



Low carbon building projects that overcame obstacles

Low Carbon Case Examples

Thurs June 11, 2020 | 2:00 - 3:00 PM ET

Bruce (BF) Nagy & Tim McDonald



**Clean Air
Partnership**

CLIMATE SOLUTIONS WEBINAR SERIES





Clean Air Partnership

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ELECTRIC FLEET VEHICLES



GEO THERMAL FOR SCHOOLS

ENGINEER DUYERANTTE & MOORE, SCHOOL DISTRICT DIRECTOR



MICROGRIDS & BATTERIES



WEBINAR SERIES - UPCOMING:

- **Guaranteed energy savings for schools & hospitals (Quebec)**
- **Solar thermal for seniors & recreation (Ontario & Alberta)**
- **Affordable passive house retrofits (Hamilton & Boston)**

TIM MCDONALD

**RA, LEED AP, CPHC, CPHD,
CO-FOUNDER, PRESIDENT & CEO ONION FLATS, PHILADELPHIA**

**ONION FLATS IS A REAL ESTATE DEVELOPMENT/
DESIGN/BUILD FIRM.**

**LEAD ARCHITECT AND CONSTRUCTION MANAGER FOR MANY
PROJECTS. CERTIFIED LEED ACCREDITED PROFESSIONAL,
PASSIVE HOUSE CERTIFIED CONSULTANT AND TRADESMAN.**

**ADJUNCT PROFESSOR OF ARCHITECTURE AT PHILADELPHIA
UNIVERSITY, TEMPLE UNIVERSITY, UNIVERSITY OF CALGARY, AND UNIVERSITY OF PENNSYLVANIA.**

**NORTHERN LIBERTIES NEIGHBORS ASSOCIATION ZONING COMMITTEE, PHILADELPHIA SUSTAINABILITY
ADVISORY BOARD, OLD CITY CIVIC ASSOCIATION BOARD OF DIRECTORS.**

**FOUNDER/PRESIDENT OF FAARM, A NON-PROFIT ORGANIZATION DEDICATED SOLELY TO THE EXHIBITION
OF ART AND ARCHITECTURE IN PHILADELPHIA.**

**PARTNER IN PLUMBOB, LLC AND JIG, INC., A GENERAL CONTRACTING, CONSTRUCTION MANAGEMENT
AND GREEN ROOF COMPANY.**



BRUCE (BF) NAGY CLIMATE SOLUTIONS

- Columnist & features
- Consultant
- Author 200+ articles on climate solutions
- Author *The Clean Energy Age*, Rowman & Littlefield



Climate solutions
Expert best practices
Case examples
Clear priorities



SOLUTIONS, PRIORITIES, CASE EXAMPLES



BUILDINGS

NEW & RETROFIT TECHNOLOGY & PROGRAMS



TRANSPORTATION

ELECTRIC FLEETS, INFRASTRUCTURE & TRANSIT VEHICLES



POWER GENERATION & STORAGE

TECHNOLOGY, PLANNING & ECONOMICS

AGENDA

INTRODUCTION

5 MINUTES

HERITAGE BUILDINGS
MONTREAL & TORONTO

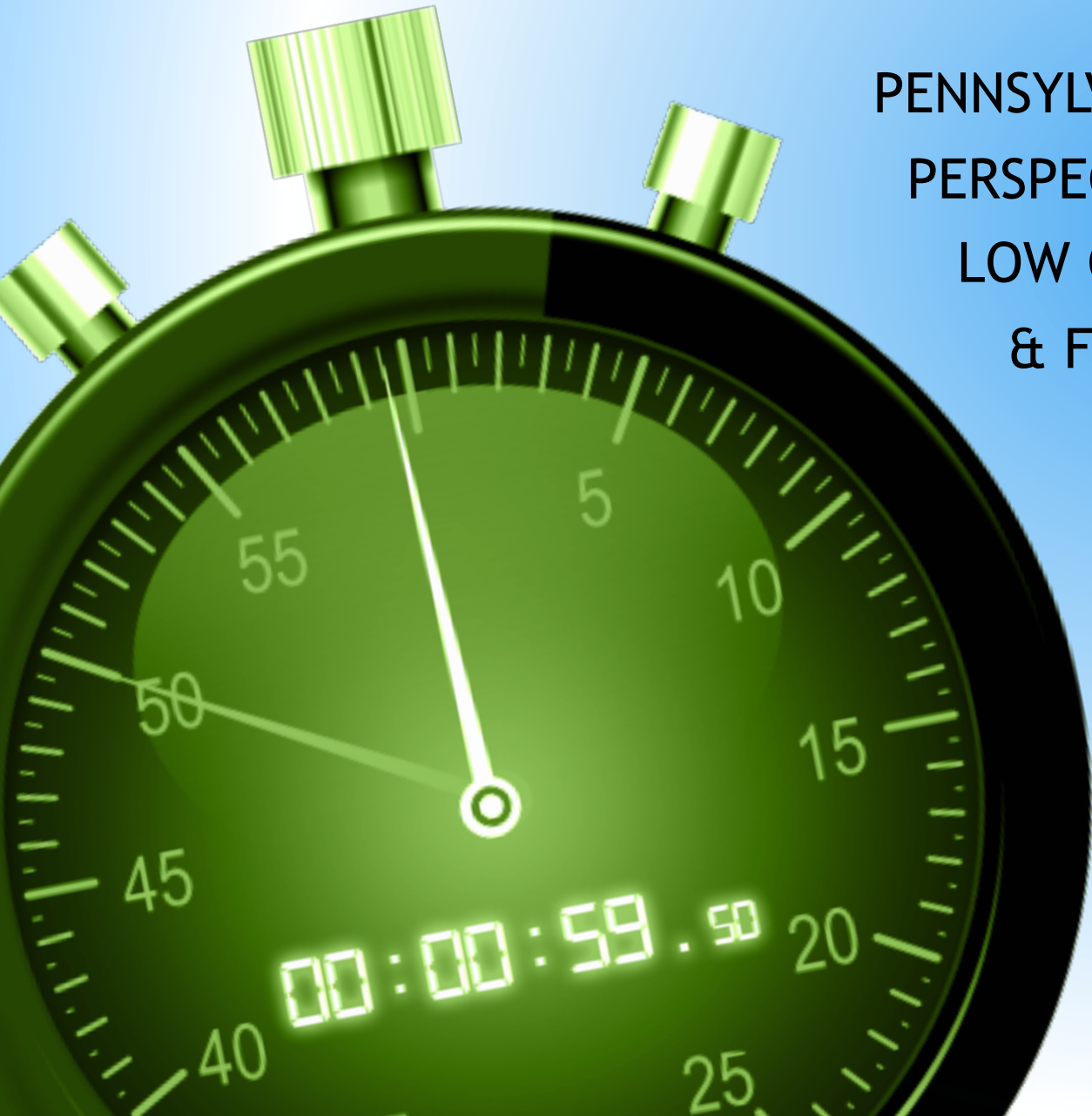
20 MINUTES

PENNSYLVANIA: BUILDER'S
PERSPECTIVE - INNOVATIVE
LOW CARBON BUILDINGS
& FUNDING PROGRAMS

30 MINUTES

QUESTIONS
& WRAP

5 MINUTES



SUN LIFE BUILDING MONTREAL

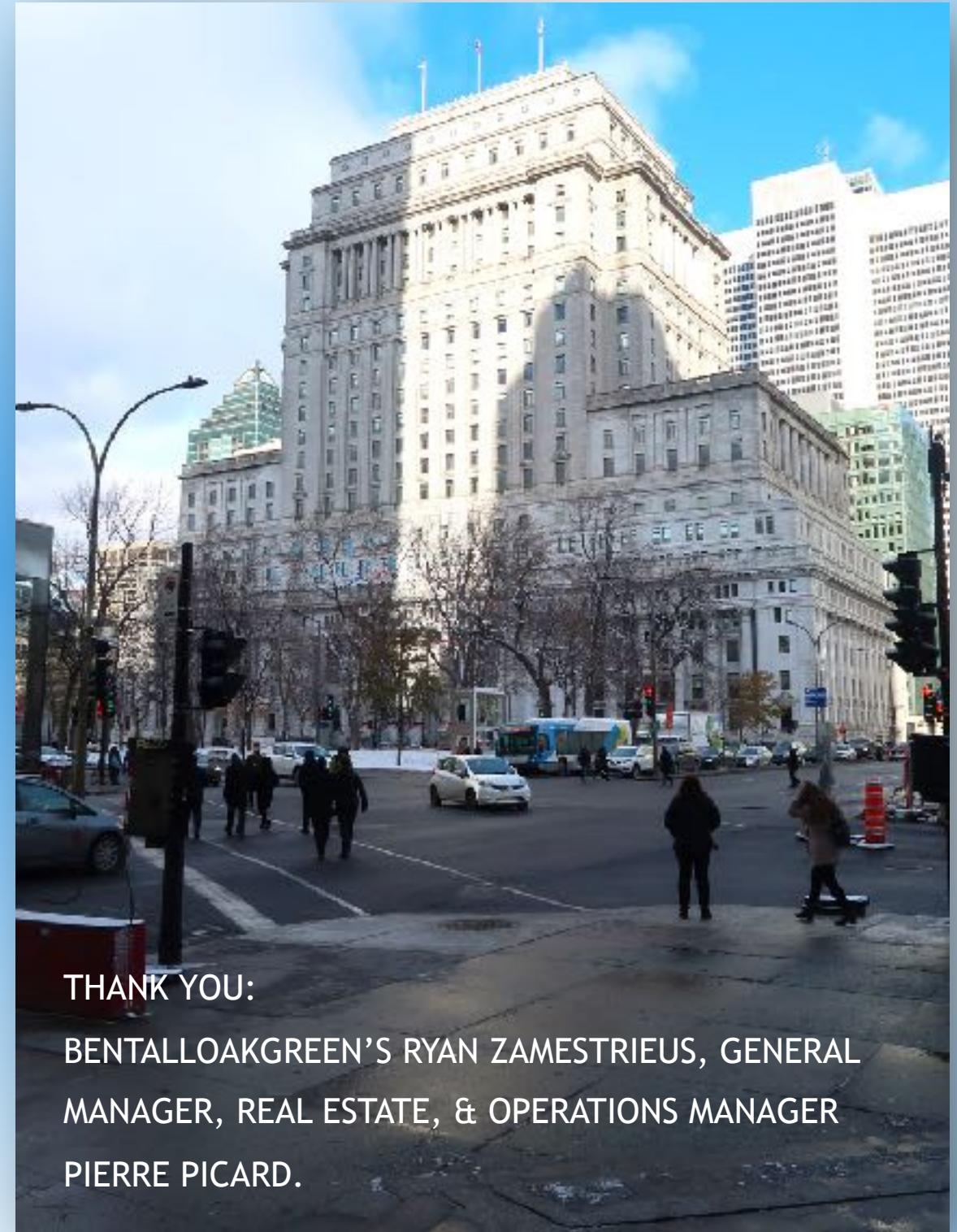


HISTORICAL DRAMA AT DORCHESTER SQUARE

SUN LIFE BUILDING MONTREAL

ÉDIFICE 'SUN LIFE' ON METCALFE
BUILT IN PHASES 1914 - 1933

NEOCLASSICAL 'ARCHITECTURAL
GEM' TORONTO ARCHITECTS
DARLING, PEARSON & CLEVELAND



THANK YOU:

BENTALLOAKGREEN'S RYAN ZAMESTRIEUS, GENERAL
MANAGER, REAL ESTATE, & OPERATIONS MANAGER
PIERRE PICARD.

SUN LIFE: 100 YEARS OF HISTORY

WINSTON CHURCHILL

OPERATION FISH IN WW II

2000 TONS GOLD BARS, COINS, SECURITIES
WORTH \$160 BILLION+ TODAY

SAILED IN TWO SHIP CONVOYS 4600 KM
TREACHEROUS NORTH ATLANTIC
GERMAN U-BOATS HAD SUNK 100+ VESSELS
IN MAY 1940 ALONE

STORED IN THE 3RD BASEMENT OF THE SUN LIFE BUILDING FOR YEARS, WITH 24-
HOUR RCMP GUARD. 600 PEOPLE WERE INVOLVED, BUT SECRET WAS NEVER LEAKED.



SUN LIFE: 100 YEARS OF HISTORY

NHL OFFICES FROM 1934 UNTIL 1977,
MARCH 1955 CLARENCE CAMPBELL
FORCED TO SET AN EXAMPLE
SUSPENDED ROCKET RICHARD
THE LEAGUE'S LEADING SCORER
FOR THE SEASON & PLAYOFFS.

FAN RIOT IN THE STREETS OF MONTREAL
THIRTY-SEVEN INJURIES
100 ARRESTS & ABOUT
\$100,000 IN PROPERTY DAMAGE.



CLEAN ENERGY HERITAGE RETROFIT

OFFICIAL HERITAGE STATUS

CONSTRUCTED FROM GRANITE

& HEAVY GAUGE STEEL

26 FLOORS 1 MILLION SQUARE FEET+

LEED PLATINUM CERTIFICATION

BOMA BEST PLATINUM CERTIFICATION

ENERGYSTAR SCORE OF 92 & OTHER CLEAN ENERGY AWARDS & CERTS.

1600 WATER SOURCE HEAT PUMPS & ENERGY RECOVERY VENTILATORS (ERV)

WATERFURNACE OR THERMOPLUS 12 & 18 MBH ETC

MASTERPIECE OF ZONE MANAGEMENT - SOPHISTICATED DELTA CONTROLS

SURPRISINGLY LITTLE ACTIVE HVAC IS REQUIRED



ZONE MANAGEMENT & HEAT RECOVERY

INTERIOR ALWAYS NEEDS SOME COOLING
PERIMETER USUALLY NEEDS SOME HEATING

DATA HEAT RECOVERY: SUN LIFE, TELUS,
NATIONAL BANK, VOXDATA, COGENT
COMMUNICATIONS.



6 COOLING TOWERS, 2400 TON SHARED & OPTIMIZED WITH NEIGHBOURING
PLACE VILLE MARIE. ALSO SOME UNUSED BACKUP CHILLERS.

WHEN IT'S -10°C OUTSIDE (5% OF THE TIME) STEAM FROM CHAUFFAGE
CLIMATISATION URBAINE MONTREAL, A DISTRICT ENERGY SYSTEM.

CLEAN ENERGY & MORE

THE LOAD: MODERN VARIABLE SPEED MOTORS OPTIMIZED TO OPERATE FEWER HOURS. CARBON DIOXIDE SENSORS BETTER MANAGE FRESH AIR INTAKE, LED LIGHTS WITH SENSORS THAT FOLLOW NIGHT-TIME CLEANING CREWS, MERV 13 AIR FILTERS FOR INDOOR AIR QUALITY.

AND: LOW FLOW PLUMBING, 70% RECYCLING DIVERSION, FRUIT & VEG GARDEN & BEE HIVES ON ONE OF ITS ROOFS.



THE COST: QUEBEC POWER IS INEXPENSIVE \$1.31 PER SQUARE FOOT.

THE FUTURE: MORE WORK WITH SEQUENCE OF OPERATION, REFRIGERANT REVIEW.

EVERGREEN BRICK WORKS IN TORONTO



A HISTORY BUILT ON BETTER CONSTRUCTION

HOMESTEADER WILLIAM TAYLOR
DISCOVERED RED CLAY & SHALE NEAR
THE DON RIVER & MUD CREEK IN 1882.

HORRIFIC DOWNTOWN FIRE IN 1904,
LED TO A BYLAW PROHIBITING
MOSTLY-WOOD BUILDINGS IN TORONTO.

THE DON VALLEY BRICK WORKS FLOURISHED FOR
ABOUT 100 YEARS, UNTIL THE CLAY RAN OUT IN 1984.

BUILDINGS, OVENS (GRAFFITI) ETC. ALL DECLARED
HERITAGE & EVENTUALLY MANAGED BY EVERGREEN, WITH
GUIDANCE FROM ONTARIO HERITAGE TRUST & TORONTO PRESERVATION DEPT.



EVERGREEN BRICK WORKS TODAY



16 BUILDINGS, 53-ACRE SITE. CONFERENCE, EDUCATIONAL & EVENT SPACES, INDOOR & OUTDOOR FUN AREAS FOR FAMILIES, WINTER ICE RINK, SUMMER GARDEN CENTRE, PLAY AREAS FOR CHILDREN, HISTORICAL INSTALLATIONS, SHOPS, CAFES, ONE OF THE BIGGEST FARMERS' MARKETS IN THE CITY. SOME BUILDINGS ARE LEED PLATINUM.

HERITAGE & FLOODPLAIN CHALLENGES

CHALLENGES: HERITAGE DESIGNATION, LOCATION ON A VALLEY FLOODPLAIN, MULTIPLE OWNERS, ALL ADD TO OBSTACLES RELATED TO ENHANCEMENTS, INCLUDING ENERGY UPGRADES & WATER SYSTEM IMPROVEMENTS.

BUT THEY HAVE A GREAT TEAM AND HAVE GOTTEN IT DONE. EG. THEY

ACTUALLY RAISED THE FLOOR TO COMPLY WITH PLANNING REQUIREMENTS, ETC.



LIMITATIONS ON ENVELOPE ENHANCEMENT



NOT ALLOWED TO ALTER THE WALLS. COULD ONLY GET PERMISSION FOR A FEW INCHES OF INTERIOR ROOF INSULATION, ABOUT R15, DOING SOME EXTERIOR BUILD-UP INSTEAD. WHEREVER POSSIBLE DOUBLE GLAZED WINDOW WALLS & WINDOWS. ONE OF THE MAIN BUILDINGS IS LIKE A HUGE BARN WITH STRATIFICATION CHALLENGES.

NO FOSSIL FUELS

40 GEOTHERMAL BOREHOLES AT 605 FT DEEP EACH - ONLY A SMALL STRIP OF LAND, SO DIAGONAL DRILLING UNDER BUILDING BY GEOSOURCE

GEO HARVESTS 10°C - 12°C
GROUND SOURCE HEAT PUMPS
INCREASE THIS TO 50 °C

IN FLOOR HYDRONIC HEAT,
AIR HANDLING UNITS WITH GEO FED COILS

275 SOLAR THERMAL PANELS

AIR CURTAINS OVER ALL THE EXITS

3 SOLAR CHIMNEYS FOR COOLING

-OPEN WINDOW AND CHIMNEY DRAWS HOT AIR UP



THANKS TO: CHIEF ENGINEER & PROJECT DESIGNER
ALI ANVARI & PAUL FRITH FROM GEOSOURCE

“FROM THE BEGINNING WE WANTED TO ELIMINATE
GAS & AIM FOR CARBON NEUTRAL.”

THE FUTURE IS NOW

“I WANTED INTELLIGENT PUMPS WITH ANALYTICS & WI-FI CAPABILITY. THIS IS A MODERN, COMPLEX FACILITY. I HAVE TO BE ABLE TO MONITOR OPERATIONS FROM ANYWHERE.”

“ELLIS DON DID SOME PRO BONO WORK & IN EXCHANGE USED THE PROJECT TO DEVELOP A CRADLE-TO-GRAVE LOW-CARBON PROCESS REQUESTED BY ITS OTHER CLIENTS.”

“THE GEOFIELD IS LIKE A BATTERY. WE CHARGE IN THE SUMMER TO PROVIDE HEAT IN THE WINTER.”

“NEXT STEPS: SOLAR PHOTOVOLTAIC AND ELECTRICITY STORAGE.”



SWITCH TO TIM



QUESTIONS?

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that overcame obstacles

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THANK YOU

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