".

The section of the London Lines, south of the Thames River, along Elviage Road required a number of leak repairs resulting in the London South Line being abandoned in 2016. The London Dominion Line, a NPS 10 bare and unprotected steel pipeline with a maximum operating pressure of 1900 kPa, remained in operation beyond 2016 but continued to experience leakage and was ultimately replaced by a NPS 4 PE 420 kPa pipeline to eliminate further leaks and to service the customers that were originally connected to the London Lines.

The supply of natural gas into the City of London changed significantly over the course of the 80+ years since the original London South Line and London Dominion Lines were installed and operated. Given these changes, Enbridge Gas determined that the London Lines would not be used as the primary feed into the City of London going forward. The Company's system planning decision in this regard resulted in the OEB-approved Project to connect the City of London to its Strathroy system.

ENBRIDGE

Investment Summary Report

Investment Code	Report Start Year	Number of Years
49607	**2023**	**10**

Investment Name

LOND-London Lines Replacement

Investment Description

Issue/Concern:
"Investment Code 49607 (Part 1 of 4) covers the 2021 In-Service work consisting of:
• A single replacement steel pipeline (3450 kPa) from Dawn to Komoka (consisting of approximately 15.1 km of NPS 6 from Dawn to Oakdale Header, 51.5 km of NPS 4 from Oakdale Header to Mt. Brydges, and 15.5 km of NPS 6 from Mt. Brydges to Komoka Trans.).
• A new NPS 6 steel pipeline feed from Dawn-Parkway Transmission to Mt. Brydges.
• 2021 In-Service station works includes: Oakdale Header Station, Komoka Transmission Station and nine 144H size stations along the route."

"Related Investment Codes include: 735670 = LOND-LLRP 2022-ISD:Stns-SRoyGate&Class7 / 735671 = LOND-LLRP 2022-ISD:Distrib.Srvcs&Mains / 735672 = LOND-LLRP 2022-ISD:Abandonment"

The London Lines is a pair of high pressure distribution pipeline that connects Dawn to the City of London, and the multiple municipalities in between and spans approximately 80.9 km. The London Lines consists of 2 high pressure (HP) pipelines running in parallel and is considered a major feed supplying gas to the small communities between Dawn and London. The line located further north is known as the London South Line and is comprised mainly of NPS 10 steel pipeline coated in Barrett Enamel and installed in 1935. The line located further south is known as the London Dominion Line and is comprised mainly of NPS 8 steel pipeline coated in Durnite and installed in 1936, which was subsequently replaced in 1952. The materials used were reclaimed and refurbished steel pipe from the Windsor district with an average vintage of 1920 - 1930.

There are a number of business benefits to replacing the London Lines pipelines as soon as possible. They include:
Integrity– associated risks from numerous outstanding leaks and future leak potential eliminated through replacement:
- Pipeline is constructed with unrestrained Dresser coupling fittings.
- Aerial crossings at ditches which in some instances are bare and/or have unrestrained Dresser couplings.
- Inoperable valves including valves installed at grade/in the ground
- Current system operates below MOP to reduce number of leaks.
- Both pipelines installed in the 1950s - one line constructed using reclaimed pipe from Windsor of 1920s vintage.
- Depth of cover issues in multiple sections.
- Non-standard supports at deep ditches to allow access for leak survey
- Increased difficultly of repairs including finding pipe suitable for welding

O&M resources - a reduction in the amount of O&M resources needed to address, monitor, and fix new and outstanding leaks is substantial. Estimated cost of a new repair is $15-60k.
System flexibility – the connection of Strathroy to the Dawn to Parkway system in two locations will provide resiliency to the network.

Assets: London Lines consists of 2 HP pipelines running in parallel (London South Line and London Dominion Line).
Related Programs: N/A

Recommended Alternative Description

Scope of Work:
This project will install 83.5 km of NPS 6 & NPS 4 steel pipe with a MOP of 3450 kpa (500 psi) from Dawn Compressor Station to Komoka Transmission Station, replacing the two pipelines known collectively as the London Lines. There will also be secondary new pipeline installed to connect the new NPS 6/4 pipeline to the town of Strathroy. The pipeline provides service, directly and indirectly, to approximately 8,500 customers.

Resources: 2021 - OTC and would be bid on by external contractors

Solution Impact:
Main replacement project identified by Operations - Pipelines as high-priority. Replacement is required due to age, pipeline condition and risk assessment results. This confirmed the timing for execution of this replacement project for 2021.

Timing & Execution Risks:
Risks: Moratoriums, 3rd party developments, COVID-19 impacts, permitting and required easements.

Investment Type	Project (EGI)	Planning Portfolio	UG - Core - DP - Main Replacement - General Mains Replacement
Investment Stage	Executing		

Investment Overview

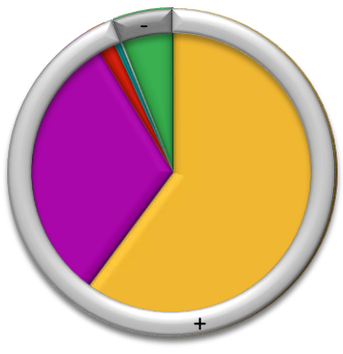
1. Project Information	State/Province	Ontario
	Operating Area (EGI)	Div_03 - Sarnia
	Asset Program (EGI)	DP - Main Replacement
	Asset Class (EGI)	Distribution Pipe
2. Compliance	Compliance Investment	No
	Compliance Justification & Code	
3. Must Do	Must Do Investment	No
	Intolerable Risk (EGI)	No
	Third Party Relocation (EGI)	No
	Program work with sufficient history and risk to warrant	No

Alternative Spend Profile - Recommended

Name	Net Base Capex O (CA)
LOND-London Lines Replacement	$ 558,963

Account Type	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Base CAPEX O	$ 558,963	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Contributions	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Dismantlement	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Alternative Value - Recommended



Value Function Measure	Value	Value in Percentage
Operational Risk	5,476	60%
Financial Risk	2,834	31%
Public Safety Risk	172	2%
Employee And Contractor Safety Risk	59	1%
Reputational Risk	21	0%
Avoided GHG Emissions (CA)	0	0%
Budget Savings OPEX (CA)	0	0%
Cost Avoidance CAPEX (CA)	0	0%
Cost Avoidance OPEX (CA)	0	0%
Environmental Risk And Remediation	0	0%
Total Investment Cost (CA)	(540)	6%
Total	**8,022**	**100%**

Report Generation Date: 2/21/2023

Investment Summary Report	Investment Code	Report Start Year	Number of Years
	102128	**2021**	**5**
	Investment Name		
	Kirkland Lake Lateral Replacement		

Investment Description

Issue/Concern:
The Kirkland Lake Lateral is 12 km of NPS 4 steel pipe of late 1950s vintage (1957/1958) operating at an MOP of 6895KPa / 1000psig (>30%SMYS) and is considered a transmission main under the Transmission Integrity Management Program (TIMP):
- Main runs through mostly bedrock with blasted main bed and rocky backfill.
- Depth of Cover (DoC) and backfill washout is a big concern- 2019 ECDA included a DoC survey and found over 1.3km of pipe with less than 0.6m of cover.
- One inoperable valve at Swastika.
- The main has 1 river crossing.
- Approximately 4 km of the 12 km of pipe was replaced for class location mitigation work.
- Lateral supplies Kirkland Lake and some mining customers and is looped with another NPS 8 main (Kirkland Lake Loop)
- Utilization for these two mains is nearing full capacity, especially when the addition of three new mines takes place:
    - When demand increases (i.e. addition of these three mines) this would eliminate the ability to use the NPS 8 system as a back feed / bypass to allow repairs on the NPS 4 mains, should additional leaks occur.
    - Repairs on the NPS 4 would then require local isolation via bypass, dramatically increasing leak repair costs and repair times.
- Since this is a transmission line operating >30%SMYS, any leaks must be repaired via cut-out replacements (no sleeves).
- This main was inspected by ECDA in 2007. The report gave an estimated 12-year life from that point in time and found 11 immediate dig locations.

- A leak was found in September 2019 (1st leak in at least 12 years) and was repaired via cut-out / replacement using the NPS 8 loop to isolate the NPS 4 as capacity demands allowed for this process. Repair cost was approximately $375K.
- ECDA inspection was performed in late fall of 2019:
    - 13 immediate digs in 12 locations were identified and require mitigation within 18 months (June 2021).
    - These digs are O&M expenses, if cut-out repair is required, this would be Capital (replacement of >1m of pipe)
    - An additional 40 indications were classified as “scheduled for investigation” and require investigation digs within 48 months (2023).
    - TIMP estimates a cost of approximately $100K per dig.
    - TIMP estimates that in total, approximately $6M in digs and repairs is required to mitigate these 53 indications.
- TIMP has imposed a pressure reduction to the main of 850 psig as a temporary mitigation.

Justification:
The NPV analysis for replace versus repair shows a strong recommendation towards replacing the main as the least costly option.

Assets: Kirkland Lake Lateral

Related Programs: TIMP Inspection Program

Recommended Alternative Description

Scope of Work: Due to the condition of the existing NPS 4 Kirkland Lake Lateral, a cost estimate has been requested for the replacement of the line. This is a result of the latest ECDA report on the pipeline. Portions of the line have recently been replaced in 2018 and 2019 as part of the Class Location program. The remaining sections are proposed for replacement (8.5 km total of NPS 4). This option is a size for size replacement.

Solution Impact:
Replacement with new pipe will remove the over 300 corrosion indications being found by ECDA and reduce the likelihood for corrosion leaks as well as damage, as the new main will be set to the correct depth of cover.

Resources:
2022 OTC - resources TBD

Project Timing & Execution Risk: A 2022 in-service date considering this option will most likely require OEB approval through a Leave To Construct (LTC) application.

Investment Type	Project (EGI)	Planning Portfolio	UG - Core - DP - Main Replacement - Vintage Steel Mains Replacement Program
Investment Stage	Short Term Planning		

Investment Overview

1. Project Information	State/Province	Ontario
	Operating Area (EGI)	Div_45 - Timmins
	Asset Program (EGI)	DP - Main Replacement
	Asset Class (EGI)	Distribution Pipe
2. Compliance	Compliance Investment	Yes
	Compliance Justification & Code	2019 ECDA identified 13 Immediate Dig / Repair features that need to be mitigated no later than 2021, with an additional 40 features requiring scheduled mitigation by 2023. There are a further 300 indications being monitored. TIMP is suggesting that replacement versus repair be a preferred option. If the pipe is replaced then TIMP will remain in compliance. Otherwise repairs will be required for the 13 immediate and 40 scheduled digs through O&M.
3. Must Do	Must Do Investment	No
	Intolerable Risk (EGI)	No
	Third Party Relocation (EGI)	No
	Program work with sufficient history and risk to warrant continuation (EGI)	No

Investment Summary Report	Investment Code	Report Start Year	Number of Years
	102128	**2021**	**5**
	Investment Name		
	Kirkland Lake Lateral Replacement		

Alternative Spend Profile - Recommended

Name	Status	NPV	B/C Ratio	Net Base Capex O (CA)	Alternative Start Date
NPS 4 Size for Size Replacement	Recommended	$ 4,614,115	1.32	$ 16,800,000	1/1/2021

Account Type	2021	2022	2023	2024	2025
Base CAPEX O	$ 600,000	$ 16,200,000	$ -	$ -	$ -
Contributions	$ -	$ -	$ -	$ -	$ -
Dismantlement	$ -	$ -	$ -	$ -	$ -

Alternative Value - Recommended

Value Function Measure	Value	Value in Percentage
Cost Avoidance OPEX (CA)	7,263	22%
Budget Savings OPEX (CA)	4,490	13%
Cost Avoidance CAPEX (CA)	4,180	12%
Budget Savings CAPEX (CA)	3,126	9%
Financial Risk	0	0%
Employee And Contractor Safety Risk	0	0%
Environmental Risk And Remediation	0	0%
Public Safety Risk	0	0%
Reputational Risk	0	0%
Revenue Impact (CA)	0	0%
Operational Risk	0	0%
Total Investment Cost (CA)	(14,444)	43%
Total	**4,614**	**100%**

Investment Code	Report Start Year	Number of Years
49607	**2021**	**5**

Investment Summary Report

Investment Name

LOND-London Lines Replacement

Investment Description

Issue/Concern:
The London Lines is a pair of high pressure distribution pipeline that connects Dawn to the City of London, and the multiple municipalities in between and spans approximately 80.9 km. The London Lines consists of two high pressure (HP) pipelines running in parallel and is considered a major feed supplying gas to the small communities between Dawn and London. The line located further north is known as the London South Line and is comprised mainly of NPS 10 steel pipeline coated in Barrett Enamel and installed in 1935. The line located further south is known as the London Dominion Line and is comprised mainly of NPS 8 steel pipeline coated in Durnite and installed in 1936, which was subsequently replaced in 1952. The materials used were reclaimed and refurbished steel pipe from the Windsor district with an average vintage of 1920 - 1930.

There are a number of business benefits to replacing the London Lines pipelines as soon as possible::
- Integrity– associated risks from numerous outstanding leaks and future leak potential eliminated through replacement:
  - Pipeline is constructed with unrestrained Dresser coupling fittings.
  - Aerial crossings at ditches which in some instances are bare and/or have unrestrained Dresser couplings.
  - Inoperable valves including valves installed at grade/in the ground
  - Current system operates below MOP to reduce number of leaks.
  - Both pipelines installed in the 1950s - one line constructed using reclaimed pipe from Windsor of 1920s vintage.
  - Depth of cover issues in multiple sections.
  - Non-standard supports at deep ditches to allow access for leak survey.
  - Increased difficultly of repairs including finding pipe suitable for welding.
- O&M resources - a reduction in the amount of O&M resources needed to address, monitor, and fix new and outstanding leaks is substantial. Estimated cost of a new repair is $15-60k.
- System flexibility – the connection of Strathroy to the Dawn to Parkway system in two locations will provide resiliency to the network.

Assets:
London Lines consists of two HP pipelines running in parallel (London South Line and London Dominion Line).

Related Programs: N/A

Recommended Alternative Description

Scope of Work:
This project will install 83.5 kilometres of NPS 6 and NPS 4 steel pipe with a MOP of 3450 kpa (500 psi) from Dawn Compressor Station to Komoka Transmission Station, replacing the two pipelines known collectively as the London Lines. There will also be secondary new pipeline installed to connect the new NPS 6/4 pipeline to the town of Strathroy. The pipeline provides service, directly and indirectly, to approximately 8,500 customers.

Resources:
2021 - OTC and would be bid on by external contractors

Solution Impact:
Main replacement project identified by Operations - Pipelines as high-priority. Replacement is required due to age, pipeline condition and risk assessment results. This confirmed the timing for execution of this replacement project for 2021.

Timing and Execution Risks:
Risks: Moratoriums, third party developments, COVID-19 impacts, permitting and required easements.

Investment Type	Project (EGI)	Planning Portfolio	UG - Core - DP - Main Replacement - General Mains Replacement
Investment Stage	Executing		

Investment Overview

1. Project Information	State/Province	Ontario
	Operating Area (EGI)	Div_03 - Sarnia
	Asset Program (EGI)	DP - Main Replacement
	Asset Class (EGI)	Distribution Pipe
2. Compliance	Compliance Investment	No
	Compliance Justification & Code	
3. Must Do	Must Do Investment	
	Intolerable Risk (EGI)	No
	Third Party Relocation (EGI)	No
	Program work with sufficient history and risk to warrant continuation (EGI)	No

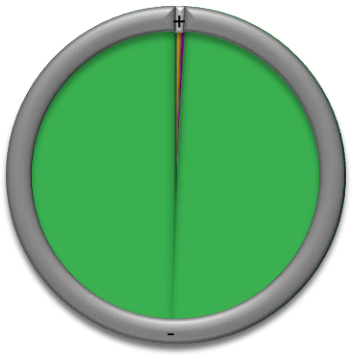
Alternative Spend Profile - Recommended

Name	Status	NPV	B/C Ratio	Net Base Capex O (CA)	Alternative Start Date
Option 1	Recommended	$ (101,814,948)	0.00	$ 110,251,177	1/1/2020

Account Type	2021	2022	2023	2024	2025
Base CAPEX O	$ 97,899,180	$ 8,302,453	$ -	$ -	$ -
Contributions	$ -	$ -	$ -	$ -	$ -
Dismantlement	$ -	$ 22,376,991	$ -	$ -	$ -

	Investment Code	Report Start Year	Number of Years
Investment Summary Report	49607	2021	5
	Investment Name		
	LOND-London Lines Replacement		

Alternative Value - Recommended



Value Function Measure	Value	Value in Percentage
Operational Risk	520	1%
Financial Risk	357	0%
Reputational Risk	0	0%
Employee And Contractor Safety Risk	0	0%
Environmental Risk And Remediation	0	0%
Public Safety Risk	0	0%
Total Investment Cost (CA)	(101,815)	99%
Total	**(100,937)**	**100%**