The Company S2E

*Everything we do is about a response to climate change*

technology company that was focused on photovoltaics added a new division 7Gen that uses technology to create Sustainable Livable Communities
West 5  London, Ontario

At a Glance
- London, Ontario Canada
- 70 acres
- 2000 Living Units
- 500,000 sq ft Commercial/retail
- NET ZERO ENERGY Community
- All electric / air source heat pumps

~25% Complete
West 5 – Original Concept

- EV Community
  Powered by DC GRID
- Energy from the Sun
- Net Zero Energy Community
- Local food greenhouses and gardens
- Sustainable Water Management
Heilos – First NZE
11-story Multi-use
High rise
160 NZE Plus Townhomes
Riverstone – Near NZE
Retirement homes
NZE Office buildings
Solar Parking Canopies

Blessing and Curse
EVE Park
London, Ontario

At a Glance
• Net Zero Energy Condominium Neighborhood
• 84 one, two, and three bedroom townhome condominiums
• All Electric / Air source Heat Pumps
• Community built for electric vehicles
• Under construction (Occupancy Summer 2023)
EVE Park

Electric Vehicle Enclave

• Ready for EV’s and Autonomous Vehicles
• EV Car and E Bike Community share
• Unique parking tower
Parking Tower with Smart EV Charging

- Parking ratios 1.1 instead of 1.5
- 16 cars on the space of 2 surface parkings
- 1 parking spot for free, second payable
- Parking tower construction in 7 days instead of 18 months
- Cost went up from 16,000 CAD to 40,000 CAD per space due to regulations for elevators
EVE Park – Live in a Park not a Parking Lot
Construction Process

- Panelization / Modular Construction

- Reduce Waste
- Faster onsite Construction
- Reduce costs?
How to Design NZE Communities

Menu ➔ Best Solutions
Technology – Efficiency First

- Design orientation, shape, and location
- Insulation & air tightness
- No Gas
- Air-Source Heat Pumps
- Day Lighting and LED Lighting
- Windows reduce area, triple pane, electrochromic
- Smart Controls
- Hot Water Conservation
- Efficient Appliances; heat pump clothes
- Energy Monitors
Technology – Renewables and Storage

Add Renewables / Storage / and Dispatchable Demand in a Holistic design: Expandable Microgrid
Concordia Research: use digital twins for citizen engagement and site optimization
Research on microgrid simulation

System can supply loads in future (10 year horizon)

Supply-Demand balance zero or positive: H, 0.5H, 5min
Resilient for ext. climate events

TX-DS requirements/up grades in future

Provision of ancillary services
Microgrid Optimization

Objective functions:
- Minimizing the total System losses
- Minimize household costs

Operational Constraints:
- Active power Balance
- Reactive power Balance
- Voltage Limit
- Active power generation limit

Optimization
- Non-linear programing
First results
Summary

• First large scale fully electrified zero/positive energy district in Canada
• Includes EV charging
• Case study for multi level energy management that minimizes system losses and cost
• Case study for detailed cost/benefit analysis
• Document barriers and solutions to implementation including cost