RETROFITS WITH PURPOSE:

Going beyond the status quo to create and preserve value.

33 Bloor

Street East, Toronto, Ontario

CAGBC Canada Green Building Council

Acknowledgments

This case study has been prepared as part of the Purpose Accelerator – Canada's Private Sector Retrofit Accelerator, funded by Natural Resources Canada's (NRCan) Deep Retrofit Accelerator Initiative (DRAI). Building decarbonization retrofit work is typically pursued through a sequence of interventions that extend over a period of several years. This series will highlight projects at various stages of their retrofit journey.

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About the Project

Project type: Deep Retrofit - HVAC

Timeline: Design & Construction 2024-2025

Asset class: Office with ground-floor retail

Gross floor area/ leasable area: 352 000 sf/ 293 000 sf

Number of floors: 18

Original construction: 1991

Project Team

Property Owners: Institutional investors (confidential)

Asset and Property Manager:
Epic Investment Services

Transition Planning and Owner's Representative:
Purpose Building

Design Builder: Kolostat Inc.

The Retrofit Journey

The "Retrofits with Purpose" series chronicles buildings supported by the Purpose Retrofit Accelerator at key milestones in their retrofit journey.

Deep retrofits for Canada's buildings are vital for reducing greenhouse gas (GHG) emissions, meeting occupant needs, and preserving long-term asset value.

A deep retrofit is not a single moment in time, but a journey of years. Deep retrofits can be broken into segments from strategic planning through to moments of intensive effort to deliver major projects — such as upgrading windows or heating systems.

Following the process developed by Purpose and using their portfolio screening tool, owners of multiple buildings can focus on the buildings where intensive effort is most urgently needed.

Supporting an effective retrofit journey requires the development of a **Transition Plan**, which sets major project scope and timing to complement the building situation. This transition plan considers factors like building condition, occupant needs, retrofit benefits and costs, and the interaction between the projects needed to complete the deep retrofit.

Each major project then proceeds through milestones including **Approval**, **Design**, **Construction**, and at completion the projects are validated through **Measurement and Verification (M&V)**.

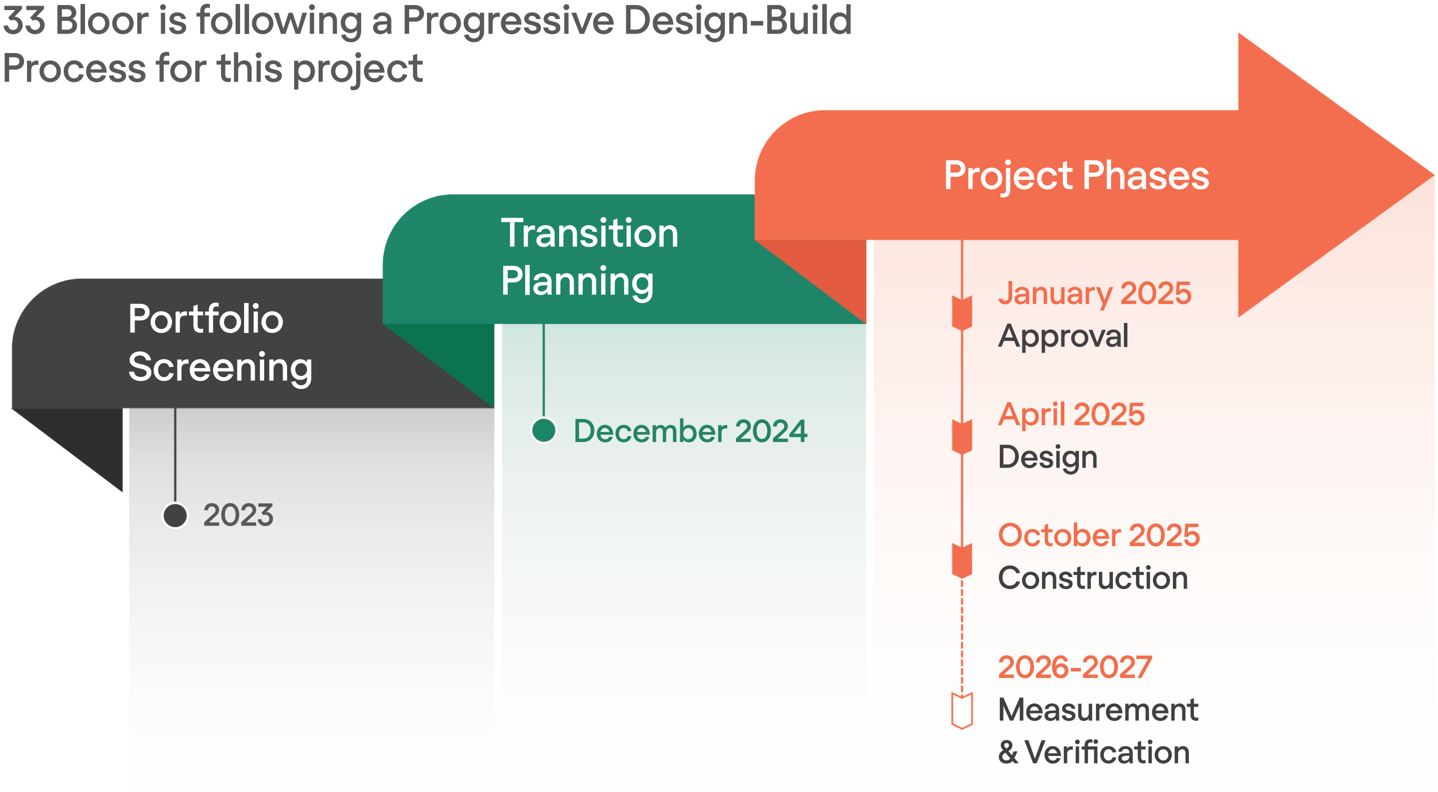
33 Bloor: A Retrofit Vision Beyond Replacement

Like many buildings of its time, in 2024, 33 Bloor's heating system might have lasted another year or two, but the risk of urgent mid-winter issues was looming. Instead of just replacing the system to maintain the status quo, asset and property manager **Epic Investment Services** saw this as an opportunity to create and preserve asset value.

Epic engaged transition planning expert, Purpose Building, and design-builder Kolostat to support fast delivery, cost certainty, risk management and flexibility while delivering on the owners' vision. The Purpose Retrofit Accelerator — supported by Natural Resources Canada's Deep Retrofit Accelerator Initiative (DRAI) — provided financial support for developing the strategy.

> "We knew what we needed help with, and we needed to engage partners who could bring practical options to the table and help us evaluate them."
>
> — Nada Sutic
> *VP of Sustainability, Innovation and National Programs at Epic.*

33 Bloor is following a Progressive Design-Build Process for this project



The first step was to identify and investigate options. The project team confirmed the electrical and structural system adequacy, then right-sized the new system to reduce costs.

Three shortlist solutions were identified with different upfront costs and delivered value, but each being a long-term capital investment utilizing established technology capable of reliably operating beyond 2050:

1 **Gas Boilers**

A like-for-similar gas boiler replacement (new, condensing boilers).

2 **Gas & Electric Boilers**

A partial fuel-switching option with electric boilers sized to fit within existing electrical infrastructure (with the option to add/incorporate heat recovery later).

3 **Gas Boilers & Heat Recovery**

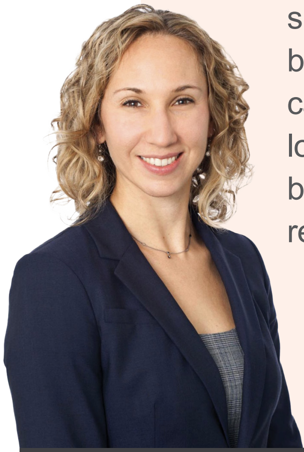
A partial fuel-switching option with a heat-recovery chiller connected to the supplemental cooling system and new gas boilers for the balance of the heating needs (with the option to add/incorporate electric boilers later).

At a design charette, the building owners confirmed their alignment on the vision and approach to evaluating solution options, which enabled quick and effective subsequent business case discussion and decision making. Purpose summarized the charette outcomes in a way that allowed Epic to clearly communicate the business case and decarbonization benefits of each solution to establish the confidence owners needed to endorse the retrofit approach.

Reaching Project Approval

The owners approved the **Gas Boilers & Heat Recovery** option, based on its ability to rapidly deliver a low life cycle cost, high efficiency, and substantial emissions reductions.

The owners' quick approval demonstrated the value of considering multiple parameters to optimize outcomes. In an evolving market where investors, lenders, and codes lean toward low-carbon buildings, decarbonization is critical to long-term asset viability. Yet, cost remains a significant consideration. For example — a previous retrofit the owners considered had the potential to reduce GHG emissions by 75 percent, but the 300 percent incremental capital cost increase made the project impractical.



"The Gas Boiler and Heat Recovery solution was the smart choice for this project. Not only will it deliver significant and immediate benefits in efficiency and carbon reduction with lower cost, but it sets the building up for further carbon reductions in the future."

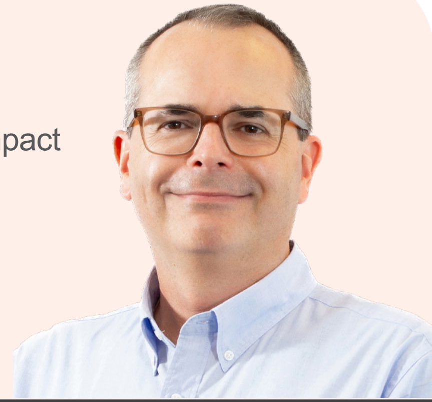
— Nada Sutic
VP of Sustainability, Innovation and National Programs at Epic.

The selected partial fuel switching solution delivered the right balance: it would achieve a significant **56 percent reduction in GHG emissions at only a 50 percent incremental capital cost over like-for-similar replacement.** Efficiency and grid citizenship were additional benefits. The new system captures waste heat to reduce energy use and operating costs, typically using electricity for base load heating & cooling when grid power is plentiful, and using natural gas for peak heating beyond that. The system is capable of switching to fully natural gas during infrequent periods of grid electricity scarcity if future utility constraints.

These project benefits establish a business case that justify upfront costs. One key metric supporting the business case was an anticipated **5.4-year payback on the incremental cost of the project compared to a like-for-like replacement**.

"If high incremental cost jeopardizes project approval for a fully decarbonized retrofit, a first project involving meaningful decarbonization and a more accessible cost can quickly deliver impact and avoid locking in decades of carbon emissions from a "like-for-similar" replacement."

— Jason Manikel
Energy & Decarbonization Consultant
Purpose Building



33 Bloor during building system updates

Building Systems Addressed:

Space Heating	Supplemental Cooling
Existing: Two large, atmospheric (non-condensing) natural gas boilers (5,000 MBH input each)	**Existing:** Supplemental cooling loop, connected to a cooling tower via a heat-exchanger.
Proposed: Two 50-ton heat-recovery chillers (connected to supplemental cooling system), and three 2,000 MBH (input) condensing gas boilers.	**Proposed:** Same (new heat-recovery chillers are used for heating)

Moving Into Design

With a clear understanding of the owner's vision and the retrofit solution selected, the project moved into implementation.

While existing equipment at 33 Bloor was still functioning, its end of life was looming. Instead of attempting a traditional and time-intensive design process, Epic took a more streamlined approach, securing a Progressive Design-Build agreement with Kolostat, and engaging Purpose as the owner's representative.

A benefit of this accelerated process was the way that decision milestones were incorporated, allowing the owner to provide direction to either proceed as planned, pause to explore alternatives, or proceed along a new path. As a result, the retrofit progressed rapidly, and the project team was always ready to adjust the plan should an aging boiler fail and require urgent replacement. The owner was never prematurely locked in.

In a **Progressive Design-Build (PDB) approach**, the owner engages the Design-Builder early in the initial design development. In a traditional Design-Build approach the Design-Builder is engaged after the design is developed. The PDB approach can deliver on a tight project timeline while enabling effective collaboration, cost confidence and risk management.

The importance of Timing and Experience

As it turned out, this retrofit's timing was fortuitous. 33 Bloor's boilers began to fail just as new equipment was being installed, revealing a key lesson – plan early and have a roadmap in place before – not after – equipment starts to fail.

Involving the experienced facilities team early injected almost 35 years of operational insights and asset-specific site knowledge into the retrofit plan and process. The combination of timing and experience increased confidence, accelerated decision-making, and reduced risk of operational issues.

As a result, 33 Bloor was able to accommodate a pressing systems refurbishment with a decarbonized solution delivered in a timely manner and for a reasonable investment.

At the time of writing, 33 Bloor's deep retrofit construction has been completed, and the system is undergoing commissioning.

Estimated Retrofit Impact

Capital cost	Utility cost savings	Payback period	Energy use intensity	Greenhouse gas emissions intensity
50%	**10%**	**5.4-year**	**27%**	**56%**
above like-for-similar baseline	whole-building savings	Simple payback on incremental cost	whole-building savings	carbon emission reductions

Lessons Learned

The retrofit of 33 Bloor helped increase institutional expertise that can be applied to future projects. Among the key lessons learned were:

1 **Don't wait for systems to fail:**

Urgent equipment replacement is a common catalyst for deep retrofits but waiting for equipment to fail without a plan risks locking in decades more of carbon-intensive solutions. Minimize disruptions and make solutions more cost-effective by having a plan at the ready before equipment nears its end-of-life.

2 **Bring together project team and process:**

Combining resourceful builders with thoughtful engineers, experienced operators and informed owners, supports good technical solutions and budget confidence. To harness collaboration, follow a process where the project team is empowered to commit to a vision, explore options, manage uncertainty, and work towards clear decision milestones.

3 **Progress comes over time:**

Deep retrofits can be completed as multiple projects spread over time delivering a compelling business case with significant impact.

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