BUILDING DECARBONIZATION Alliance

An initiative of The Transition Accelerator

Thermal Energy Networks in Canada

Market Development Toolkit

March 2026

Prepared by

dunsky Energy + Climate

Table of Contents

1. Introduction

This Toolkit is designed to support all key stakeholders to understand and develop low carbon Thermal Energy Networks (TENs). TENs, also known as district energy systems, are energy infrastructure delivering thermal energy (heating, cooling and/or water use) from one or more sources of production to multiple buildings through a network of pipes.

This toolkit aims to explain:

- The roles of core stakeholders,
- How to screen for good sites,
- How to develop a business case and rate structures, and
- Approaches to collaborate with utilities and municipalities.

Because many TENs are initially built for a new development, this document emphasizes that application, though many of the tools are also applicable to TENs for existing buildings or neighborhoods. This toolkit is designed for TENs crossing multiple properties, and may overlook some nuances of campus TENs.

This Market Development Toolkit is coupled with a Policy Toolkit that provides an overview of the various federal, provincial, and municipal policies that are most impactful in catalysing TENs. This Toolkit is meant to complement FCM's upcoming Municipal TENs Guidebook and build on the Building Decarbonization Alliance's report: Thermal Energy Networks in Canada: Unlocking Impact Potential and Advancing Enabling Policy.

2. Stakeholder Map

The stakeholder map in Figure 1 outlines the role of each of the key stakeholders throughout the development stages of a TEN. It can help guide stakeholder engagement plans. More details of activities at each stage can be found in Table 1.

Notes to reader when using this tool:

- The TENs sector is evolving differently across the country. As such, this map may be missing relevant stakeholders specific to a jurisdiction.
- Each of these stakeholders is multi-faceted and there may be various people within each organization who should be involved.
- In addition to the ones listed, there are other stakeholders who would be engaged through consultation processes including Indigenous communities, local residents and businesses, and vulnerable populations.
- Where the ownership of the TENs utility is combined with another stakeholder, such as a municipality, a real estate developer, or an existing utility, the roles may be combined.
- Pre-feasibility studies may also be called opportunity studies or screening studies.

Figure 1 TEN Stakeholder Map

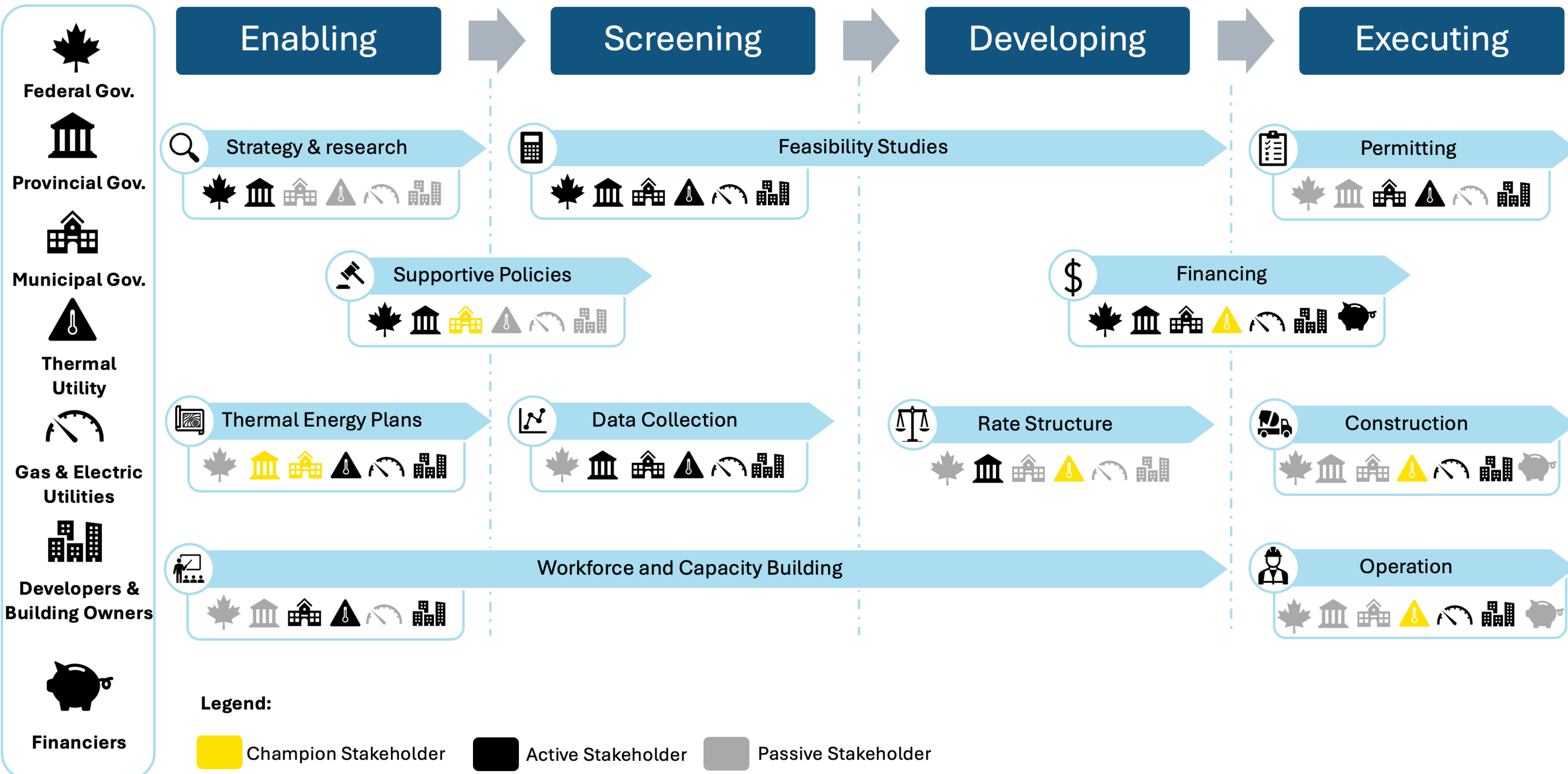

Table 1 Role of Key Stakeholders at Each Stage of TEN Development

Actor	Enabling	Screening	Developing	Executing
Federal Government	• Lead **strategy & research** • Develop supportive policies such as pollution pricing and model building/energy codes		• **Feasibility study** of connecting federal thermal loads • Consider **financial support**	• Provide **financial** support
Provincial Government	• Lead **strategy & research** • Direct municipalities or utilities to develop **Thermal Energy Plans** • Develop **supportive policies** such as pollution pricing, strict building/energy codes, and regulatory processes	• **Provide data** on waste thermal sources	• **Feasibility study** of connecting provincial thermal loads • Approve rate structure, if applicable • Consider **financial** support	• Provide **financial** support
Municipal Government	• Develop legal framework and **supportive policies** by incorporating TENs into planning, zoning, and building/development standards • Develop **Thermal Energy Plans** • **Build capacity** across stakeholders	• Develop supportive policies including access to right-of-way, public land, and waste thermal sources • **Provide data** on wastewater and other waste thermal sources	• **Feasibility study** of connecting municipal thermal loads • Consider **financial** support	• Approve **permit** applications
Thermal Utility	• **Build capacity** across stakeholders • Participate in **Thermal Energy Plans**	• Pre-**Feasibility** study across region • **Provide data** on thermal sources and capacity. • Determine ownership structure, partners, and clients	• **Feasibility study** & detailed design • Finalize contracts & rate structure • Secure **financial** for construction	• **Construction & operation**
Gas + Electric Utilities	• Develop or support **Thermal Energy Plans**	• **Provide data** on building energy usage and gas network capacity • Participate in feasibility studies	• Consider **financial** support	• **Construction & operations**, as needed
Developers + Building Owners	• **Build capacity** across the industry • Participate in **Thermal Energy Plan** process	• Pre-**Feasibility** study for new developments • **Provide data** on building energy usage (planned or existing)	• Perform **feasibility studies** for new developments and existing buildings • Secure **financial** resources • **Build capacity** across occupants	• Incorporate in plans & permits • **Construct** and retrofit as needed • **Operate** as needed

3. Working with Stakeholders

This section outlines key considerations that TENs proponents (i.e. developers and TENs utilities) should keep in mind when engaging with municipalities and utilities (both their regulated and unregulated arms) and provides recommendations for effective collaboration during the development of TENs. Although there are roles for provincial and federal governments,[1] this section is focused engagements with municipalities and utilities because of their local relevance influencing the development of a TENs.

The engagement approach with municipalities and utilities will be heavily influenced by the TENs ownership structure — 100% private, hybrid public/private, or 100% public.

When there are not TENs already in operation, both municipalities and utilities will need more capacity-building support and time to understand the roles and responsibilities with regards to TENs. TENs proponents should build this into their expectations.

3.1 Working with Municipalities

The realities of municipalities and guidance for TENs proponents are detailed in Table 2.

Table 2 Municipal Context and Guidance for TENs Proponents

Municipal Context	Advice for TENs Proponents
Planning and Decision-Making	
• Municipalities are responsible for **land use planning, zoning**, and many **public services and infrastructure** including water and wastewater services. • Municipalities also manage **permitting services** for building permits, neighborhood plans, subdivision plans, road cuts, right of way access agreements, and others. • In some provinces, municipalities may pass **bylaws requiring connection to TENs** in a defined zone, particularly when they are part of the TENs ownership structure. • Municipalities may use **incentive mechanisms** (e.g., increased density allowances) or green development standards to encourage TENs in new developments.	• Align TENs proposals with **Master Community Plans (Official Plans), Neighborhood Plans (Secondary Plans), Subdivision Plans** and **Community Energy Plans**. Where relevant, consider **Green Development Standards, Right of Way and Land Use Provisions**. • Understand the municipal authorities and conditions for mandating TENs connection (see Thermal Energy Networks in Canada: Municipal Policy Pathways). • Build a relationship with a municipal staffer to be an **internal champion** and navigate to the appropriate staff for early and thorough engagement.

1 Thermal Energy Networks in Canada: Unlocking Impact Potential and Advancing Enabling Policy

Municipal Context	Advice for TENs Proponents
Risk Management & Business Case	
• Municipalities use **structured risk management** frameworks to identify, assess, and mitigate risks in projects they fund or support. • TENs **risks of focus** for municipalities include: damage to municipal infrastructure, public and resident safety, affordability. • **Benefits that matter** to municipalities include: energy resilience, economic development potential, job creation, reliability of power supply, addressing energy poverty, reducing GHGs. • Municipal staff are often required to maintain **lobbyist registries**, documenting all conversations with private sector parties.	• **Demonstrate how the project manages risk**, including: › Providing detailed risk registers, contingency plans; › Supporting education and capacity building of municipal staff; and › Demonstrating capacity for long-term project stewardship in alignment with the municipal goals. • **Register on the lobby registry** in order to meet with municipal staff.
Procurement Processes	
• Municipal procurement is governed by principles of **fairness, transparency,** and **value-for-money**. Their procurement processes are typically published under **procurement bylaws and standards**. They may also have green procurement or social procurement guidelines or policies. › Common procurement models include: › Request for Proposals (RFP) › Request for Quotations (RFQ) › Call Ups from Standing Offer Lists › Public-Private Partnerships (P3s) for large infrastructure projects. • Municipalities must **comply with trade agreements**, which influence procurement thresholds and procedures.[2]	• Become familiar with a municipality's **procurement processes** and ask municipal procurement staff about which process will apply to the TENs project.

2 Welcome to your new Dentons PowerPoint template

3.2 Working with Electric and Gas Utilities

The realities of electric and gas utilities, both regulated and unregulated arms, and guidance for TENs proponents are detailed in Table 3.

Table 3 Context of Electric and Gas Utilities and Guidance for TENs Proponents

Regulated Utility Context	Unregulated Context	Advice for TENs Proponents
Mandates and Responsibilities		
• Utilities are mandated to deliver **safe**, **reliable**, and **affordable** services, often under provincial regulation. • **Their core obligations include:** › **Infrastructure** planning and maintenance › **Rate-setting** and cost recovery › Compliance with **environmental and safety** standards.	• Pursues commercial opportunities such as **renewable energy development, energy efficiency, or consulting.** • **Higher risk tolerance** and higher potential for returns. • Profits are **not rate-based** or guaranteed.	• Understand the **goals and roles** of the utility (regulated and unregulated). • Identify **key staff** working on infrastructure planning and major projects. • Discuss the utility's **ability to support** a TENs project, from supplying data to incenting connection. Data sharing tools such as Energy Star Portfolio Manager or Green Button may facilitate.
Regulatory Requirements		
• Utilities must submit **regulatory filings** to provincial regulators for approval of capital investments and rate changes. • These filings increasingly require: › **Decarbonization plans** › **Equity and affordability assessments** › **Stakeholder engagement strategies**. • In the USA, some electric and gas utilities are required to develop **clean heat plans** (also known as thermal energy plans).	• **Not subject rate regulation** but may still be governed by corporate governance and general business laws.	• Understand the **existing efforts and expertise** of the utilities regarding TENs projects and clean heat planning. • Outline how TENs will **reduce infrastructure needs** for the electric and gas utilities.

Regulated Utility Context	Unregulated Context	Advice for TENs Proponents
Legislative Limitations		
• Utilities may face constraints in: › Investing staff time or financial resources in **non-core assets** › Partnering on **speculative** developments › Operating outside their **service territories.**	• Can invest in competitive markets, **form joint ventures**, and respond more quickly to **market opportunities**.	• Understand the utilities' barriers and develop strategies in which the TENs **overcome those barriers**.

3.3 Strategies for Collaborating with Municipalities and Utilities

1. **Understand the Organizational Structure:** Municipalities and electric/gas utilities are large organizations with many departments. Projects like TENs will touch many departments. TENs proponents should take time to build a relationship with internal champions (such as those with an environmental or resiliency mandate) to help navigate the organizational structures and ensure that they engage early with all the relevant staff and councillors. Relevant staff at the municipal side will likely include: planning staff responsible for right of way and development approvals, staff overseeing municipal land and real estate, and local area councillor(s). On the utility side, relevant staff to engage would include those working on integrated resource plans, infrastructure planning, key account representatives, and energy conservation services.

2. **Engage Early and Often:** Initiate dialogue with utilities and municipal staff as well as relevant municipal councillors during the concept phase. Follow up with relevant updates.

3. **Align Objectives:** TENs proponents should ensure that their project goals are in service of the municipality's and utilities' published objectives and strategies and communicate accordingly. Municipal strategies may include Term of Council Priorities, Master Community Plans, Neighborhood Plans, Subdivision Plans, or Community Energy Plans. Utility strategies may include Strategic Plans or Integrated Resource Planning.

4. **Respect Constraints:** Municipalities and utilities tend to have limited budgets and staff capacity. Proponents should respect their limitations and risk tolerances by demonstrating how the TENs will mitigate risk and help overcome their limitations.

5. **Demonstrate Support and Value:** Proponents should demonstrate the engagement and support of stakeholders. Highlight how the project contributes to municipal and utility goals, such as emissions reductions, climate resiliency, economic development, and energy affordability.

6. **Build Trust:** Maintain transparency, share data, respect strict procurement and public accountability processes, and participate in consultation processes.

4. Decision Tree and Opportunity Scorecard

The Decision Tree and Opportunity Scorecard on the following pages are intended to be used in series to help developers, municipalities, utilities, and other stakeholders screen possible sites for TENs viability. Together, they will walk users through the necessary conditions and criteria required to enable a TENs project to identify suitable locations and foundational conditions.

Caveats to using the decision tree and opportunity scorecard:
These tools should be used as directional, for screening of potential sites for more comprehensive feasibility studies. There are many factors that affect the viability of a TENs project including:

- local climate conditions
- thermal load requirements
- building types (residential vs commercial vs institutional)
- level of infrastructure capital cost
- existing thermal infrastructure in a building
- existing TENs infrastructure
- comparative operation costs

4.1 Decision Tree

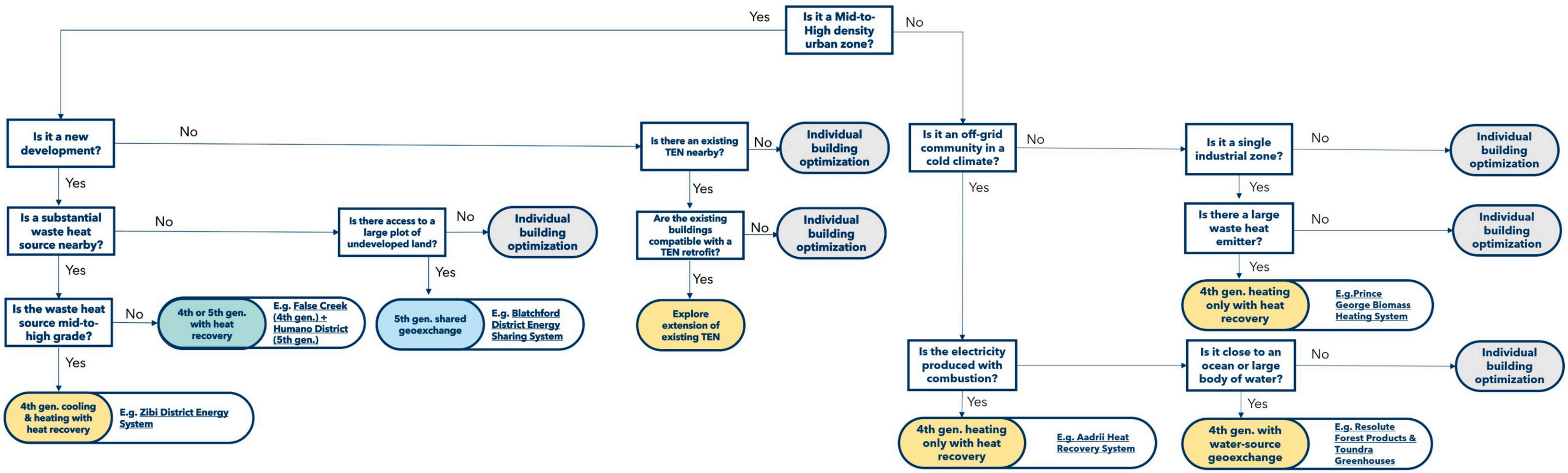

Figure 2 Decision Tree for TENs Opportunity Screening

Quick Rule Definitions		Ranking of TENs Potential		
		Low	Medium	High
Must Have	Floor area of new development (m2)	<100,000	100,000 – 150,000	>150,000
	Heat & DHW load density (MWh/ha/yr)[3]	<300	300-750	>750
	Load factor (MW avg/ MW peak)	<0.25	0.25 – 0.5	>0.5
Bonus	Urban density (FAR)	<2	2-4	>4
	Load diversity	1 use	2 uses	3+ uses
	Capacity of thermal energy source (MW)	<0.5	0.5 - 2	>2
	Proximity to thermal energy source (km)	>2	0.5-2	<0.5

Potential Waste Heat Sources for TENs

Direct Use Heat

- Heat which can be used directly for heating a building, typically over 65°C
- Waste to energy plants

High Grade Heat

- Energy sources 40 to 65°C
- Industrial facilities that produce waste heat or significant volumes of wastewater

Low Grade Heat

- Heat sources below 40°C
- Buildings with large refrigeration or cooling systems (e.g. data centres, ice arena, grocery store, cold storage)
- Food or beverage manufacturing (e.g. brewery/distillery, drying/canning, bakery)
- Wastewater treatment facilities or large sewer lines (with flows of at least 30 L/s, ideally over 50 L/s)
- Bodies of water that could be thermal reservoirs (e.g. large rivers, lakes, reservoirs, quarry/mine)
- Geoexchange borehole fields (>0.25 ha/MW.[4] Sites could be parks, parking lots, farms, or other surface uses)
- Snow melt piles (for cooling)

3 ReShape. Oct 1 2025. IDEA Webinar on TENs and Area Based Planning.

4 This assumes ground-coupled boreholes each at 150m deep, producing 50W/m of borehole, separated 6.5m from each other. If the geology enables open-loop wells, the total area needed could be reduced.

4.2. Opportunity Scorecard

The TEN Opportunity Scorecard is intended to help a proponent identify if a TENs opportunity is low, mid, or high. This is a step that can help identify which data sources (such as thermal density and real occupant data) are needed and if a pre-feasibility study is warranted.

5. Business Case Considerations

Some of the key elements of a business case are determined in the **thermal energy supply agreements** (or equivalent) between the thermal utility and the customer. Note, in BC where the TENs market is regulated, thermal energy supply agreements are rarely used, rather, the systems are based on a utility tariffs and service provision model.

An **infrastructure agreement** is another relevant agreement. It is the contractual framework governing how the physical network is designed, built, owned, accessed, expanded, and maintained, and how risks and responsibilities are allocated between the thermal energy utility, the municipality, and other landowners hosting the TENs network. The structure of these infrastructure agreements are site specific and are not covered in detail in this toolkit.

5.1. Outline of a Thermal Energy Supply Agreement

The common elements of a thermal energy supply agreement are outlined below, divided into the following sections: core contract terms, operational and technical provisions, legal and risk management, and optional clauses. These terms may evolve as the regulatory oversight of TENs evolve. In BC where TENs are regulated, there may be additional relevant clauses. A legal professional should be involved in drafting a final contract.

5.1.1. Core Contract Terms

Scope of Services	• Defines what thermal energy services are being provided (e.g. heating, cooling, hot water), delivery points, and system specifications.
Term, Renewal & Asset Ownership	• Specifies the contract duration (often 10–30 years), renewal options, and conditions for early termination. • Defines ownership of assets during and upon completion of term.
Rate Structure & Payment	• Fixed or variable pricing models (e.g., indexed to fuel prices or inflation) - see Section 5.2, for details. • Rate escalation factors and calculation formulas. • Minimum monthly charges, consumption charges, demand charges, or capacity charges.
Performance Guarantees	• Payment schedules and penalties for late payments. • Minimum energy delivery thresholds. • Temperature control guarantees. • System uptime or availability metrics.
Metering & Monitoring	• Details how energy usage is measured, who owns the meters, and how data is shared. • Measurement and verification protocols.

5.1.2. Operational and Technical Provisions

Maintenance & Repairs	• Clarifies responsibilities for maintaining thermal infrastructure (e.g., boilers, chillers, distribution pipes). • Expected maintenance and major replacement schedule.
Force Majeure	• Covers events like natural disasters or supply chain disruptions that excuse performance temporarily. • Outlines backup and redundancy plans.
Interconnection & Infrastructure Access	• Defines rights to access buildings, easements, or utility corridors for installation and maintenance. • Outlines system integration for hybrid systems.
Change in Law	• Addresses how regulatory changes (e.g., carbon pricing, emissions standards) impact pricing or obligations.

5.1.3. Legal and Risk Management

Liability & Indemnification	• Allocates risk for damages, injuries, or service interruptions.
Insurance Requirements	• Specifies types and levels of insurance each party must carry.
Default of Contract	• Outlines what constitutes breach of contract.
Default Remedies	**Financial Remedies** • **Compensatory Damages:** These cover direct losses (e.g., cost of replacement energy) and sometimes indirect losses (e.g., business interruption) suffered by the non-breaching party. • **Liquidated Damages:** Pre-agreed sums payable upon breach, often used when actual damages are hard to quantify (e.g., failure to meet temperature thresholds or delivery volumes). • **Refunds or Price Adjustments:** If the utility fails to deliver contracted energy, the client may be entitled to a refund or reduced payment. **Legal and Equitable Remedies** • **Specific Performance:** A court may compel the breaching party to fulfill its obligations - especially when the energy source is unique or irreplaceable. • **Injunctive Relief:** Used to prevent further harm, such as stopping unauthorized use of infrastructure or enforcing exclusivity clauses. • **Rescission:** The contract may be fully voided if the breach is fundamental, allowing both parties to terminate without further obligation.
Default Remedies	**Operational Remedies** • **Step-In Rights:** The client may be allowed to take over operations temporarily if the utility fails to perform (common in public-private partnerships). • **Service Credits:** Penalties applied as credits against future invoices, often tied to performance metrics like uptime or temperature delivery. • **Termination Rights:** Contracts typically allow termination for material breach, sometimes with a cure period before termination is triggered.
Dispute Resolution	• May include mediation, arbitration, or litigation procedures.
Confidentiality & Data Use	• Protects proprietary information and may govern how usage data is handled.

5.1.4. Optional or Strategic Clauses

Environmental Attributes	• Addresses issuance, validation, ownership of renewable energy credits (RECs) or carbon offsets if the thermal energy is sourced sustainably and meets emissions requirements of the buildings.
Subcontracting & Assignment	• Regulates whether the utility can subcontract operations or assign the contract to another entity.
Exit Clauses	• Allows the client to terminate early under specific conditions (e.g., building closure, technology upgrade).
Pain/Gain Sharing	• Details how the benefits and risks will be shared between utility and customers if TENs performance varies materially from the models.

5.2 Cost Recovery Considerations

The primary mechanism for covering the costs of constructing and operating a TENs is through rates, as detailed below. In addition to rates, costs can also be recovered through:

- **Renewable energy certificates:** TEN operators can sell voluntary thermal renewable energy certificates (T-RECs) that represent the environmental benefit of waste-heat recovery or renewable thermal energy replacing fossil fuel heating.
- **Capital cost sharing:** for greenfield or expansion projects, developers may pay a portion of pipe installation, energy transfer stations, on-site heat pumps or mechanical rooms.
- **Anchor tenant agreements:** large customers may sign long-term contracts, guaranteeing minimum revenue to TENs operators. These agreements may also outline the potential to offer anchor customers reduced capacity rates as new customers are onboarded and/or reduced capacity rates once the initial investment is paid off.
- **Grants or incentive programs**

When designing a rate structure for a TENs project, there are three main considerations, each of which is detailed below:

- How the rates compare to business-as-usual (BAU)
- Which rate structure to use
- How to determine the rates

5.2.1 How TENs Rates Compare to Business-As-Usual

Building owners or developers considering connecting to a TEN will need a comparison of the TENs rates to their BAU option, which is typically heating with natural gas and cooling with electricity. When assessing the business case, it is important to include all of the related costs of the BAU, as shown in as shown in Table 4.

Table 4 Business and Usual Cost Components

Capital Costs	• **Install:** Purchase, installation, and commissioning of space and water heating and cooling equipment. • **Mechanical room:** Associated costs (space opportunity cost, ventilation, electrical capacity, structural needs). • **Outdoor space:** For cooling towers.
Variable Costs	• **Fuel:** Natural gas, biofuels, renewable natural gas, waste heat, or electricity (factoring in rate class). • **Uptime** expectations and cost of lost load.
Operations & Maintenance	• **Staff and service contracts:** Engineering and servicing time for boilers and domestic hot water heaters. • **Water & treatment:** Treatment supplies, sewer cost, and water for treatment process for boilers, chillers, colling towers, and heat pumps. • **Equipment insurance:** Often 0.15% of annual equipment and material costs. • **Equipment maintenance:** Often 1% of the plant capital cost, which includes annual preventative maintenance, repair costs (every 7-10 years), and cooling tower winterizing. • **Reserve fund:** Assumes replacement of equipment after 20 years, factoring in inflation.

When calculating the relative TENs costs, it is important to understand the long-life expectancy of the infrastructure, particularly the distribution piping and energy transfer stations, which can be accomplished through long amortization periods or including residual values.

5.2.2 Rate Structure Options

The most common rate structures used in TENs can include one, two, or three components, namely:

1. Fixed cost – include connection costs, capacity and operation and maintenance (O&M)
2. Energy cost – fees based on energy usage (may include low carbon rate for renewable energy vs. natural gas)
3. Capacity cost – system costs based on user's peak load

See Table 5 for a comparison of these rate structure options against a BAU model. In Canada, a 2-part rate is the most common for existing TENs.

Table 5 Comparison of TENs Rate Structures to BAU

<table>
<tr><th>BAU</th><th>1-Part Rate</th><th>2-Part Rate</th><th>3-Part Rate</th></tr>
<tr><td>Capital costs</td><td>Fixed costs</td><td rowspan="2">Fixed costs</td><td>Fixed costs</td></tr>
<tr><td rowspan="2">Variable costs</td><td>Capital costs</td><td rowspan="2">Energy costs</td></tr>
<tr><td>Variable costs</td><td rowspan="2">Energy costs</td></tr>
<tr><td>O&M</td><td>O&M</td><td>Capacity costs</td></tr>
</table>

= In-building system costs   = TENs system costs

There are relative benefits and applications of each approach as described in Table 6. The selection of a rate structure typically takes place over time, in consultation with the potential customers. Before and during the feasibility studies, preliminary rate structures will be discussed with potential customers for input and comparison with BAU, though they are not binding. The final rate structure is determined at regulatory approval (if applicable) or financial close, just before construction work begins.

When selecting a rate structure, considerations should include:

- the current and future scale and diversity of the network;
- flexibility for system expansions or thermal source changes;
- cost recovery goals; and
- ensuring risks are appropriately allocated.

Table 6 - Rate Structure Options

	One Part Rate Structure Fixed Charge	Two Part Rate Structure Fixed + Energy Charges	Three Part Rate Structure Fixed + Energy + Demand Charges
Rate Component	• Installed capacity charge • Uniform charge for all customers (where customers are similar in size and use pattern)	• Fixed charges recovered through customer or capacity charge • Variable charges recovered through energy charge	• Non-demand fixed charges recovered through customer charge • Most variable charges recovered through energy charge • Demand-related fixed and variable costs recovered by metered demand charge
Typical Metrics for Monthly Charges	• $/customer or $/installed kW, $/installed GJ/hr, $/m2 conditioned space	• $/customer, $/kW, $/m 2 conditioned space. • $/kWh, $/GJ, $/kg steam	• $/customer • $/kWh, $/GJ, $/kg of steam • $/kW, $/GJ/hr, etc.
Application	• Ambient temperature loops where peak demands do not materially increase costs to the TENs • Projects where customer types and infrastructure costs are relatively uniform	• Systems with diversity in customer size/usage • Projects with substantial variable costs • Systems incurring supplemental fuel costs • Systems with predictable peak loads	• Complex systems with diverse customer profiles • Projects with substantial variable costs • Networks where peak demand drives infrastructure size and costs
Pros for TENs Utility	• Maximum revenue stability, thus easy to repay debt • Moderate revenue potential • Low cost to administer (no metering required)	• Moderate revenue stability and debt repayment capacity • Can benefit from load growth	• Maximum ability to raise revenues • Lowest risk for lenders
Cons for TENs Utility	• May under-recover costs from users with high energy use or peak demands	• Requires metering infrastructure	• More complex to administer and explain • May require reconciling installed capacity with measured peak usage • Requires energy and demand metering

	One Part Rate Structure Fixed Charge	Two Part Rate Structure Fixed + Energy Charges	Three Part Rate Structure Fixed + Energy + Demand Charges
Pros for Customers	• Easy to understand	• Incented to conserve energy	• Rates accurately reflect use • Incented to conserve energy and manage peak load
Cons for Customers	• Doesn't incentivize conservation or peak demand reduction	• May under-incentivize peak load management	• Complex bills
Example TENs	Humano District, Sherbrooke[5] • Fees included in rental rates • Leləm' Village, Vancouver	False Creek Neighbourhood Energy Utility[6], Vancouver • Fixed capacity charge + Variable energy usage charge	No Canadian example • Fixed meter charge + Commodity ($/kWh) (incl. low carbon rate) + Capacity ($/kW measured peak)

5.2.3 Approaches to Rate Calculations

There are various ways to calculate the value of a TENs to a customer versus their BAU options. Many of the approaches outlined in Table 7 may be used to compare a TENs rate structure to a BAU system. When setting rates, it is important to understand how any regulations will limit or influence the rate design options. For example, in BC where private TENs are regulated, the BC Utilities Commission must approve the rate structure.

Table 7 Rate Calculation Approaches

	Traditional Cost of Service	Flow Through of Actual Costs	Benchmark Against Alternative	Benchmark Against Existing TENs
Definition	Rates are based on forecasted or historical costs (capital, operations, maintenance, fuel) plus an allowed return on investment.	Rates are a pass through of actual energy costs to customers, with little or no markup. Fixed and capacity charges recover infrastructure & operational costs.	Rates are pegged or compared to the cost customers would pay using conventional energy sources.	Rates are set by comparing to similar thermal networks' pricing structures and outcomes.
Pros for TENs Utility	• Ensures full cost recovery and fair return. • Widely used and understood by investors and regulators.	• Revenues are responsive to costs. • Lower risk for investors. • Simple to justify to customers and regulators.	• Easy to communicate value proposition to customers.	• Easy to predict rates for a new system. • Simple justification to regulators and customers.

5 Humano District Project (#5)
6 False Creek Neighbourhood Energy Utility (NEU) (#6)

	Traditional Cost of Service	Flow Through of Actual Costs	Benchmark Against Alternative	Benchmark Against Existing TENs
Cons for TENs Utility	• Complex and data-intensive to administer. • Can be slow to adjust to usage changes.	• Limited incentive for investing in efficiency.	• Risk of under-recovery of actual costs makes it less attractive to investors. • Not permitted in BC.	• Not incented to innovate or design appropriately. • May not reflect actual cost realities, so harder to attract investors.
Pros for Customer	• Transparent. • Stable, predictable rates.	• Highly transparent. • Simple to understand.	• Ensures competitiveness with alternative.	• Ensures fairness and consistency across regions.
Cons for Customer	• May not directly reflect competitiveness with market alternatives.	• May be volatile if energy prices fluctuate. • May complicate budgeting.	• May be volatile if energy prices fluctuate.	• May not be competitive with alternative option. • May not reflect true cost of operations

There are also various approaches to **setting connection costs** described in Table 8.

Table 8 Approaches to Setting Connection Costs

	Annual Levelization	Multi-year Levelization
Definition	Connection charges are recalculated each year based on yearly cost of capital, expected connections, and expansions.	Connection costs are averaged over a multi-year horizon (e.g. 5–10 yrs) to produce a stable, consistent rate.
Pros	• **Responsive to change:** Adjusts quickly to new costs, inflation, or usage changes. • **Transparency:** Customers see a clear link between current-year system costs and connection fees. • **Reduced long-term risk:** Prevents over/ under-recovery if costs materially change.	• **Rate stability:** Provides predictable costs for customers & developers. • **Planning certainty:** Easier for the utility to forecast revenues and plan investments. • **Administrative efficiency:** Less frequent recalculations and regulatory filings
Cons	• **Variability:** Annual fluctuations can make financial planning harder for both utility and developers. • **Administrative burden:** Requires yearly updates, approvals, and recalculations.	• **Lag in cost recovery:** If actual costs rise faster than expected, the utility may under-recover until the next review period. • **Potential cross-subsidy:** Early customers could pay less or more than their fair share if system growth deviates from forecasts.

There are also typical approaches for rate adjustments, detailed in Table 9.

Table 9 Approaches to Rate Adjustments

	Inflation/Escalation Indexes	Bonusing Improved Performance
Definition	• Applying publicly available inflation/ escalation indexes or TENs-specific benchmarks	• Incorporating bonuses for improved performance indexes (e.g., reliability, customer service)
Pros	• Transparent and predictable for customers	• Incents TENs utility to invest in improvements
Cons	• May not reflect true costs to TENs utility	• Less predictable for customers