

# WE BUILD FOR THE FUTURE.

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## DANIELS' DECARBONIZATION ROADMAP

February 2023

**Daniels**  
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## Land Acknowledgement

Our work toward both truth and reconciliation continues. We are committed to educating ourselves and understanding the truth about our shared history with Indigenous Peoples.

In keeping with our commitment to reconciliation, The Daniels Corporation (Daniels) acknowledges the inherent relationship Indigenous Peoples have with the lands, air and water, all as part of their sacred relationship with Mother Earth. We acknowledge these are treaty lands and part of the traditional territory of several Indigenous Nations.

As we work in and build communities across the Greater Toronto Area (GTA), we are committed to listening to and learning from Indigenous Peoples, drawing wisdom from generations of living in harmony with the land and natural environment.

For thousands of years, the GTA has been the traditional gathering place shared by many nations, including the treaty lands of the Mississaugas of the Credit, and the shared territory of the Neutrals, the Anishinabek, the Chippewa, the Haudenosaunee and the Wendat Peoples.

The GTA is home to many diverse First Nations, Inuit and Métis Peoples and we are grateful for their contributions and the opportunity to work and live with them in this territory we all call home.



# Introducing our Decarbonization Roadmap

Climate change is here, and it presents an existential crisis for our society. Human-caused climate change is already contributing to many weather and climate extremes across the globe, causing immeasurable harm to people and ecosystems.

Our goal has always been to lead by example, using our business as a positive force, enriching our communities by valuing people, partnerships and the planet. Throughout our history we've taken opportunities to push beyond business-as-usual performance, whether it was constructing the first sub-division in Canada to the R-2000 standard, building the largest ENERGY STAR® townhome community in North America, or building to the LEED Gold standard in the initial phases of the Regent Park revitalization.

At Daniels, we have both an opportunity and a responsibility to take action to reduce our carbon footprint and leave a legacy for future generations. We believe that low-carbon design should be a core aspect of real estate, accessible across a full spectrum of housing. Our goal is to leverage our size and scale to challenge the assumption of a sustainability premium. No matter what the future holds, low-carbon communities provide resilient homes that insulate against future climate change risk.

Daniels' Decarbonization Roadmap was developed as a direct response to the climate emergency and to challenge ourselves and the industry at large to move as quickly as possible to decarbonize new real estate development. As leaders, we cannot wait for regulations to push us in the right direction. We must look inwards at our own business and ask ourselves how we can maximize our impact. By prioritizing decarbonization, we have simplified our approach to sustainable, resilient communities, and can focus on the strategies which will take

us closer to overcoming one of the largest challenges faced by humanity—mitigating climate change.

Our Roadmap outlines a performance-based plan for our next two development-cycles, where we are implementing a data-driven approach to reducing the carbon impact of our new communities with a set of stringent limits for carbon emissions of our future development pipelines. We have outlined a series of technological and process-based strategies to ensure that the commitments and targets laid out in our Roadmap are ambitious but achievable.

We recognize that the sustainable building industry is rapidly evolving, and as we move forward with executing on this Roadmap, we acknowledge this plan may have to adapt and evolve along the way. We will work collaboratively to overcome any challenges that we will encounter and share our progress in a clear, transparent, and accessible way, with our mission being to lead the decarbonization of an entire industry.



*Jake Cohen*  
CHIEF OPERATING OFFICER



*Adam Molson*  
VICE PRESIDENT, RENTAL COMMUNITIES & SUSTAINABILITY



## Our Roadmap

All new Daniels communities starting development in **2026** will target **Near-Zero Whole Life Carbon.**



**GENERATION 1**  
COMMITMENT

**2021-2025**

LOW-CARBON  
**1000**  
kg CO<sub>2</sub>/m<sup>2</sup>  
Whole Life Carbon Intensity

**40%**  
Reduction from Daniels'  
Emissions Baseline

**GENERATION 2**  
TARGET

**2026-2030**

NEAR-ZERO  
**600**  
kg CO<sub>2</sub>/m<sup>2</sup>  
Whole Life Carbon Intensity

**64%**  
Reduction from Daniels'  
Emissions Baseline

# OUR METRICS & METHODS

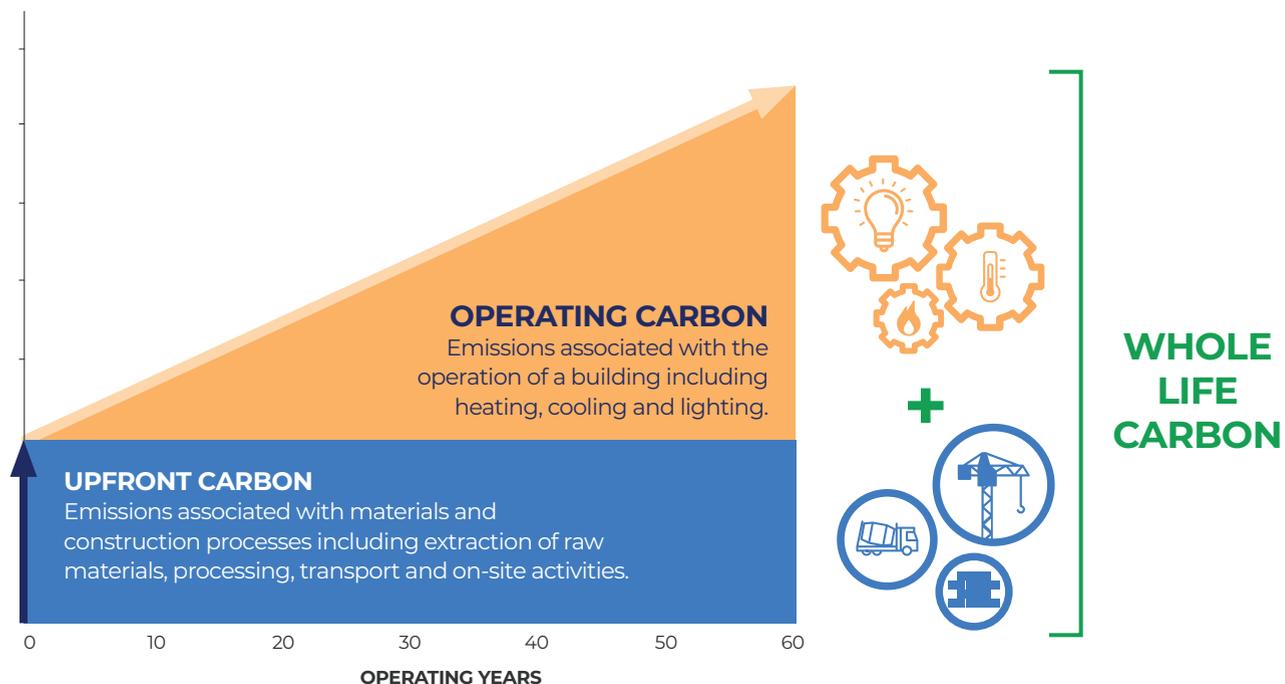
As one of Canada's preeminent builder and developers, our greatest opportunity for impact is in the homes we build, as the decisions made by our design, development, and construction teams sets the course of emissions from our communities over their entire lifespan.

The biggest step we can take as an organization is to build for the future, with environmental sustainability engrained into the entire design of our new communities.

## Carbon in New Construction

When we assess the carbon impact of our new communities, we must account for both the upfront carbon emissions (also known as embodied carbon\*) and operating carbon emissions, modelled over the lifespan of the community. Whole Life Carbon intensity combines these two sources of emissions, and this metric is how we measure and report on our carbon impact. Our emissions are measured and reported using kilograms of carbon dioxide per meter squared ( $\text{kg CO}_2/\text{m}^2$ ) as intensity based values allow us to compare emissions independent of project size.

Our reporting framework is unique from many of our industry partners and peers, as with new construction we are reporting on projections based on models, rather than cataloguing emissions from previous operating periods, such as utility bills.



\*In industry the terms “embodied carbon” and “upfront carbon” are interchangeable, but we are intentionally using “upfront carbon”, as it is more digestible and easier to conceptualize when engaging with stakeholders with varying levels of baseline knowledge.

## Quantifying Our Emissions

We use Whole Life Carbon intensity as our key metric for reporting emissions. The cumulative emissions of our projects are calculated using the following methodologies to measure and report upfront and operating carbon.

### OPERATING CARBON

Quantifying the projected operating emissions of new construction is done through an energy model. We have adopted the Toronto Green Standard (TGS) version 3 methodology for energy modelling across our portfolio, and this is considered industry best-practice in our region today\*\*. Greenhouse Gas Intensity (GHGI) is the annualized metric for reporting operating carbon performance in kilograms of carbon dioxide emissions per square meter, per year ( $\text{kg CO}_2/\text{m}^2\cdot\text{year}$ ). When we convert GHGI to Whole Life Operating Carbon, we multiply the value by 60 years, to align with the standardized assumption for upfront carbon discussed below.

### UPFRONT CARBON

Quantifying upfront emissions is done with a Whole Building Lifecycle Assessment (WB-LCA), which calculates the sum of the emissions from all of the materials and construction activities over the lifespan of the building.

We have aligned to the CaGBC’s Zero Carbon Building (ZCB) Design Standard methodology which includes lifecycle stages of components from raw materials to final disposal (cradle to grave), with a standardized 60-year lifespan. The current ZCB methodology includes structure, foundation, and enclosure.

We are committed to continuous collaboration with industry partners and peers to share our knowledge to aid in improving industry benchmarks and policy for upfront carbon. As the industry matures, we will refine our approach as new information and technologies become available.

\*\*TGS version 3 more accurately depicts real-world performance than Ontario Building Code SB-10 methodology due to the consideration of thermal bridging losses. There are no significant changes in modelling methodology between TGS version 3 and TGS version 4 (effective for initial Site Plan Applications in Toronto submitted on or after May 1st, 2022).

# OUR BASELINE

Before we can determine where we want to go on our decarbonization journey, we must establish a baseline level of performance. This enables us to compare progress back to a specific moment in time and accurately report using consistent methodologies.

Our emissions baseline indicates the impact of a typical Daniels development prior to the implementation of our Decarbonization Roadmap.

# Establishing Our Baseline

Prior to measuring our baseline, we did not have a standard approach for evaluating the emissions of our projects. With building codes updating every few years, and many municipalities having their own unique requirements, we could not compare our projects in an apples-to-apples fashion. Our baseline study set out to address this challenge while providing a foundation for all that followed.

## 1. SELECTION OF REPRESENTATIVE PROJECTS

Five multi-residential high-rise projects were selected from the project pipeline, which started the development process between 2018 and 2020. Projects were selected to represent the diversity of the Daniels high-rise portfolio, including:

- Two projects targeting LEED certification
- One targeting TGS Version 3 Tier 2
- Three mixed use developments (retail at grade or within podium)
- Two with rental tenures
- Municipalities of Mississauga, Brampton, Toronto, and Vaughan

## 2. DATA-GATHERING AND RENORMALIZATION

To establish an operating carbon emissions baseline, we renormalized the energy models for the projects to the Toronto Green Standard version 3 methodology to ensure that the results were comparable within the baseline sample and on a go forward basis against all new projects developed under the Roadmap.

To establish an upfront emissions baseline, three of the five projects had a Lifecycle Assessment (LCA) performed to report on the upfront carbon emissions using the CaGBC's ZCB Design Standard methodology. All sites have the same, or very similar, materiality and structural makeup and therefore reported similar upfront carbon intensities. Therefore, the data from three projects was deemed sufficient for voluntary benchmarking and target-setting purposes.

We developed internal reporting tools that lined up the drivers of emissions intensity which led to the identification of inconsistencies between inputs informing the energy modelling and LCA processes, even within the standardized methodologies. We were then able to reduce the error in our models and establish best practices by further specifying parameters such as weather files, enclosure components, and specific Environmental Product Declarations (EPDs).

## 3. DETERMINING OUR BASELINE IMPACT

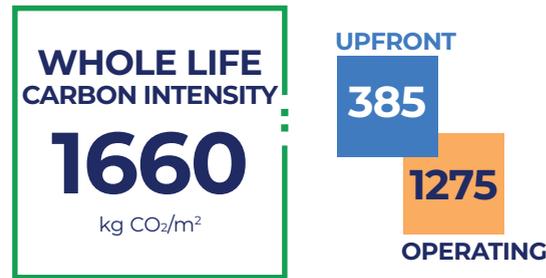
The results were analyzed to determine the impact of a typical 2018-2020 Daniels development. By establishing this baseline, we were able to identify the key design drivers that influence carbon emissions and use this information as the basis of creating a unique decarbonization strategy.



# Disclosing Our Emissions

We are implementing the voluntary disclosure of emissions performance through a unique carbon label. The purpose of this label is to enhance our accountability to our Roadmap commitments and targets, while engaging our stakeholders throughout the process. Our carbon label breaks down Whole Life Carbon to indicate the major drivers of carbon emissions and identify priority areas for improvement. We will be publishing a carbon label for each new community coming to market to help our homeowners and tenants understand the carbon impact of the homes we are building.

## Daniels Emissions Baseline



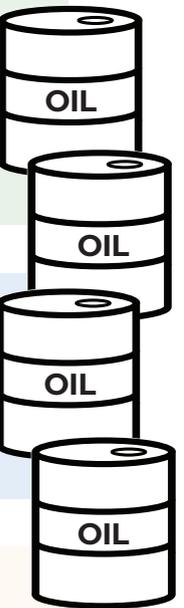
### CARBON IMPACT BREAKDOWN kg CO<sub>2</sub>/m<sup>2</sup>

| UPFRONT     |  | 385  |
|-------------|--|------|
| ■ Concrete  |  | 221  |
| ■ Rebar     |  | 93   |
| ■ Enclosure |  | 54   |
| ■ Other     |  | 17   |
| OPERATING   |  | 1275 |
| ■ Heating   |  | 687  |
| ■ Cooling   |  | 28   |
| ■ Hot Water |  | 320  |
| ■ Other     |  | 240  |

#### WHOLE LIFE CARBON INTENSITY

The total carbon footprint of a building, displayed on a floor-area basis. This combines the upfront and operating carbon over the lifespan of the building.

- Our baseline carbon intensity of **1660 kg CO<sub>2</sub>/m<sup>2</sup>** is equivalent to stacking almost **4 barrels of crude oil** on **each square meter of floor space** in our communities. This is our starting point, and why we need to drastically decarbonize our industry.



#### UPFRONT CARBON DRIVERS

The Lifecycle Assessment measures structure, foundation, and enclosure, which includes exterior walls, roofing, windows, insulation, and weatherproofing.

- Concrete and rebar make up 81% of the upfront carbon emissions in our baseline. Finding lower carbon structural materials is a key decarbonization tactic within our Roadmap.

#### OPERATING CARBON DRIVERS

Heating, cooling, and hot water are the primary operating loads for consideration. "Other" includes operational uses such as plug loads, lighting, fans, and pumps.

- Heating and hot water consumption are the two largest contributors to operating emissions. Most communities burn natural gas for these uses, which has a high emissions factor. Fuel switching from natural gas to electricity is a key decarbonization tactic within our Roadmap.

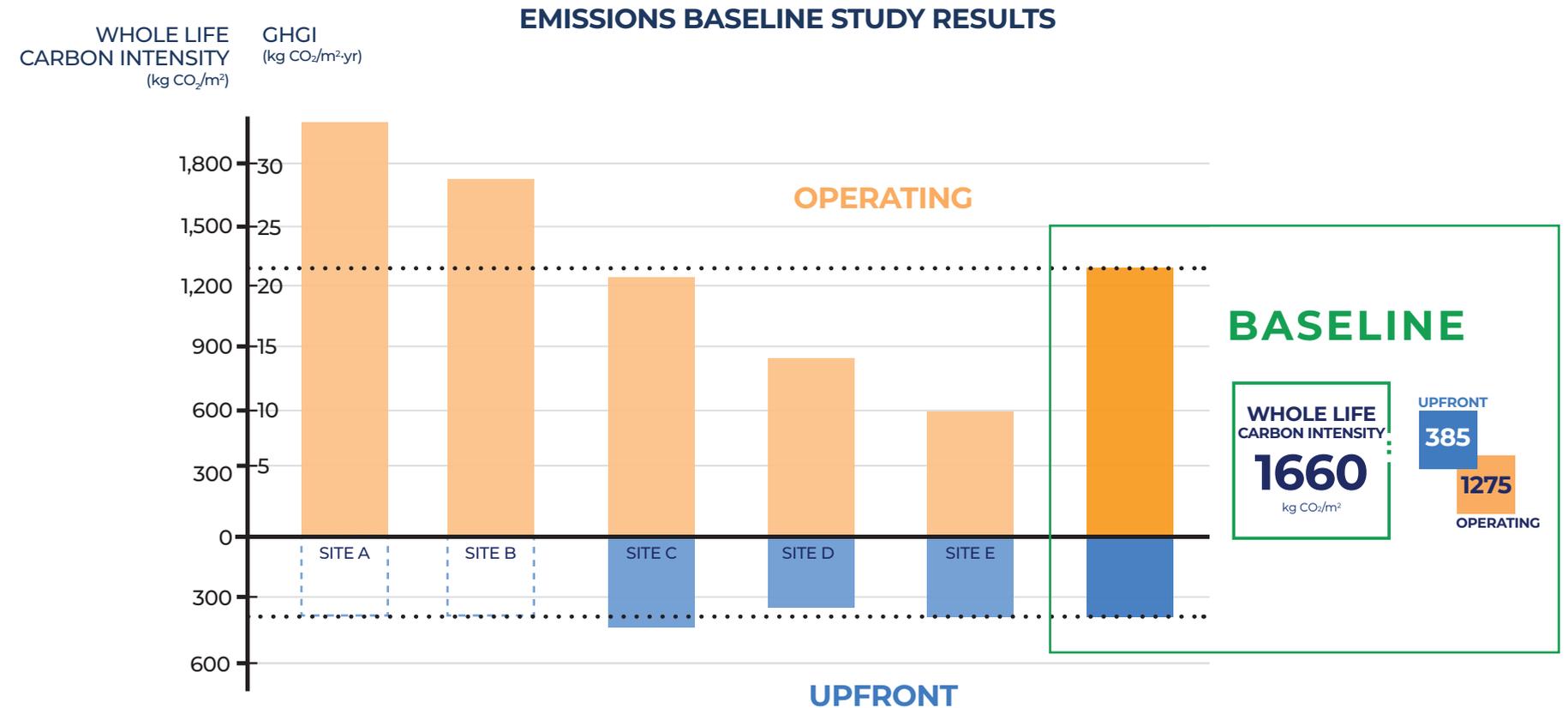
#### CARBON CONTRIBUTION INDICATOR

Visually stacks the upfront and operating emissions drivers to highlight which components contribute most to a project's carbon footprint.

- Heating, hot water and concrete are the largest contributors to whole life carbon. These areas have been identified as priority-areas to tackle first.

# Transforming Carbon Drivers into Opportunities

We took a deep dive into the individual performance of each site analyzed during our Emissions Baseline Study and identified the key carbon reduction opportunities. These became the priority focus areas for decarbonization under our Roadmap. This empowers us to be as strategic and efficient as possible in deploying our human and financial capital towards our emissions reduction efforts going forward.



In the chart above, operating and upfront emissions are compared by site, where operating carbon is shown in orange above the horizontal axis, and upfront carbon is shown in blue below the axis. The absolute value of the two bars together represents Whole Life Carbon intensity.

Operating emissions show a high level of variance due to the variety of technological solutions used to reduce carbon footprints within some of our benchmarked sites. Conversely, the quantification and optimization of upfront carbon is relatively nascent, and these sites shared very similar fundamental characteristics, with no intentional upfront carbon reduction measures implemented.

## Key Outcomes

We were able to expand on the process used in our Emissions Baseline Study to transform our internal approach to a broader application of using data to drive emissions performance across our communities and develop our Decarbonization Roadmap.

### **INTERNALIZING OUR DECARBONIZATION EFFORTS**

Moving to an internally driven sustainability program creates efficiencies by customizing our toolkit to our local market and challenges. By removing the influence of external factors, we can standardize our decarbonization toolkit and commit to higher levels of performance across our portfolio.

### **CREATING A FEEDBACK LOOP TO ACCELERATE INNOVATION**

The large variance in our sites' operating carbon emissions made us ask the question: how can we make all our communities perform as well as our best? We see the opportunity to pilot a variety of new technologies and then standardize the implementation of the most successful ones across our portfolio. Through our standardized measurement and reporting methods we can monitor and verify performance throughout the design process and ensure we achieve our objectives.

### **BUDGETING WHOLE LIFE CARBON**

Specific targets and commitments based on Whole Life Carbon empowers us to adapt to specific site constraints or a unique vision for a specific community. This also allows us to make informed decisions by performing carbon cost-benefit analyses between reducing upfront and operating emissions to identify and study complementary and contradictory whole life carbon reduction strategies.

# OUR ROADMAP

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Daniels builds inclusive and sustainable communities to create a better future for all. Our Decarbonization Roadmap has taken this to the next level by developing a multi-year strategic plan, expanding the scope of our vision to encompass our pipeline of new communities and becoming a leader in low-carbon development within the GTA.

# Near-Zero Whole Life Carbon

Within our Roadmap, we have taken a conscious and deliberate approach to the creation of a plan to reach Near-Zero Whole Life Carbon for all new construction developments. Near-Zero represents a transformational level of change within the industry and is a key milestone towards a carbon-neutral future. This is an aggressive level of carbon reduction that approaches the technological limit of decarbonization that can be achieved using strategies commercially available by 2030 for GTA-based residential high-rise construction, without the use of carbon offsets and renewable energy credits (RECs).

Near-Zero Whole Life Carbon is defined as 600 kg CO<sub>2</sub>/m<sup>2</sup>, which represents a 64% decrease in the Whole Life Carbon intensity of our new communities from our Emissions Baseline. Putting this into context, on an annual basis we anticipate this will require operating intensities of 5 kg CO<sub>2</sub>/m<sup>2</sup>-year, which is equivalent to Toronto Green Standard version 3, tier 4 requirements plus a 22% reduction in upfront carbon emissions.

## Near-Zero vs. Net Zero?

Both upfront and operating emissions have different hurdles to reach Net-Zero carbon. Today, many buildings that pursue Net-Zero purchase carbon offsets, while only accounting for operating emissions and completely ignoring upfront emissions. By targeting Near-Zero we are focusing all our efforts to reduce our direct emissions as much as possible, instead of promising Net-Zero and relying on offsets to do the work (which can often be used to mask the true direct emissions impact). We believe offsets have the potential to be an important part of the equation, but our philosophy is they should only be used after we've done everything possible within current technological and economic realities to reduce our own direct emissions.

**UPFRONT CARBON** emissions result from extraction, manufacturing, transportation, and installation of all the materials used in the construction of a building. While we are advocating for change throughout our supply chains to reduce the carbon footprint of the materials we use, getting down to carbon neutrality will take many years and timing is difficult to predict. Our estimate of Near-Zero upfront carbon is based on our current findings and projections. We recognize that upfront carbon is a rapidly evolving field and will continuously re-evaluate our definition of Near-Zero upfront carbon as the industry matures.

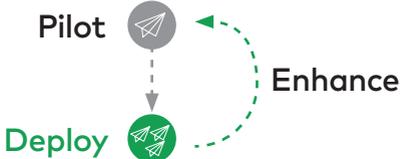
**OPERATING CARBON** is associated with the energy used to run a building and can either be emitted directly— such as burning fossil fuels like natural gas on-site for uses like heating or hot water— or indirectly— emissions from energy produced off-site such as grid electricity. Fortunately, in Ontario our electricity grid is relatively clean and comes mostly from renewable or non-emitting sources. However, electricity still has a carbon footprint due to some upstream use of fossil fuels. This is a limiting factor of getting to Net-Zero carbon through electrification alone. Renewables can further reduce grid-electricity use and resulting emissions. However, due to the density of high-rise development, there is limited space available for on-site renewables compared to the energy required to run the building. Therefore, Net-Zero carbon high-rise residential development in the GTA is not currently feasible at scale.

# Our Journey to Near-Zero Emissions

We are using Whole Life Carbon as the foundational metric to drive our internal processes towards decarbonization. The timelines outlined below indicate the maximum allowable Whole Life Carbon intensity for upcoming developments in our pipeline.

The Roadmap generation will be determined for each community based on the year in which it starts the development process (this is defined

as the year the initial Site Plan Application (SPA) is filed with the local municipality). Tying sustainability objectives to this milestone enhances accountability and specifies the requirements for new communities from the outset. Throughout our Roadmap, we have planned pilots of specific decarbonization tactics where we can test and refine strategies and then deploy as standard practice in the next generation.



## DECARBONIZATION TACTICS

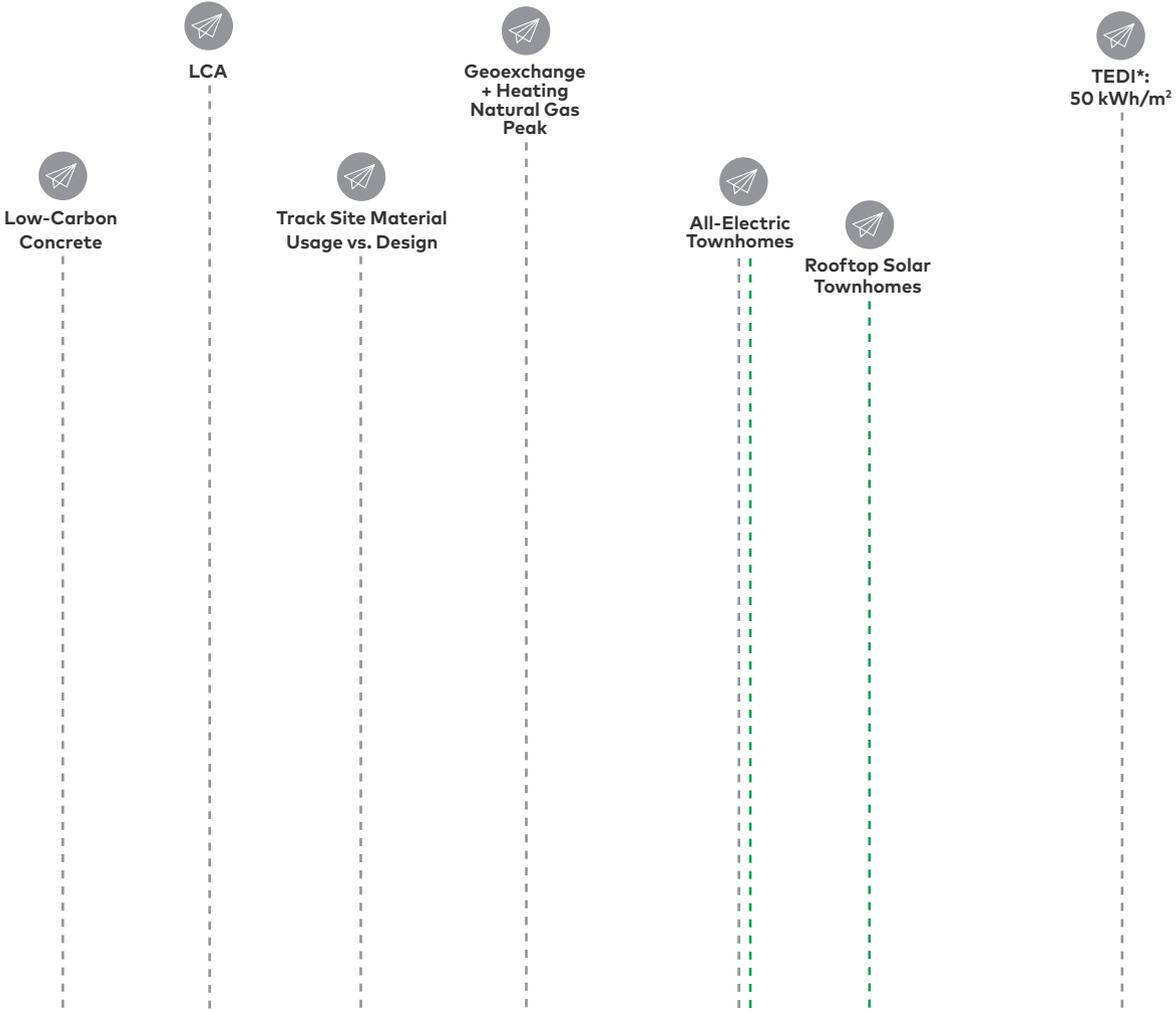
**BASELINE**  
2018 - 2020



An emissions baseline study was performed to quantify and understand the emissions profiles of our communities prior to developing our formal decarbonization strategy. By establishing this baseline, we have standardized the way carbon emissions are measured and identified the key design drivers that influence performance. We then used this as the foundation for creating our Decarbonization Roadmap.

\*TEDI = Thermal Energy Demand Intensity

| LOW-CARBON MATERIALS | MATERIAL EFFICIENCY | ELECTRIFICATION | RENEWABLES | THERMAL ENERGY DEMAND |
|----------------------|---------------------|-----------------|------------|-----------------------|
|----------------------|---------------------|-----------------|------------|-----------------------|



## GENERATION 1 2021 - 2025

1000  
kg CO<sub>2</sub>/m<sup>2</sup>

40%

### LOW-CARBON COMMUNITIES

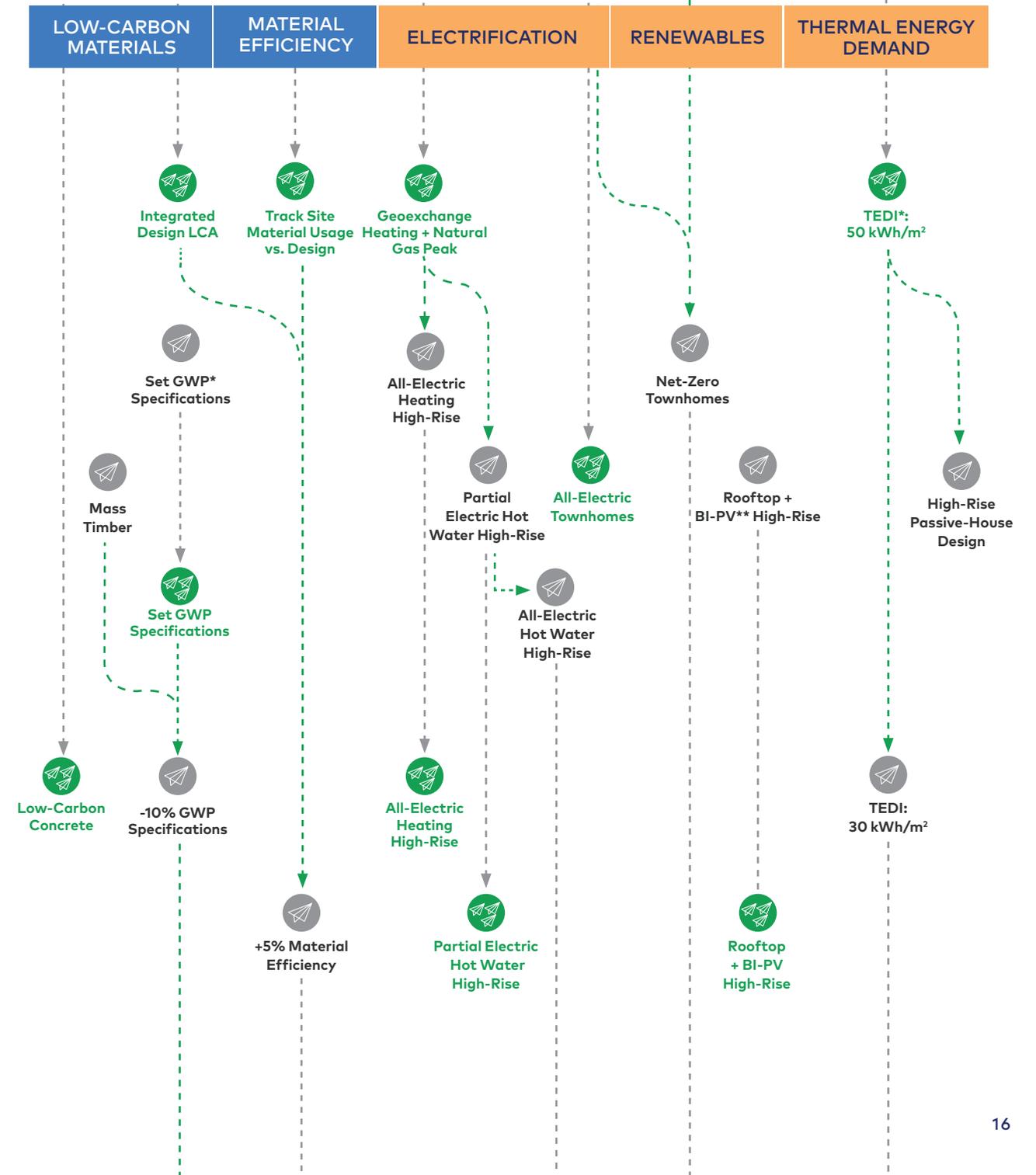
Using our baseline performance data, we were able to set realistic targets based on existing strategies and projections of future technology advances in industry.

Projects that begin development between 2021 to 2025 will fall into the 1st generation of communities within our roadmap. These projects will have a Whole Life Carbon Intensity commitment of 1000 kg CO<sub>2</sub>/m<sup>2</sup>, which is a 40% reduction from our emissions baseline. Throughout this generation, we will deploy at scale the technologies already piloted, including electrification through geexchange technology for high-rise, and air-source heat pumps for townhomes. We will pilot new strategies including Passive House design, expand electrification to hot water uses, and dive further into upfront carbon specifications and innovative materials.

It is anticipated that Generation 1 communities will achieve operating GHGI emissions of approximately 10 kg CO<sub>2</sub>/m<sup>2</sup>.yr which is equivalent to TGS version 3, tier 3.

\*GWP = Global Warming Potential

\*\*BI-PV = Building-Integrated Photovoltaics



**GENERATION 2**  
2026 - 2030+

**600**  
kg CO<sub>2</sub>/m<sup>2</sup>

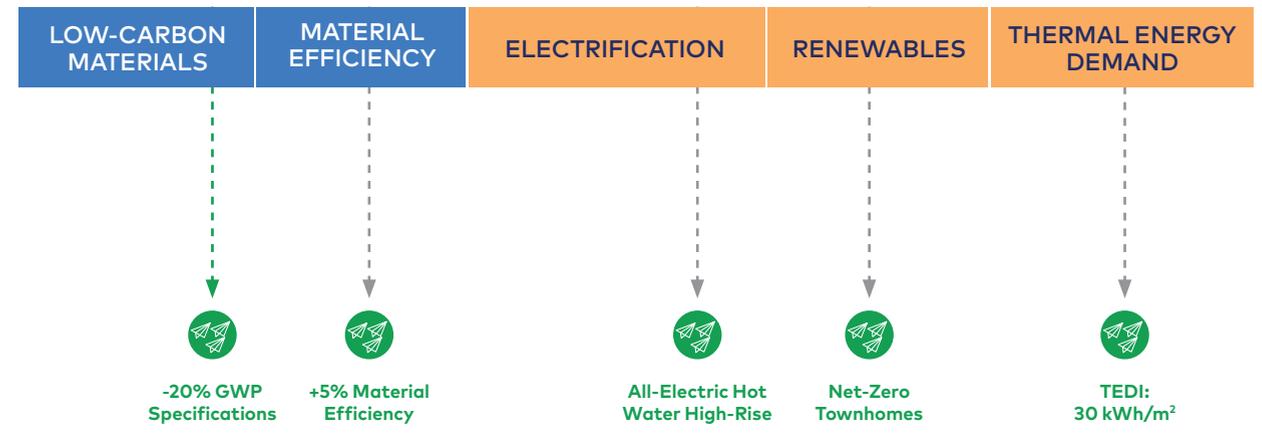
**64%**

**NEAR-ZERO COMMUNITIES**

Our goal is for all new projects starting the development process from 2026 to be designed to Near-Zero Whole Life Carbon. We recognize that the green building industry is quickly advancing. We will re-evaluate our targets and plans and add more strategies to our toolkit to continue implementing best-in-class decarbonization practices.

Throughout this generation, we will deploy at scale best-in-class low-carbon technologies to minimize our carbon footprint.

It is anticipated that Generation 2 communities will achieve operating GHGI emissions of approximately 5 kg CO<sub>2</sub>/m<sup>2</sup>.yr which is equivalent to TGS version 3, tier 4, plus a 22% reduction in upfront carbon emissions.



**Anticipated Daniels' Near-Zero Carbon Design Standard**

- ✓ Broad Deployment of **Low-Carbon Concrete** Across Typologies
- ✓ **20% Reduction** in Material Carbon Intensity of Major Components
- ✓ **5% Increase in Material Efficiency** through Design and On-Site Practices
- ✓ **All-Electric** Heating & Hot Water
- ✓ Rooftop & Building-Integrated **Solar Arrays**
- ✓ **57% Reduction** in Thermal Energy Demand Intensity
- ✓ All Townhomes to be **Net-Zero**

## Reporting Framework

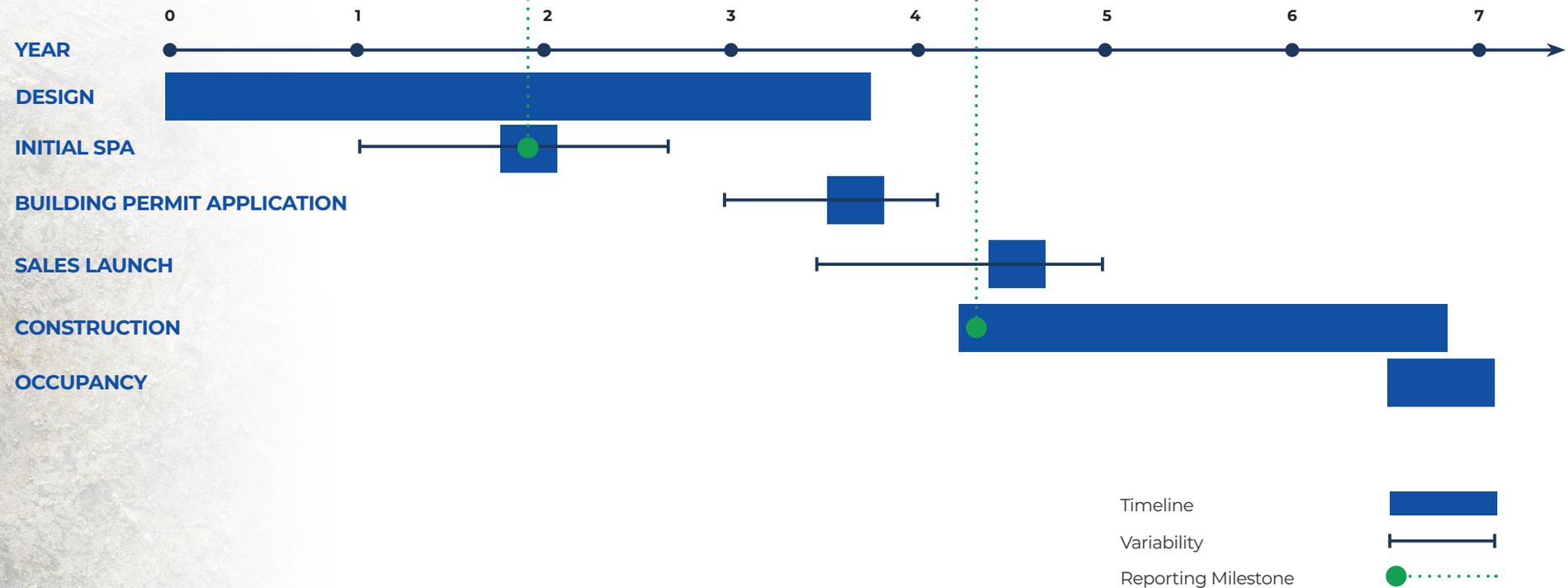
Bringing new communities to life takes several years from the initial vision to occupancy, and there are key intervals where major design decisions are made, and models are updated. There is a lag of several years between the start of the development process, and when performance is externally reported.

## Establish Carbon Performance Target

The year in which a community begins the development process will determine the generation and maximum carbon emissions commitment under our Decarbonization Roadmap. We are defining the start of the development process as when the initial Site Plan Application (SPA) is filed with the local municipality. This is in alignment with municipal regulations such as the Toronto Green Standard, where the date of the initial SPA indicates which version of the standard the project must adhere to.

## External Reporting

Performance data for a community will be published based on which year it begins construction. This aligns with municipal building permit processes.



# Daniels

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