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Business Case for Decarbonization



Utility cost savings, avoided carbon tax, and capital project planning can provide positive NPV



Tenant attraction and retention



Revitalization and repositioning can create value from benefits beyond energy and carbon



Futureproofing, long-term value, and reduced transition risk

<https://www.mckinsey.com/industries/real-estate/our-insights/climate-risk-and-the-opportunity-for-real-estate>

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Attracting and Retaining Top-Notch Tenants

Public Sector leading the zero-carbon transition

Committed to Net-Zero by 2050, and 37% reduction in GHG emissions in the buildings sector by 2030



Private sector and large institutional investors aligning



SCIENCE BASED TARGETS

1,493 Net-Zero Commitments Globally

AVIVA

CIBC



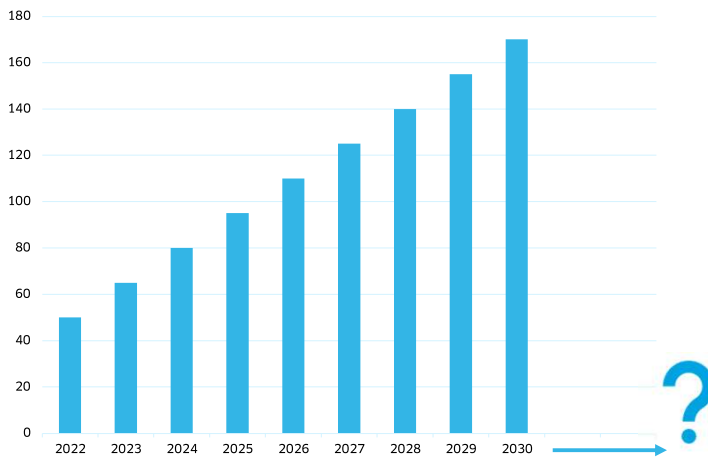
HSBC

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Mitigating Carbon Pricing Risk

Minimum National Carbon Pollution Price (\$/tonne)



Cost of carbon will continue to increase for Canada to meet its climate change goals

Source: [Update to the Pan-Canadian Approach to Carbon Pollution Pricing 2023-2030 - Canada.ca](https://www.canada.ca/en/gov/department-of-civil-service/2023/02/update-to-the-pan-canadian-approach-to-carbon-pollution-pricing-2023-2030)

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Mitigating Policy Risk



**The City of Toronto's
Net Zero Existing
Buildings Strategy**

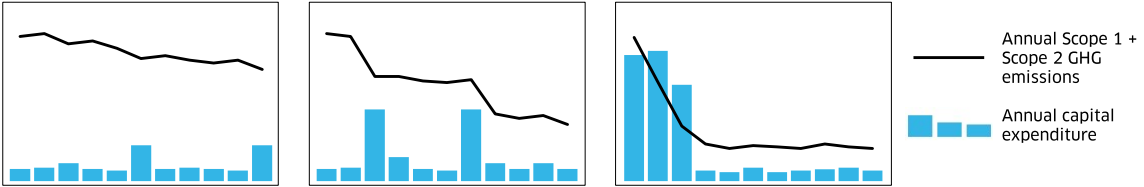
Final Report
March 2021

Major municipalities across Canada are planning to implement emissions limits for existing buildings

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Approaches to Asset Decarbonization



Business as Usual / Baseline

- Lifecycle replacement and opportunistic upgrades
- As-needed / quick-payback projects
- Very unlikely to get to zero

Zero Carbon over Time (ZCoT)

- Requires long term planning
- Gradual investment, gradual results
- Small/large projects
- Pathway to zero emissions

Deep Green Retrofit and Repositioning

- Requires deep technical and financial analysis
- High investment, quick results
- One large implementation
- Instant impact

— Annual Scope 1 + Scope 2 GHG emissions

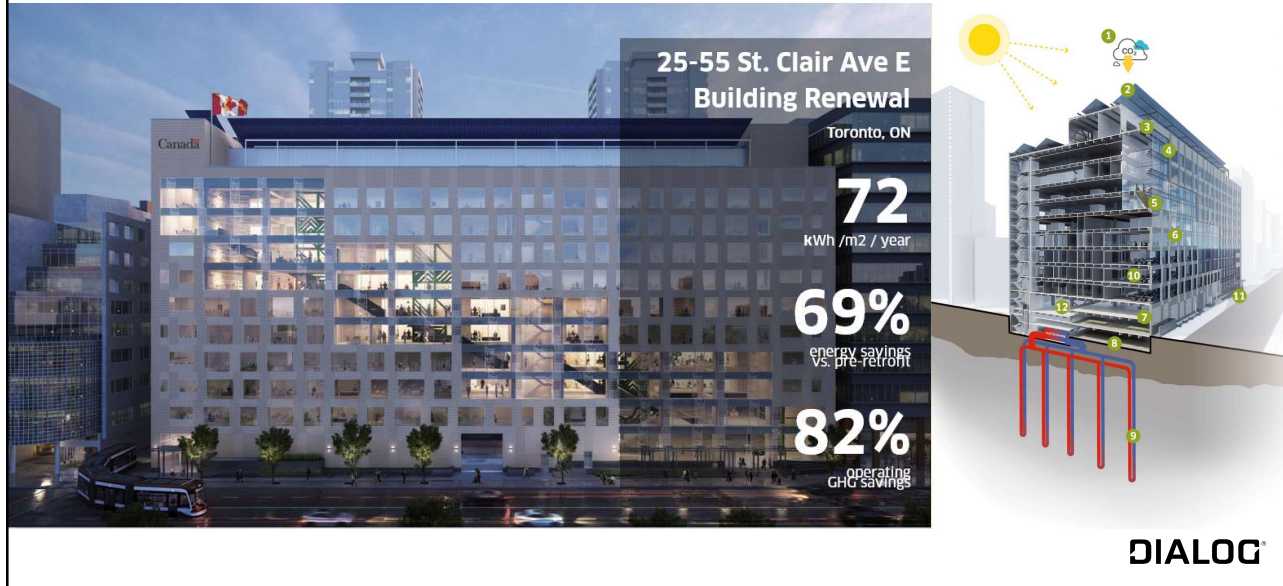
■ Annual capital expenditure

creates opportunities for
+ placemaking and deeper community impact

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Public Sector Precedents

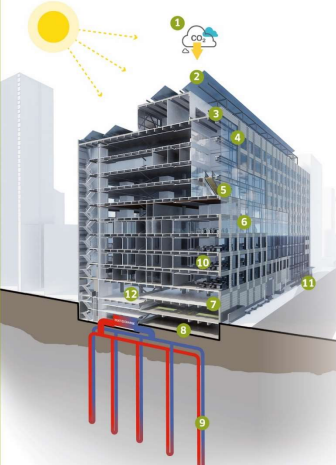


25-55 St. Clair Ave E Building Renewal
Toronto, ON

72 kWh / m² / year

69% energy savings vs. pre-retrofit

82% operating GHG savings



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HSBC Place - Deep Energy Retrofit (2017)

- Approx. 318,000 sq. ft., 18-storey commercial office building
- Located in downtown Edmonton, AB
- Originally constructed in 1980



Well-located building with long service life



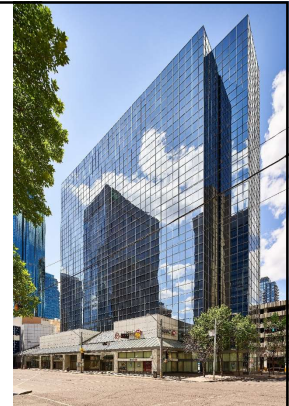
Requires major capital expenditure



Tenant or occupant turnover is imminent

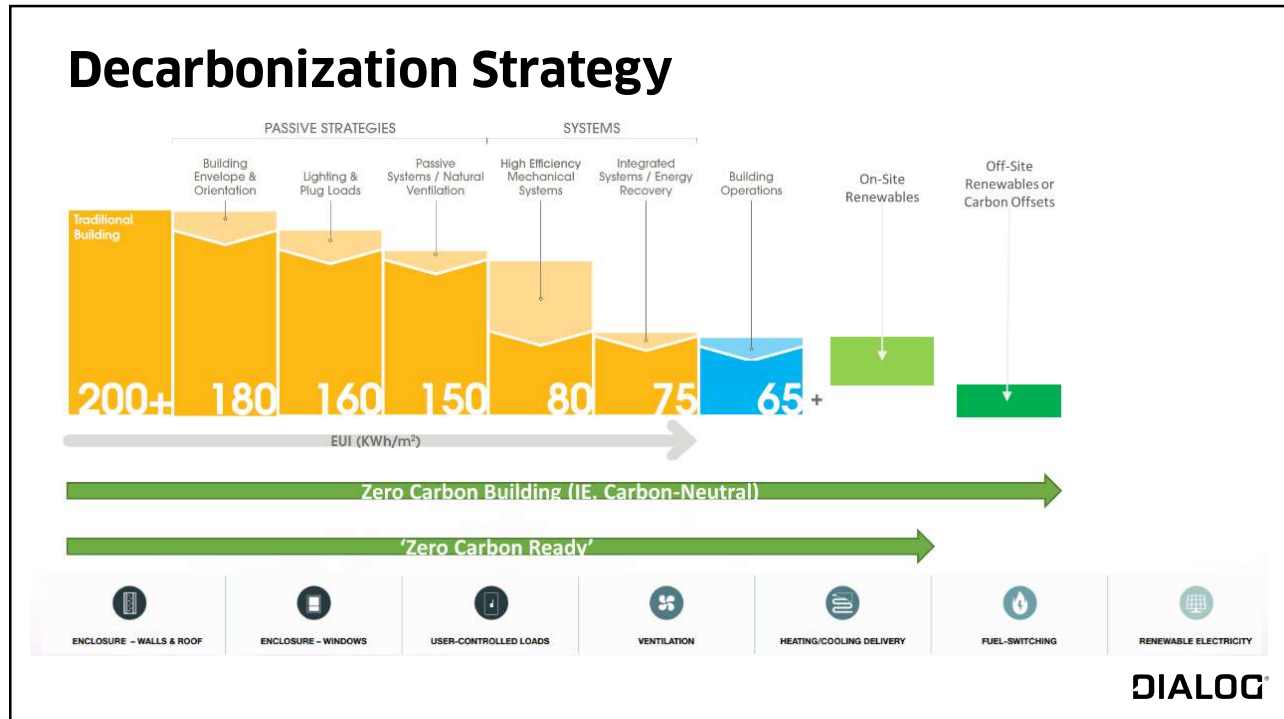


Potential for revitalization and repositioning



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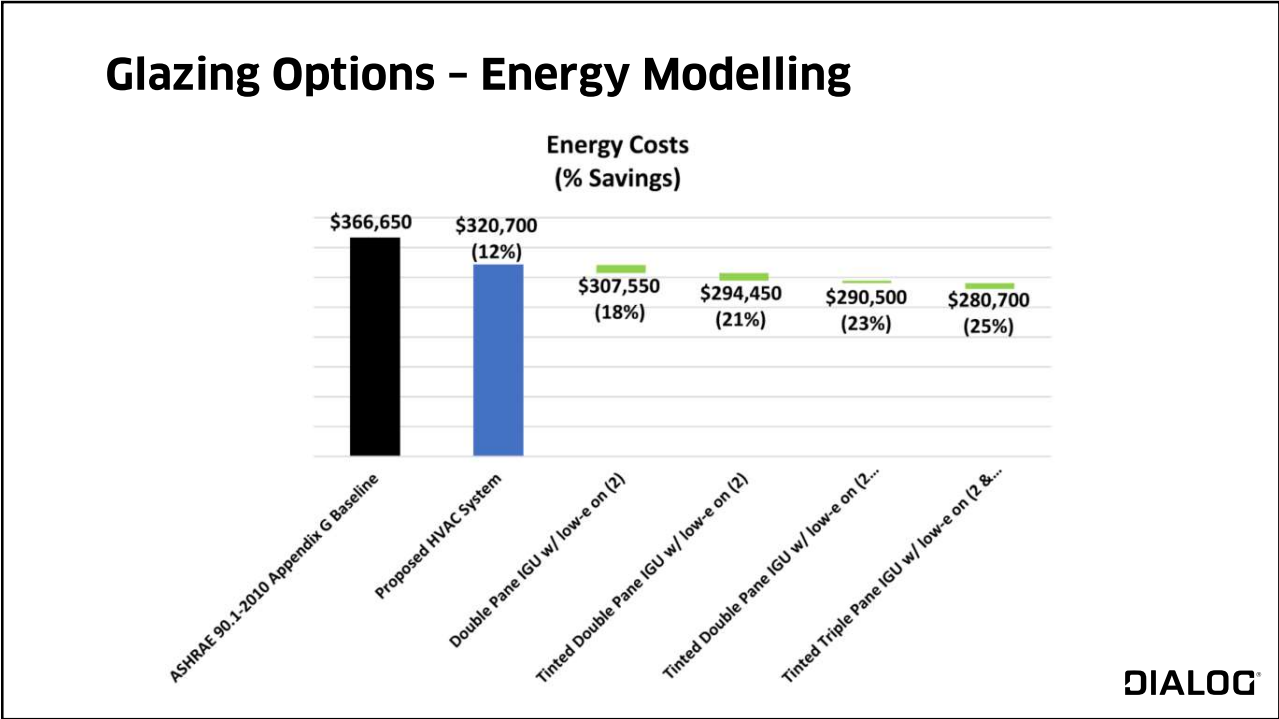
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Building Envelope - Before

- Double-pane insulated glass in curtain wall with aluminum frames
- 300 reported window seal failures indicates end of life
- Operations report systemic leaks in the curtain wall and condensation in the winter
- Thermal performance very poor

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Building Envelope - After

PRESSURE PLATE AND CAP
Triple Glazed + 2x Low E + Argon

U – Value 1.8 – 1.4 W/m2/K

- New lower window sill
- New 9'-0" window head
- Window shades to integrate into ceiling
- Extended options for exterior design

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Mechanical - Before

- Heating: 3 x natural gas-fired boilers, 36 years old, ~80% efficient
- Cooling: 2 x centrifugal chillers, roof-mounted cooling towers
- 2-zone VAV supply air from penthouse fans, split north/south, no heat recovery
- Perimeter radiation



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Mechanical Upgrades



New Fan Coil System

- Increased number of zones
- All services located in the ceiling (no baseboards)



Dedicated outdoor air system (DOAS) equipped with enthalpy wheel heat recovery and DCV controls



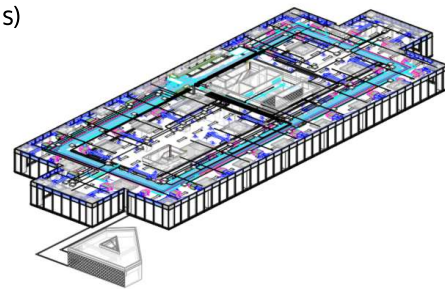
Variable Primary Pumping



Heating: Condensing boilers with low temperature heating design



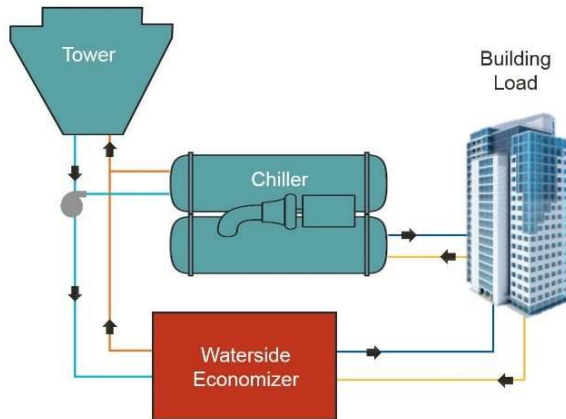
Cooling: High-efficiency magnetic bearing chillers



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Data Centre Free Cooling



Three modes of cooling:

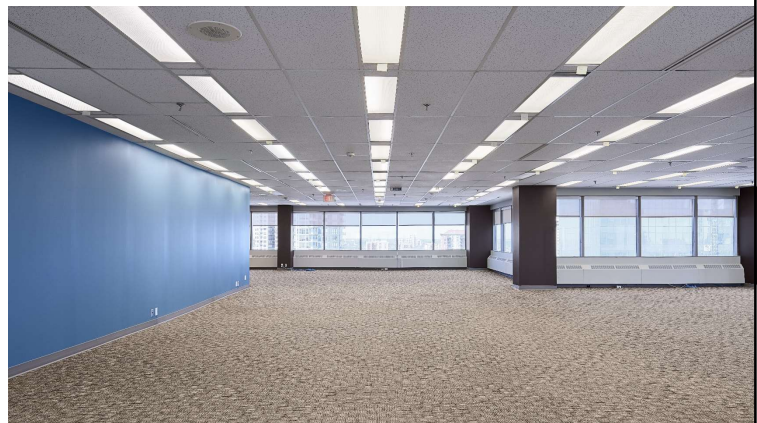
1. Mechanical cooling (WBT > 10C) - all cooling by chillers only
2. Hybrid cooling (0 < WBT < 10C) - cooling provided by chillers with waterside economizer as first stage
3. Free cooling mode (WBT < 0C) - cooling provided by evaporative cooling only

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Lighting - Before

- 347V fluorescent lighting
- ON/OFF relay lighting controls
- No centralized controls



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Lighting - After

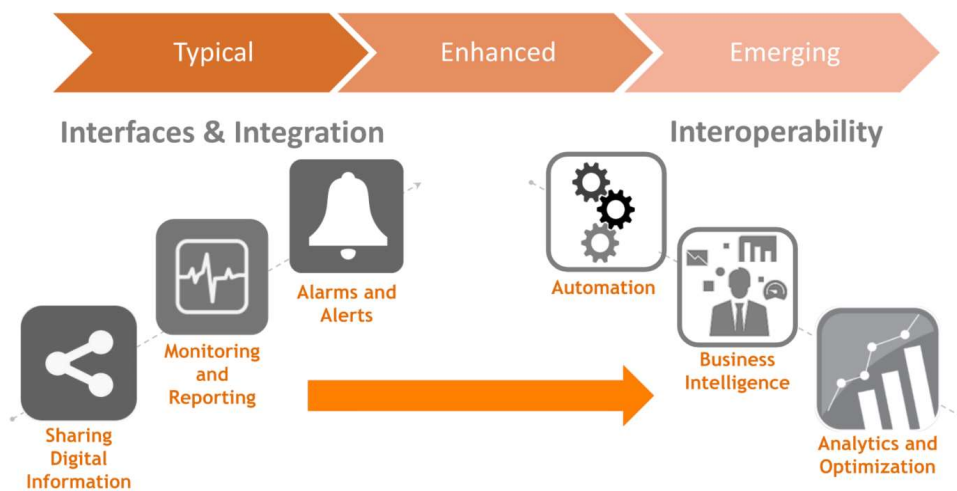
- All LED luminaires
- Individual control via digitally addressable lighting interface (DALI)
- Daylight harvesting and occupancy-based controls
- New equipment extends electrical distribution life by 30-40 years



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Smart Building Systems



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Smart Building Systems

Intelligent Integrated Systems

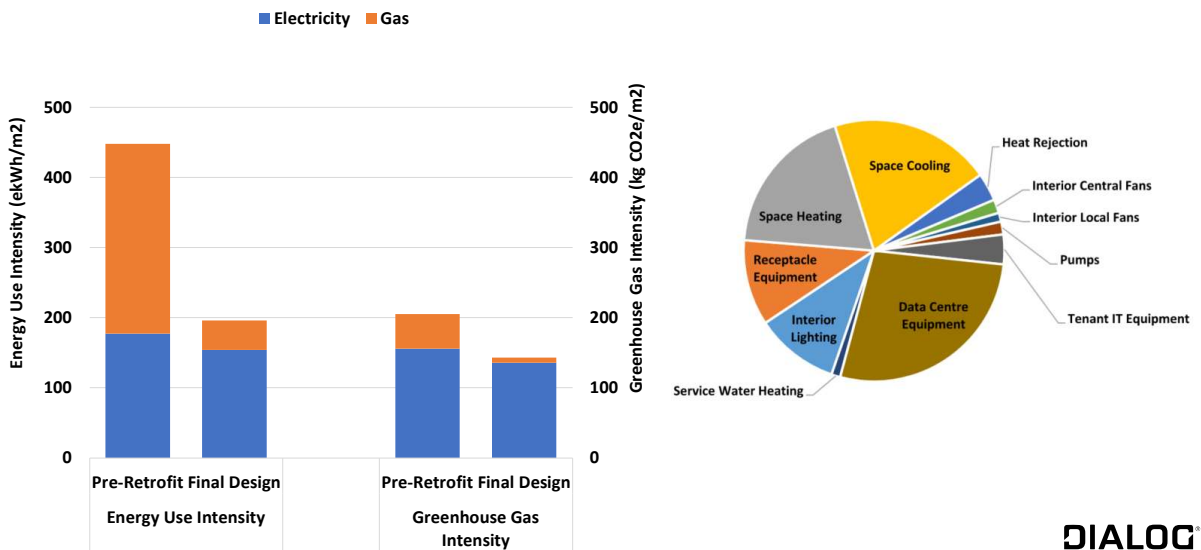
- Building operator portal - interface and control
- Tenant facilities portal - display and limited control
- Occupant portal – display and very limited control



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Energy Model Results



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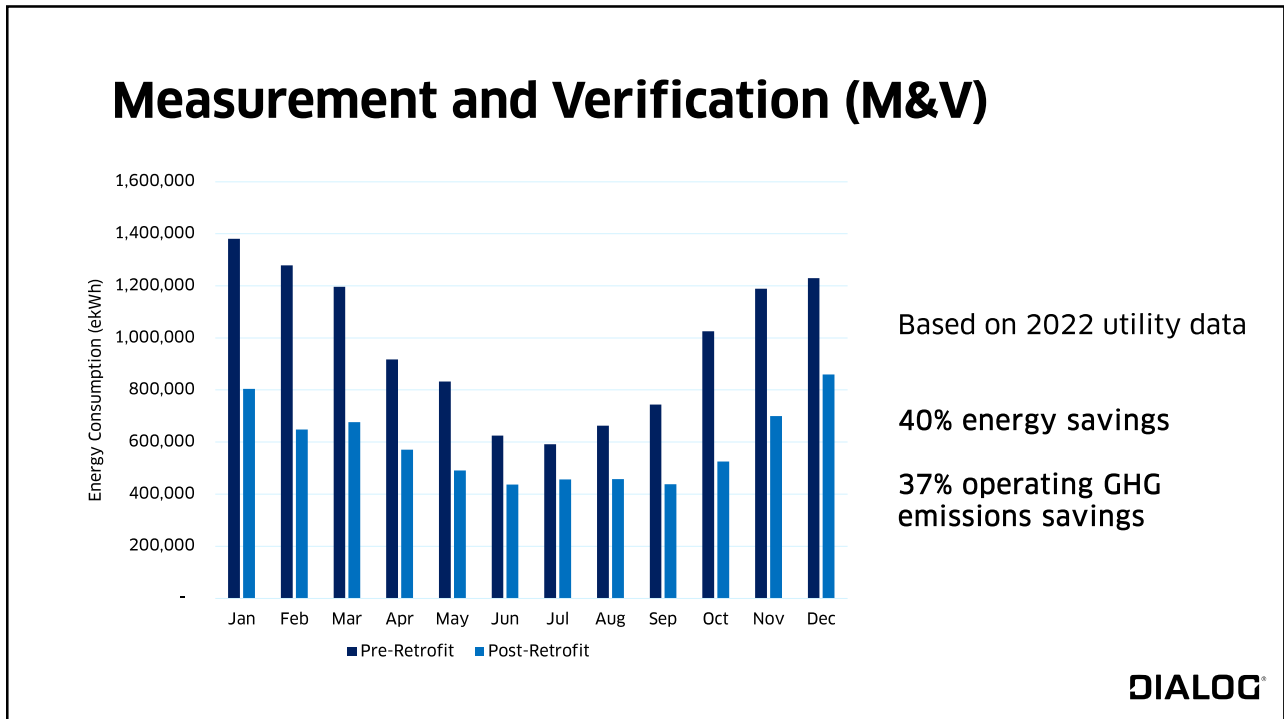
**HSBC Place
Repositioning**
Edmonton, AB

196
kWh /m2 / year

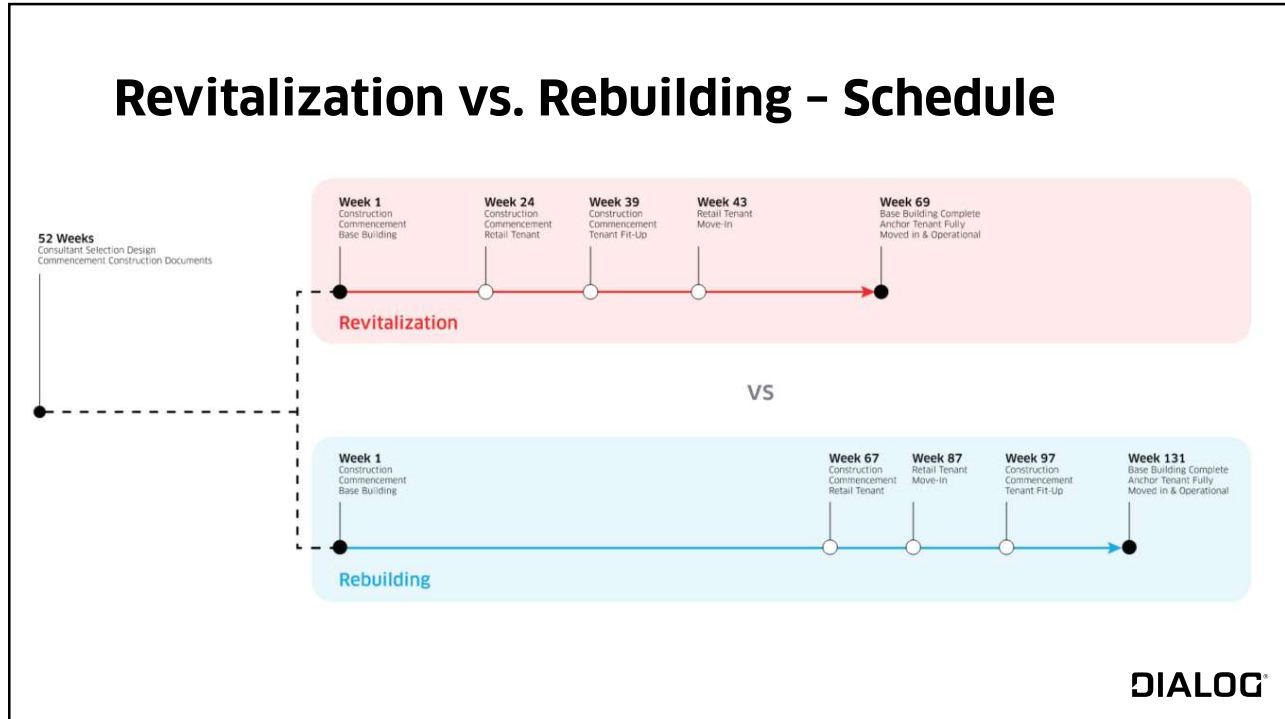
56%
anticipated
energy savings

31%
operating
GHG savings

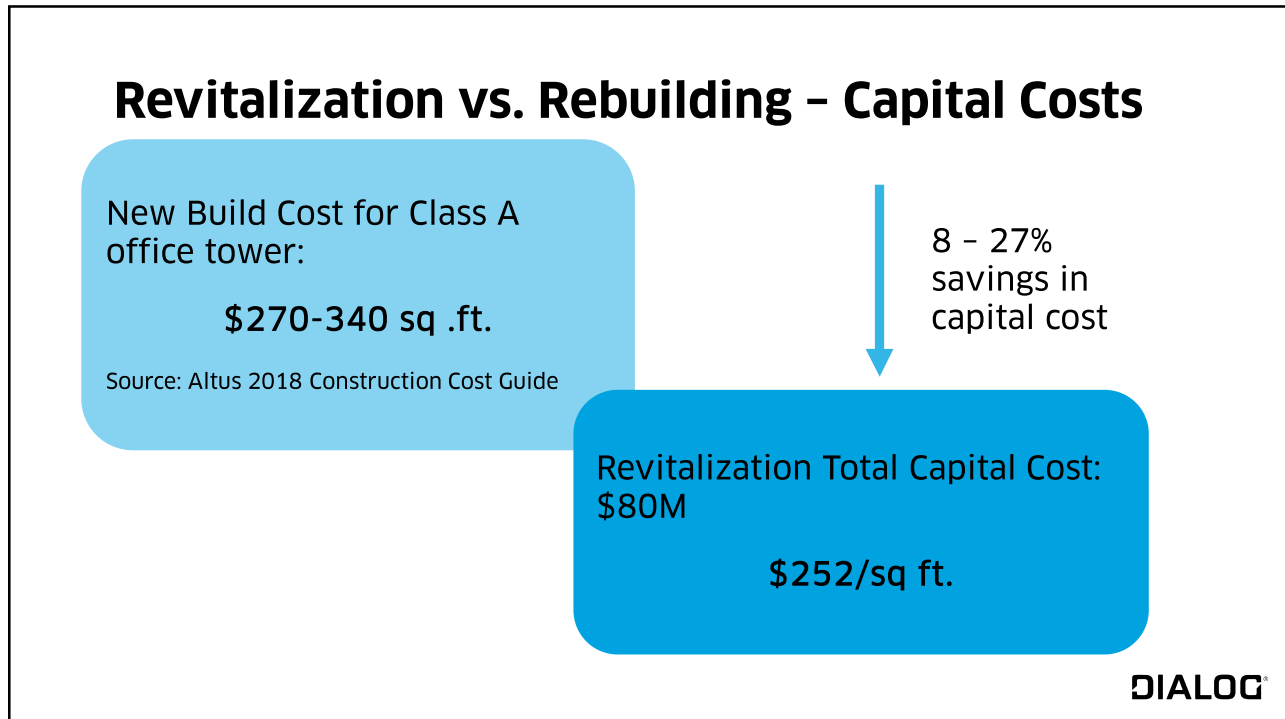
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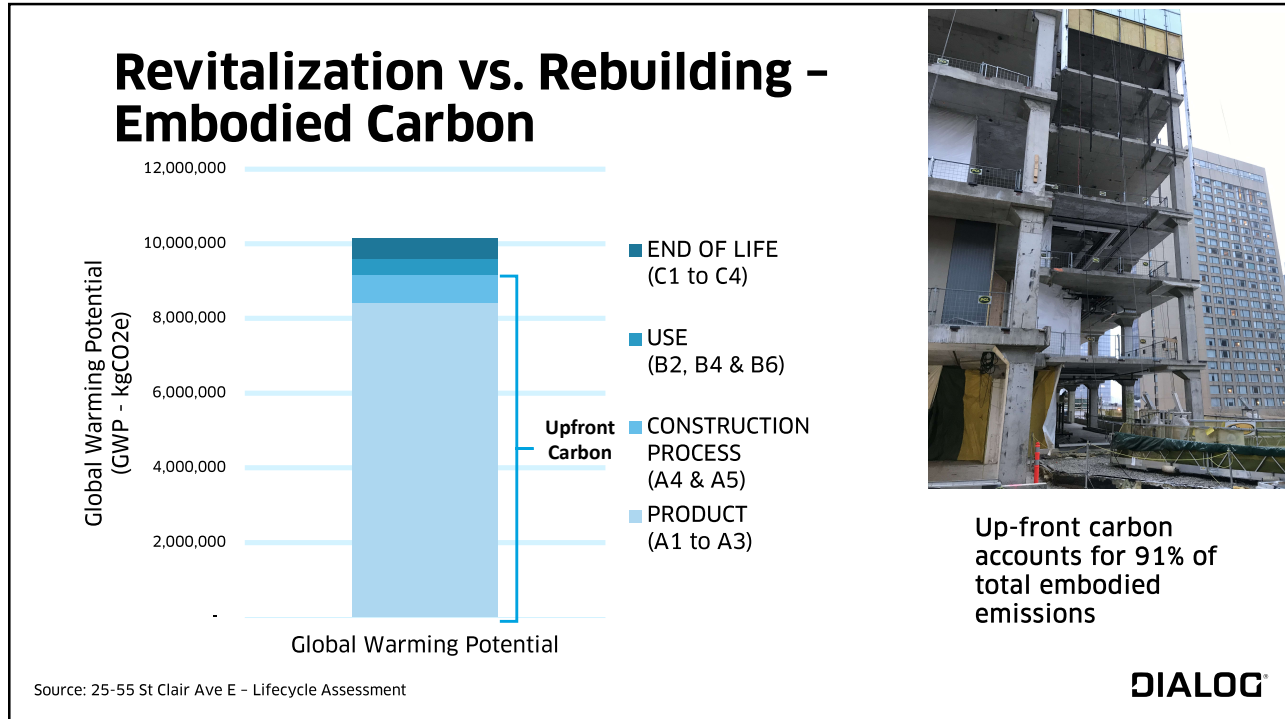
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Up-front carbon accounts for 91% of total embodied emissions

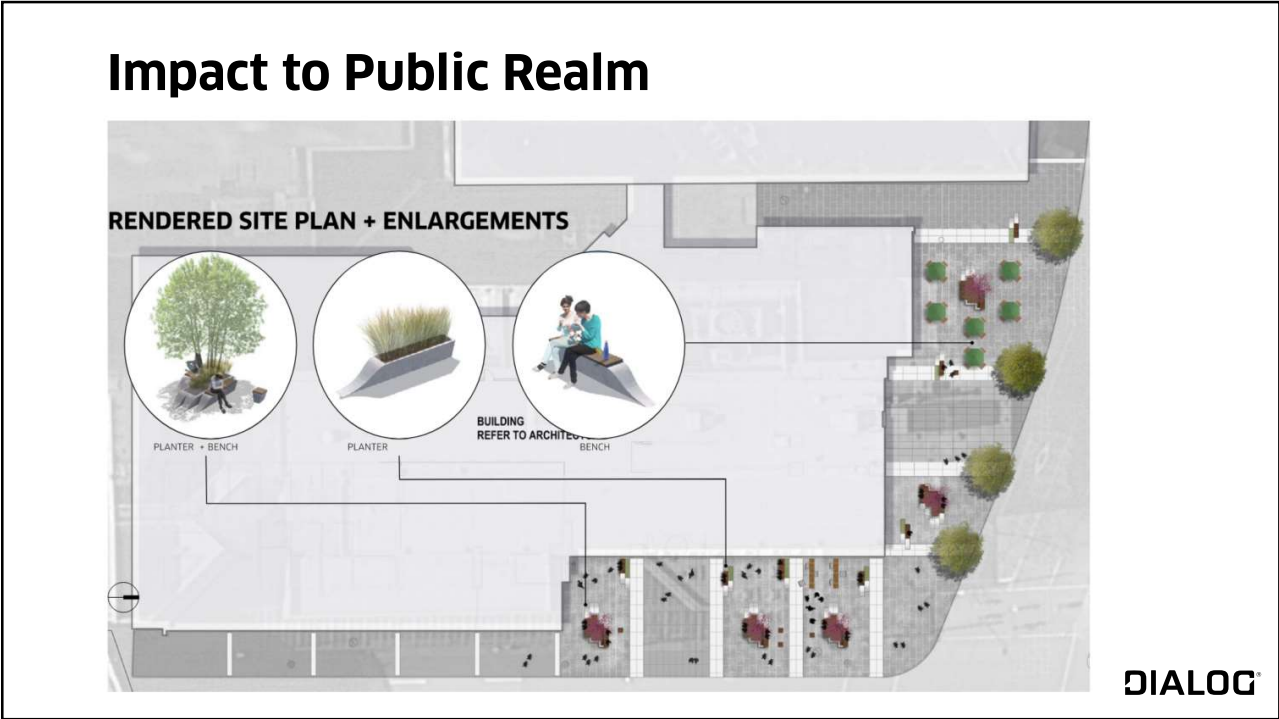
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Health and Wellness

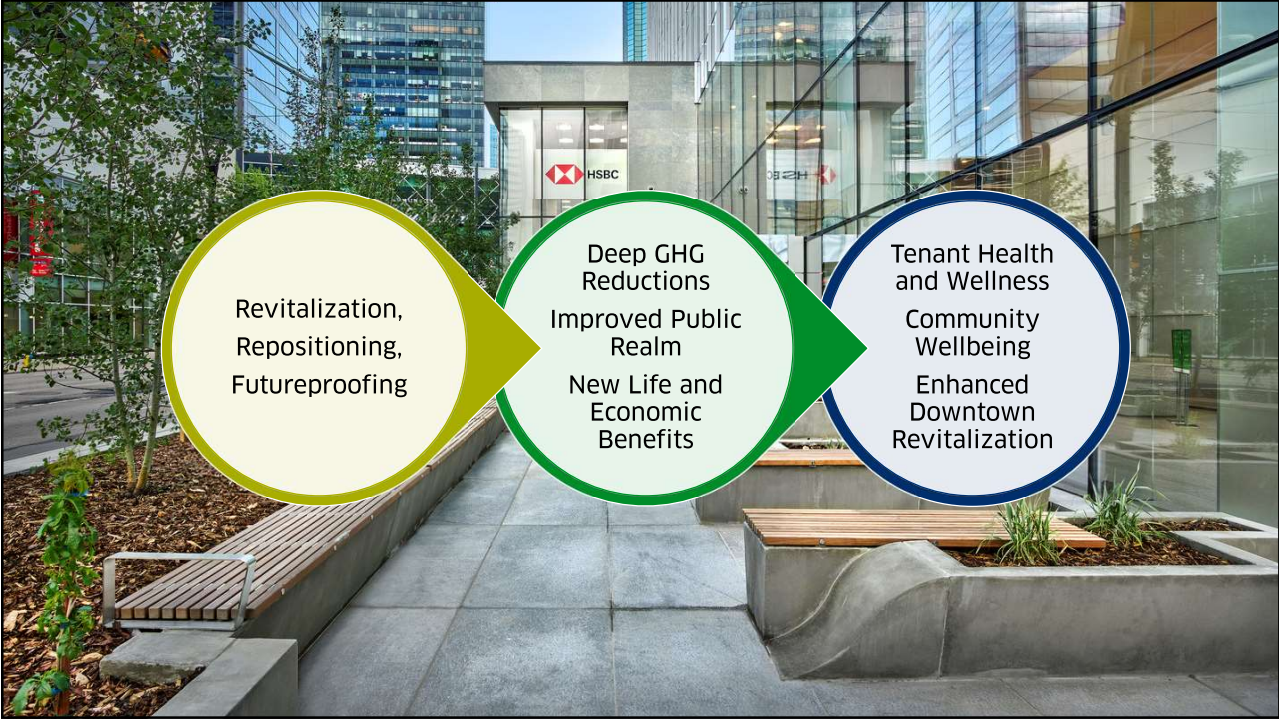
- LEED Gold Certified
- WELL Gold Certified
- WiredScore Platinum
- 100 bicycle storage spaces with showers, lockers, repair station
- 13 electric vehicle chargers
- Full-service fitness and wellness centre

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Thank You!

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