2019 REVIEW

NET-ZERO READY

for the next generation

MARKHAM DISTRICT ENERGY INC.

MESSAGE FROM THE BOARD CHAIR

Our customers expect reliable and competitively priced energy. After 20 years, I can say - mission accomplished. However, our greatest challenge may be ahead of us. Markham's next generation expects environmental leadership. While we are already 'green', our goal by the year 2050 is to achieve Net-Zero emissions to align with the strategic goal set by the City of Markham. MDE will set in motion many new technologies to increase system efficiency and reduce our use of fossil fuels. Four are presented in this report. One of the things I have learned during my tenure as Chair, is that community-scale thermal grids offer the opportunity to reduce emissions in ways individual buildings simply cannot. Markham District Energy is ready for the Net-Zero challenge.

JACK HEATH
Board Chair

MESSAGE FROM THE PRESIDENT & CEO

When we hear the word energy, most of us think electricity. What is not widely understood is that the majority of energy consumed in our urban centres is used to heat buildings where natural gas is our primary fuel. Over the next 30 years, we will have to reduce its use if we want to lower our carbon footprint for heating. This is where district energy offers the solution. Consider a new building constructed in Markham today. If our district energy system did not exist, this modern building would install a new natural gas boiler plant on the penthouse and operate for as long as the building stays standing – likely 50 years or longer. So, how does this building owner move to lower carbon over time? By connecting to district energy, the new building has the opportunity to take advantage of carbon reduction strategies utilized by the district energy system at a community scale; four of which are highlighted in this report. By connecting to district energy, all new buildings become Net-Zero Ready.

BRUCE ANDER, P.Eng.
President & CEO

An industry that is net-zero ready

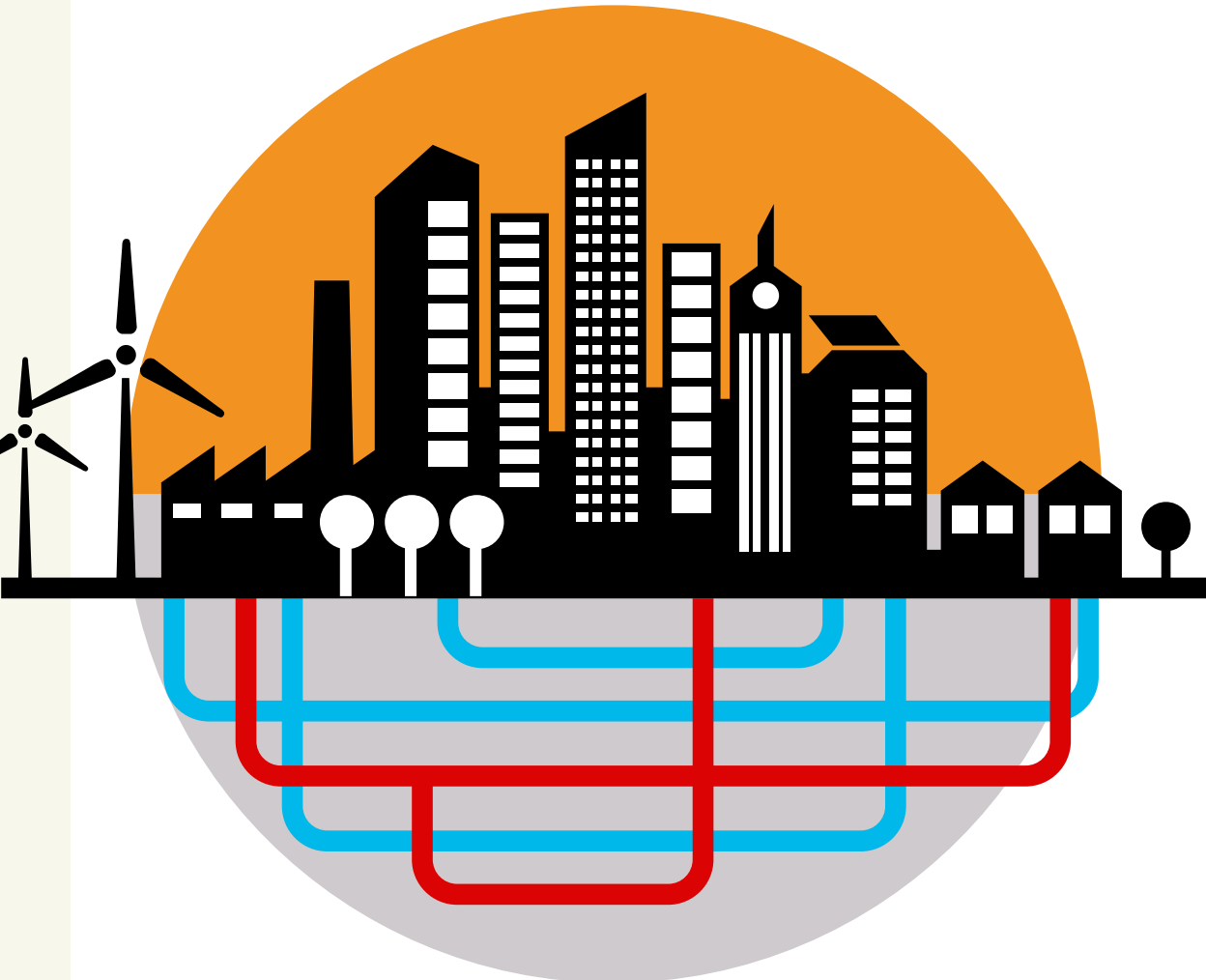
Energy to heat and cool buildings accounts for over 50 percent of greenhouse gas emissions in our cities, which consume over two-thirds of the world's energy and are home to over half the world's population. Reducing building-related emissions is a significant challenge and an important opportunity.

> We believe that without a district energy strategy in their urban centres, cities in Ontario cannot achieve their net-zero emission targets.

With the support of partners from around the world including members of the International District Energy Association, the United Nations Environment Programme (UNEP) launched the District Energy in Cities Initiative. UNEP reports:

District Energy Systems, a more sustainable way of heating and cooling buildings, have been around for more than 120 years, but they are only now attracting increased interest. From Paris to Singapore and Dubai, more cities are deploying the tried-and-tested technology to reduce their energy use and carbon emissions and boost renewable energy generation. A transition to district energy systems can help cities reduce their primary energy consumption for heating and cooling by up to 50 percent. They also form the central infrastructure for many cities' 100 percent renewables or carbon neutral targets. District energy systems are able to use larger sources of heating and cooling, such as waste heat from power stations, which cannot be connected to a single building.

In 2016, at the United Nations Conference on Housing and Urban Development (Habitat III) in Quito, Ecuador, 197 nations adopted the New Urban Agenda, which recognizes modern district energy systems as a key solution to integrate renewables and energy efficiency in cities.



DISTRICT ENERGY
IN CITIES
INITIATIVE

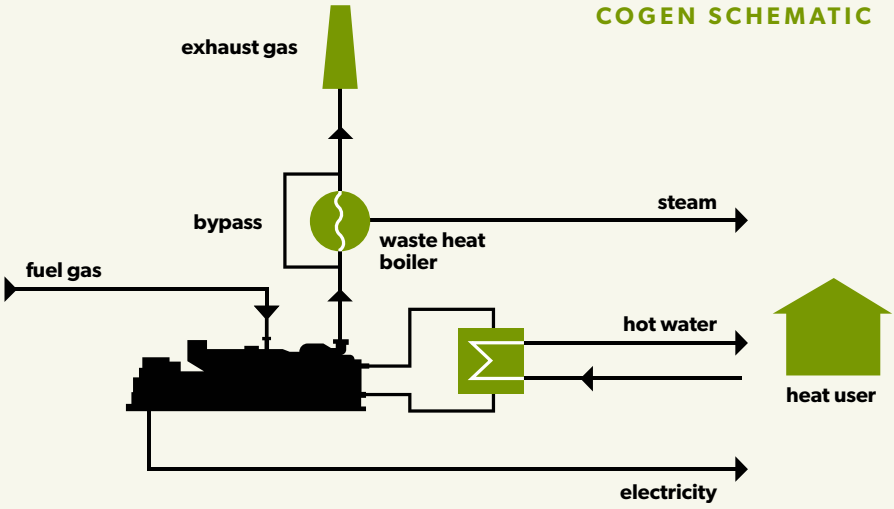
UN environment

INTERNATIONAL
DISTRICT ENERGY
ASSOCIATION

Strategy 1: Combined heat & power (CHP)

Combined heat and power (CHP), also known as cogeneration, is defined as the simultaneous production of electricity and useful thermal energy from a single fuel source. Our systems use large, natural-gas fueled engines that drive generators to produce electricity. Thermal energy is then recovered from the running engine and introduced into the community district heating loop.

COGEN SCHEMATIC



GHG reductions in 2019
7,500 tonnes

Is this Strategy Common?

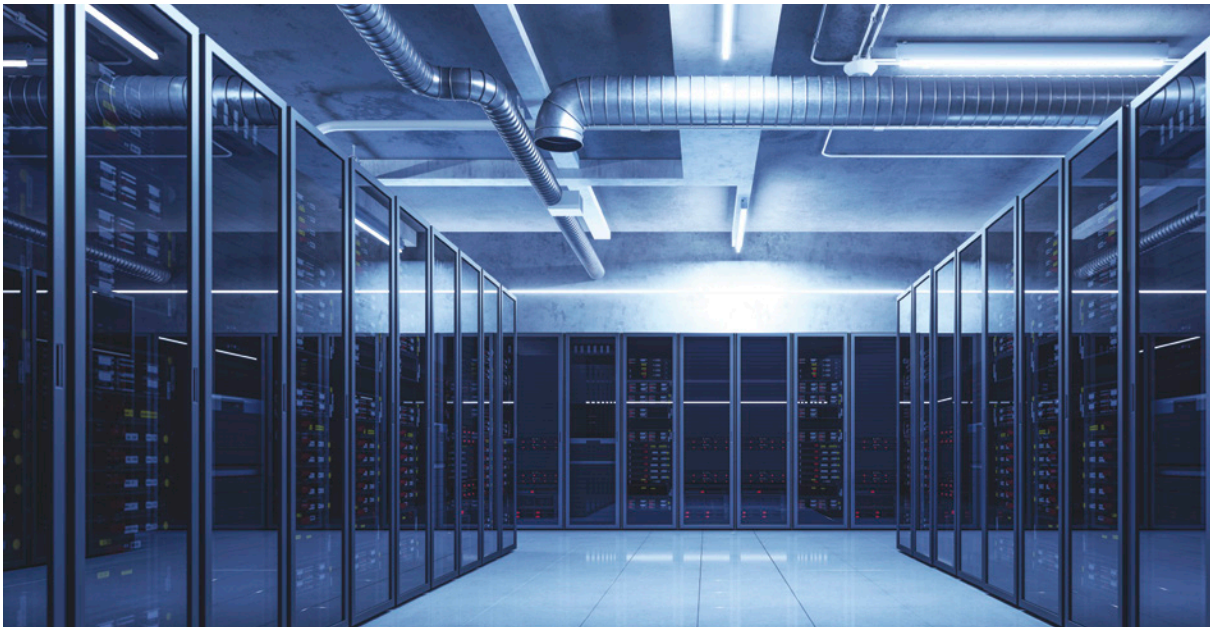
CHP is a mature technology that has been used in industrial and district energy applications for many decades.

Our Timetable

MDE installed its first CHP plant in 2001 and has since added additional plants. Today, we operate a CHP fleet equaling 15.5 MW, which is sufficient electrical capacity to power over 20,000 Markham condominium units and heat over 7,000 of those same units on the coldest day in January.

How does CHP contribute to our path to Net-Zero?

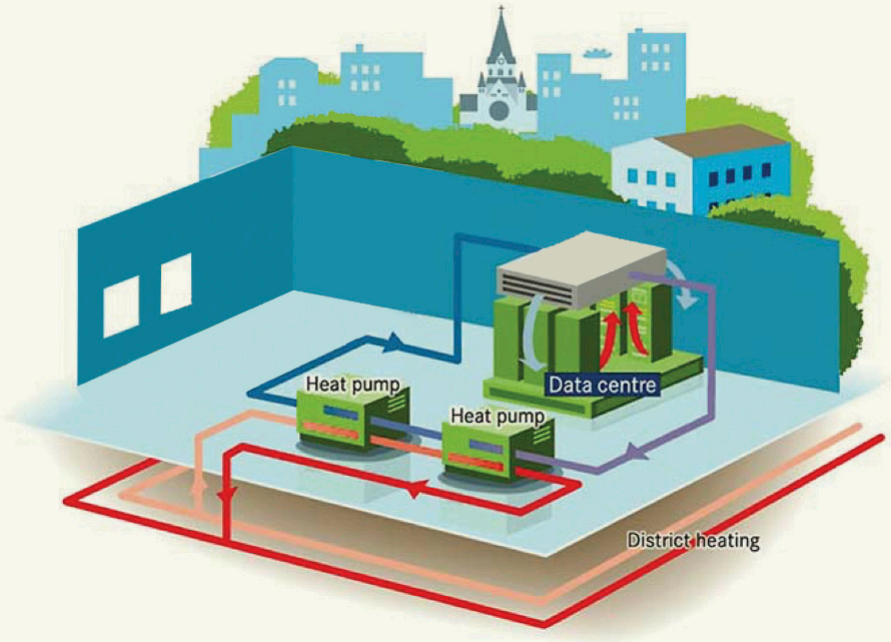
In Ontario, natural gas is the primary fuel for heating buildings. In the transition years as we move to net-zero, dramatically increasing the efficiency of our natural gas fuel supply is a critical first step on the path to net-zero. Developing community scale heating grids provides the combined thermal loads and economy of scale to implement combined heat and power.



Strategy 2: Heat recovery industrial heat pumps

An industrial heat pump is a class of heat recovery equipment that allows the temperature of a waste-heat stream to be increased to a higher, more useful temperature.

> GHG reduction estimate
> 4,500 tonnes annually



Is this Strategy Common?

Heat pumps are used in a variety of applications and the technology is mature. For homeowners, a ground-source heat pump uses the earth as the source of heat in the winter and as the "sink" for heat removed from the home in the summer.

Our Project

Several types of district energy customers including data centres and hospitals require year round chilled water, which sets the foundation for installing industrial heat pumps. MDE's cooling system would normally reject the waste heat generated by the continuous supply of chilled water into the atmosphere, but by installing an industrial heat pump in each of its systems, MDE will be able to recover the waste heat and elevate its temperature so it can be used in the community heating loops.

How will heat pumps contribute to our path to Net-Zero?

The recovered waste heat will reduce our natural gas consumption for community heating. We estimate a reduction of 4,500 tonnes of greenhouse gases, which is equivalent to removing over 1,000 cars from Markham's roads.

Our Timetable In-service 2021

This project will be funded in part by the Government of Canada

Environment and Climate Change Canada | Environnement et Changement climatique Canada

Strategy 3: Biomass fuel

The term biomass encompasses a large variety of materials including wood from various sources and agricultural residues.

Is this Strategy Common?

There are hundreds of biomass heating plants in cities, communities and campuses across North America and thousands worldwide. Leading examples include the University of British Columbia and district energy systems in downtown Seattle and St. Paul, Minnesota.

Our Project

MDE will install a biomass boiler that will be fueled with clean wood pellets or chips.

How will biomass contribute to our path to Net-Zero?

Combusting clean wood has a minimal effect on the environment because the carbon in biomass is part of the natural carbon cycle, which will be introduced into our atmosphere in the coming years whether we use it as a fuel or not. The carbon released from the burning of fossil fuels is not part of the natural cycle. Simply put, introducing biomass fuel to our district energy operations will reduce our community's dependence on natural gas. This is core to our Net-Zero strategy.

Our Timetable In-service 2022

> GHG reduction estimate
> 1,350 tonnes annually

Strategy 4: Carbon capture & utilization

Turning CO_2 into nutrition

> Potential GHG Reduction
> 10,000 tonnes annually

Is this Strategy Common?

Carbon capture and utilization is an emerging sector worldwide as the need to reduce carbon becomes an urgent international priority. While there are numerous groups working on commercial solutions, carbon capture and utilization remains leading edge technology.

Our Project

Since 2017, MDE has worked with Pond Technologies, a Markham-based firm that has developed a platform to grow algae-based nutritional products using industrial emissions fueling its proprietary lighting and bioreactor technology. For the past two years, Pond has operated a demonstration laboratory at our Warden Energy Centre producing algae strains from our natural gas heating and power generation operations.

How will carbon capture contribute to our path to Net-Zero?

The principle is simple. CO_2 is harvested from our exhaust stacks and introduced into bioreactors that grow algae; which is extracted and used to produce nutraceutical and other useful products. Once constructed, a commercial-scale Pond plant could reduce CO_2 emissions at our Warden Energy Centre by as much as 50 percent, which would result in the Centre having the lowest carbon footprint from a natural gas fueled plant in our sector.

Our Timetable In-service 2023 (subject to financing secured by Pond Technologies)

2019 highlights

SYSTEM AVAILABILITY

Our systems in Markham Centre and Cornell Centre performed exceptionally in 2019 contributing to our long-standing operations reliability. In Cornell Centre, our district energy system operated at 100% availability building on our up-time statistic of 99.9996% since 2012 when system operations commenced. Our Markham Centre system, which operated at 99.995% up-time in 2019, now reports an up-time statistic equal to 99.9992% since December of 2000 when the system launched. Providing a reliable supply of energy to our customers is paramount and continues to remain a key indicator of a successful year.

HEALTH AND SAFETY

Another primary indicator of a successful year, and one of our highest priorities, is the health and safety of our employees, customers, contractors and visitors. In 2019, we continued to build on our exceptional health and safety record reporting zero lost-time injuries and extending our record of no lost-time injuries since the company's first hour of operations in December 2000.

LOWERING CARBON

We are pleased to report MDE was awarded a grant in 2019 to significantly reduce our corporate GHG emissions. Our innovative heat recovery heat pump project will recover heat from our cooling system operations and elevate the recovered thermal energy to heat buildings connected to our heating system. Refer to pages 8/9 in this report for more information.


COOLWATER RET

Our future

York University

Focused on providing students workplace learning opportunities while they study, **York University's** Markham campus plans to work with significant economic clusters present in the Markham area and will eventually accommodate 10,000 students. Occupancy: 2023.

Gallery Square

Recognized as Canada's best mixed-use development in 2018 and a finalist in the Building Industry and Land Development Association's (BILD) Best New Community (Planned), Remington Group's latest project, **Gallery Square**, is now under construction. Occupancy: 2023.

CONTINUED GROWTH

We serve a diverse collection of commercial, institutional and residential customers totalling 12 million square feet. By 2024 we will grow by 50%. Here are four future customer highlights…

Riverview is the fourth and newest phase of Times Group Corporation's Uptown Markham community, which will be comprised of three signature towers configured to create an exclusive enclave overlooking the Rouge River conservation area. Occupancy: 2022.

Vendome is the second phase of an elegant residential community built by H&W Developments. Phase one of the project, Fontana, has been a customer since 2015. Occupancy: 2022.

Our community

2019 SUSTAINABILITY BURSARY

Established in 2010 to promote and reward environmental leadership among Markham's youth, our Sustainability Bursary recognized its 2019 recipients (one graduating student from each of Markham's high schools) for their dedication to environmental extracurricular, volunteer and community service activities, as well as academic excellence.

A core value

We give back to the community that has defined our success. Our priorities include youth, seniors, and our fellow citizens in distress or with special needs.

SUPPORTING MARKHAM CHARITIES

Our focus remains on supporting local charities serving our most vulnerable citizens.

360° kids

Evergreen
MARKHAM STOUFFVILLE THORNHILL

Special Olympics

MARKHAM STOUFFVILLE HOSPITAL

UNIONVILLE HOME SOCIETY

RESTORE CANADA

2019 financial update

TEN-YEAR EARNINGS HISTORY

EBIDTA (Earnings before interest, taxes and depreciation)

2015
$8.8 M

2010
$2.0 M

2019 SHAREHOLDER DIVIDEND

$2.72 MILLION

2019

$12.7 M

"While providing cost competitive energy services to district energy customers in our City, the annual Markham District Energy dividend helps to reduce the property tax increase by approximately 2.0% which contributes to Markham's enviable position of having the lowest 15-year tax increase record in the Greater Toronto Area.

Frank Scarpitti

– Mayor Frank Scarpitti

Statement from Auditor: Selected data is excerpted from the Corporation's financial statements for the year ending December 31, 2019. The financial statements were audited by KPMG LLT, who issued their opinion without reservation on June 18, 2020 which was the date on which the financial statements were approved by the Corporation's Board of Directors. Some figures are rounded.

Keeping energy dollars in our community

The district energy investment strategy in Markham

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[1] Finance & Audit Committee
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Ricardo Ahn Vice President, Finance & Administration

Peter Ronson Chief Operating Officer

Jim Kee Vice President, Operations

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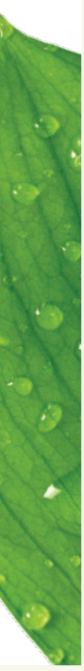

DEFINING NET-ZERO

"A net-zero energy emissions Markham in the year 2050 is one that has greatly reduced energy needs through efficiency gains and conservation. Annual energy needs for vehicles, thermal and electricity are met by sustainable and non-fossil fuel sources, carbon offsets and/or carbon sequestration resulting in an annual net-zero balance of greenhouse gas emissions."

District energy in the City of Markham is designed to add and implement new technologies and fuels that reduce or eliminate GHG emissions. **We are Net-Zero Ready**

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