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Heat Recovery, TOU Optimization & Virtual Power Plants: A New Urban Energy Paradigm

GreenSmart Eco Capital Ltd. | 2025 Strategic Outlook

District Heating from Data Centers

Urban data centers generate substantial low-grade heat, often exceeding the host building's needs. This surplus can be monetized through:

- **Municipal Hot Water Networks:** Cities like Vancouver and Toronto already buy heat via feed-in tariff programs (e.g., Toronto District Steam, Regent Park, York University).
- **Adjacent Property Sales:** In areas without municipal infrastructure, adjacent buildings can legally receive heat under utility exemptions—offering high ROI with minimal infrastructure cost.

This transforms data centers into **community heat hubs**, reducing carbon footprints while generating new revenue streams.

Time-of-Use (TOU) Electricity & Peer-to-Peer Wheeling

TOU pricing unlocks strategic energy arbitrage:

- **Nighttime Rates:** \$0.028/kWh electricity enables low-cost data center operation.
- **Heat Recovery Value:** Generates ~\$0.08/kWh in recoverable heat.
- **Daytime Cogeneration:** Natural gas at \$0.11/kWh beats grid electricity at \$0.16/kWh.

Electricity Wheeling between neighboring buildings allows:

- Direct purchase of unused nighttime power.
- Infrastructure cost savings vs. grid upgrades.
- Heat resale to neighbors—creating a closed-loop energy economy.

Virtual Power Plants (VPPs) & Battery Arbitrage

Battery tech is rapidly evolving:

Year Battery Cost (Projected) Grid Buyback Rate

2025 ~\$0.07/kWh	\$0.16–\$0.20/kWh
2027 ~\$0.03/kWh	\$0.16–\$0.20/kWh

This creates a **strong arbitrage opportunity**:

- Buy low-cost off-peak power.
- Store in batteries.
- Sell back during peak hours.

Utilities in Calgary, Miami, Vancouver, and the GTA are already incentivizing VPP participation. In some cases, they're installing batteries themselves to avoid costly grid upgrades.

Scaling the Opportunity

These strategies expand the viable footprint for urban data centers from **5% to 50%** of existing office buildings. Each site offers unique potential based on:

- Available gas infrastructure
- TOU pricing models
- Neighboring load profiles
- District heating access

Greensmart Financing & Partnership

Greensmart offers **up to 100% financing** for power and cooling infrastructure. We're ready to collaborate with building owners, developers, and municipalities to bring these solutions to life.

Yours Truly

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