Business and Financing Structures for Integrating Campus and Community Energy Programs

Michael Ahern

SVP System Development

Ever-Green Energy

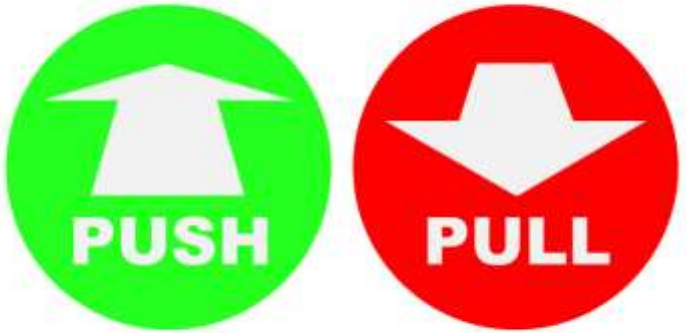
Campus Energy System Trends
The Push-Pull Dynamic

Growth and Change

- Technology advancements
- Environmental commitments
  - Decarbonization
  - Water use
- Reliability and resilience goals
- Microgrid initiatives
- Localization of energy supply

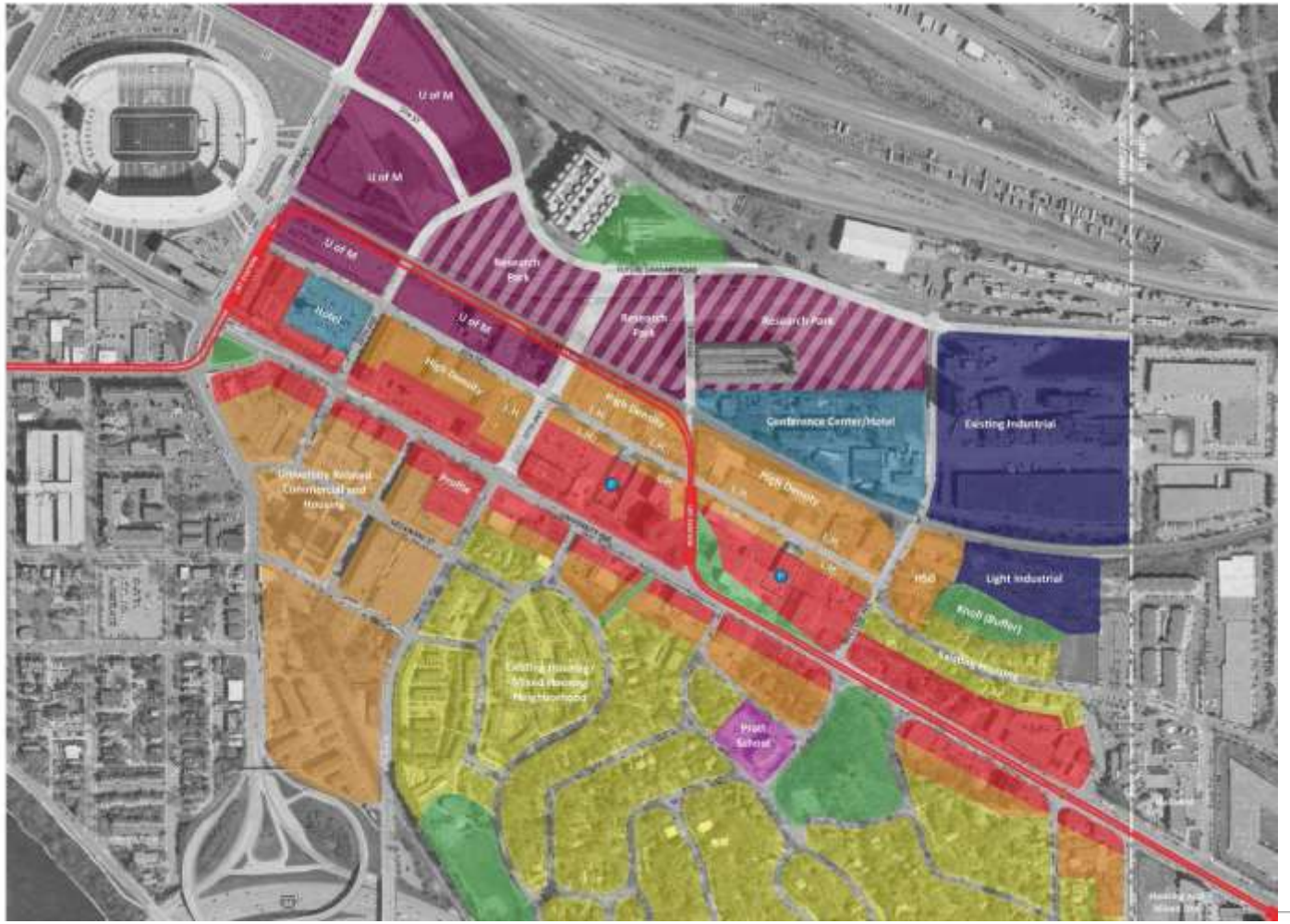
Inhibitors

- Constrained capital budgets
- Stagnant or decreasing operating budgets
- Aging infrastructure
- Retiring workforce



Campus Energy System Trends: Privatization

Campus Energy System Trends: Integration with the Adjacent Community



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CASE STUDIES: STRUCTURES FOR INTEGRATING CAMPUSES AND COMMUNITIES

Expanding District Energy in Morris, MN

UNIVERSITY OF MINNESOTA
MORRIS

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UMM's Current Heating System

Four gas-fired steam boilers

Biomass gasifier

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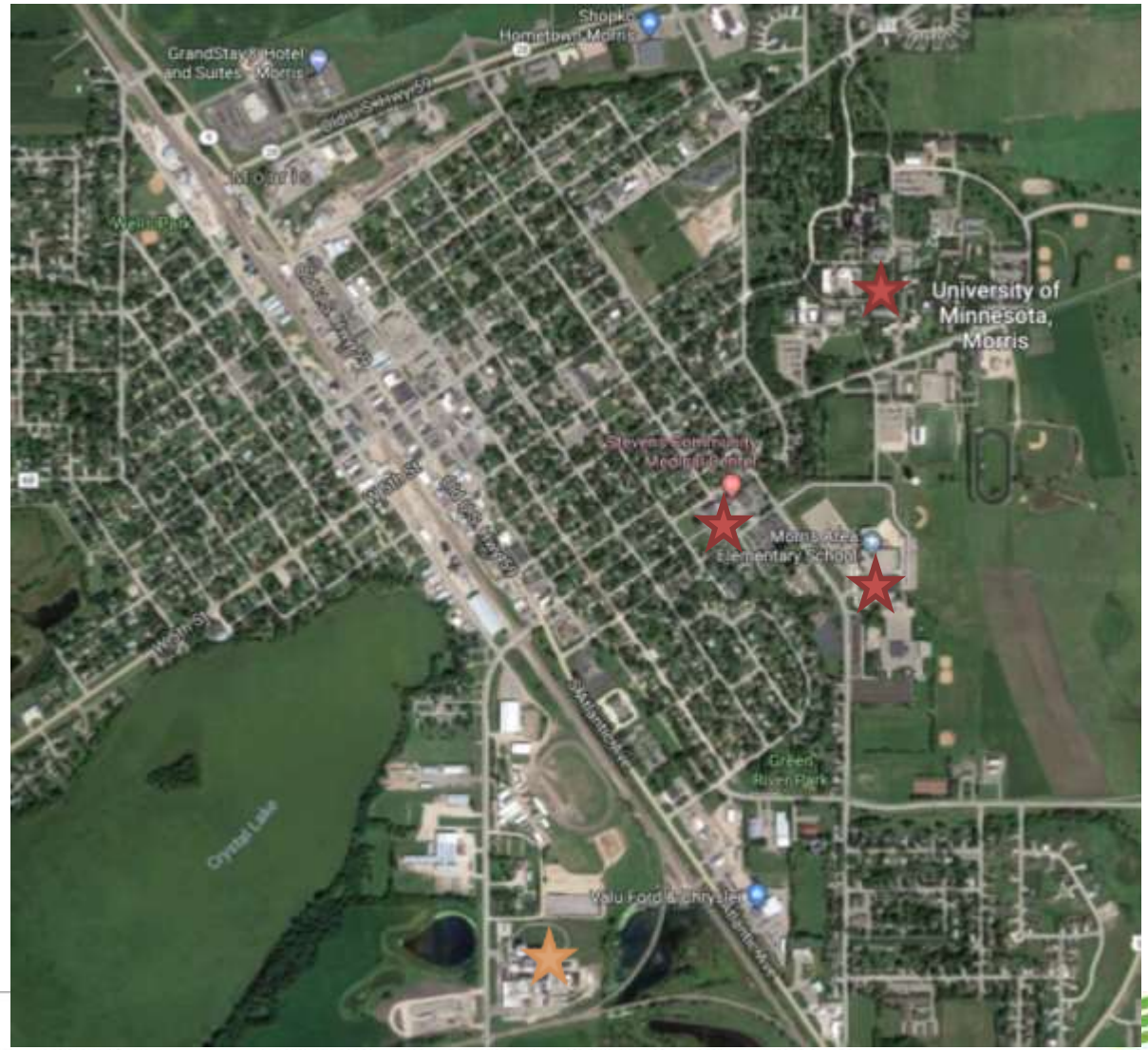
Advancing Energy in Morris

Goals

- Reduce overall energy costs
- Localize energy supply
- Resilience
- Carbon neutrality
- Increase efficiency
- Reduce maintenance costs
- Avoid unnecessary capital costs



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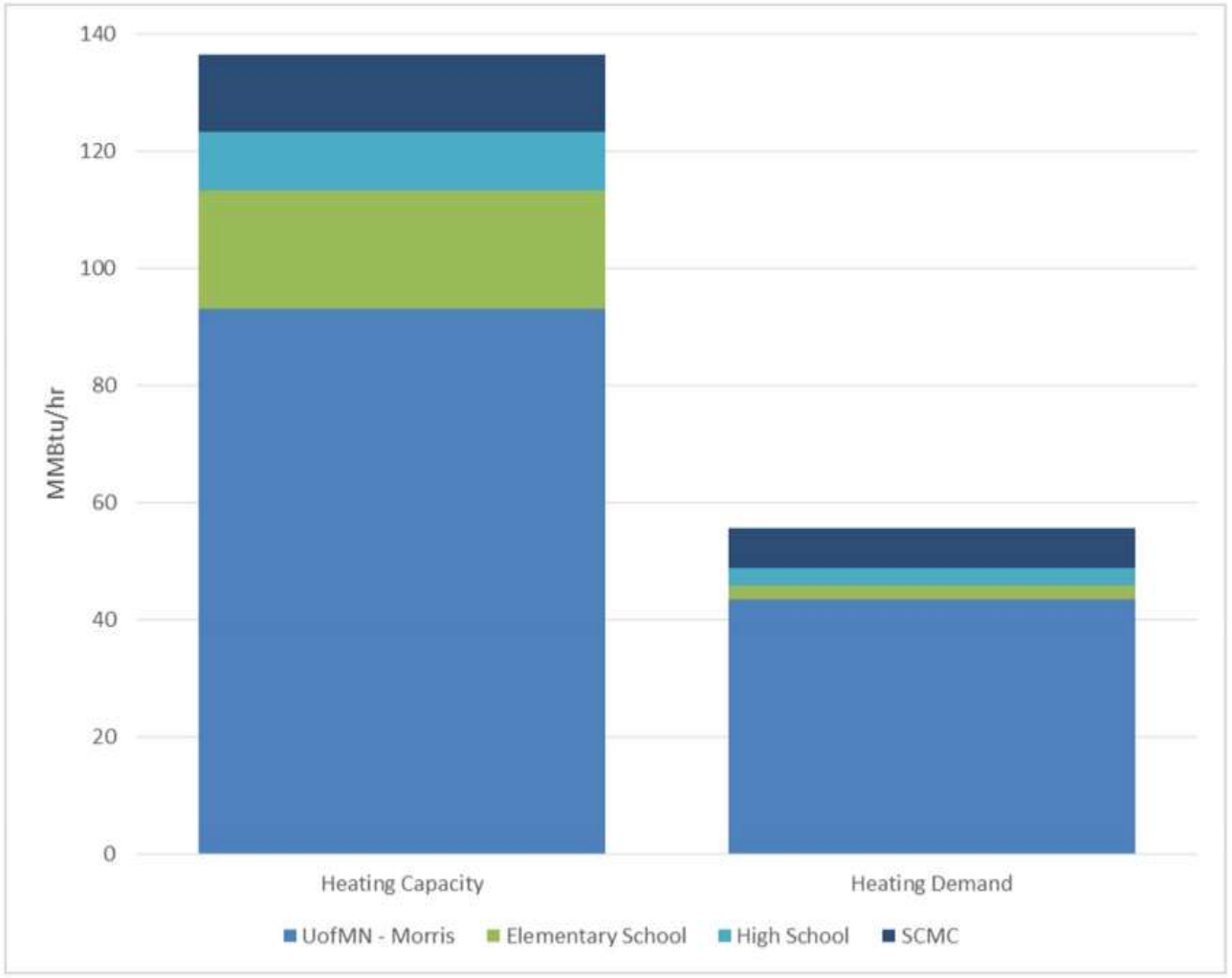
Aggregated Capacity & Demand



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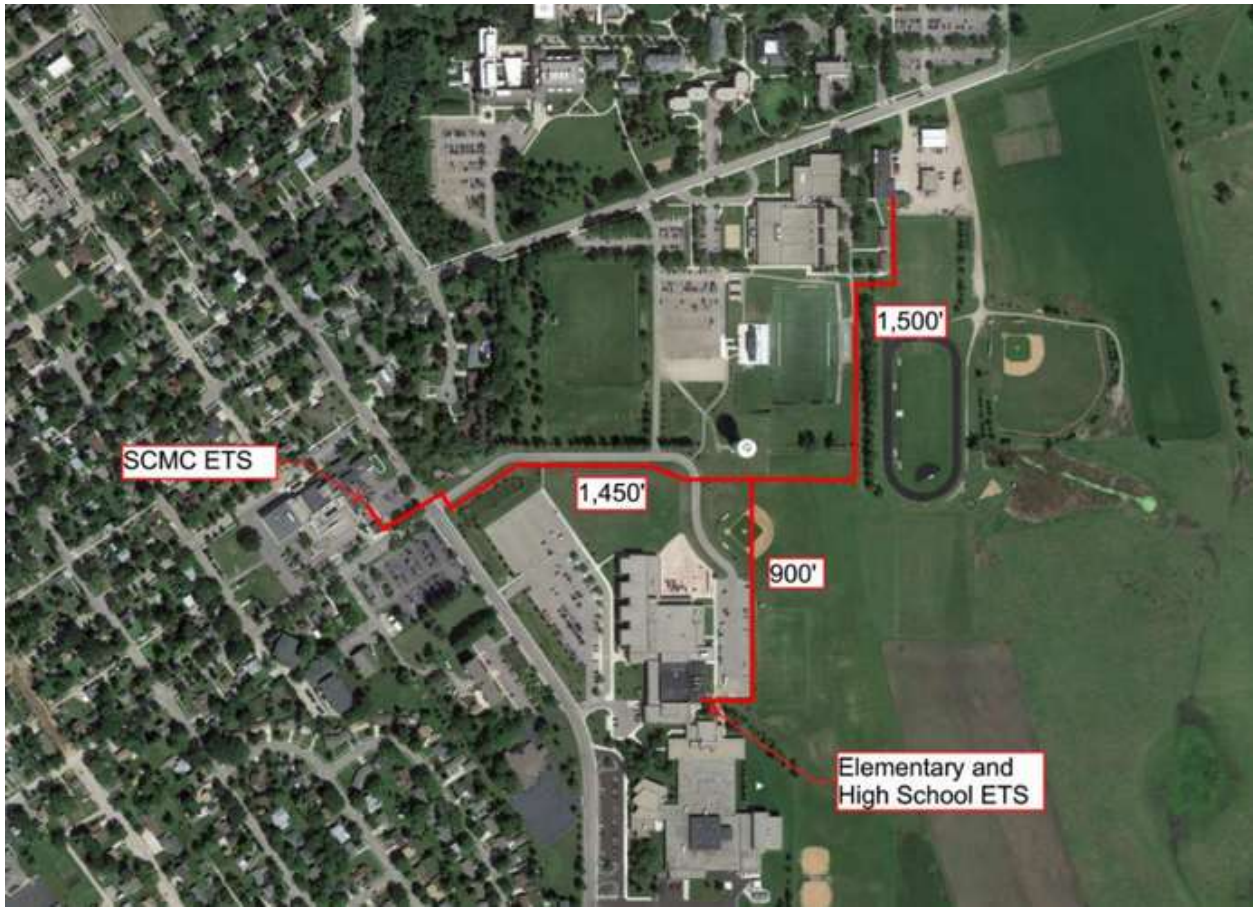
Integration Benefits

- Reduced energy-related costs for the parties by ~10%
- Reduced carbon emissions in Morris by 28%
- Avoids upcoming capital needs at the elementary school and hospital
- Establishes the framework for further growth in Morris



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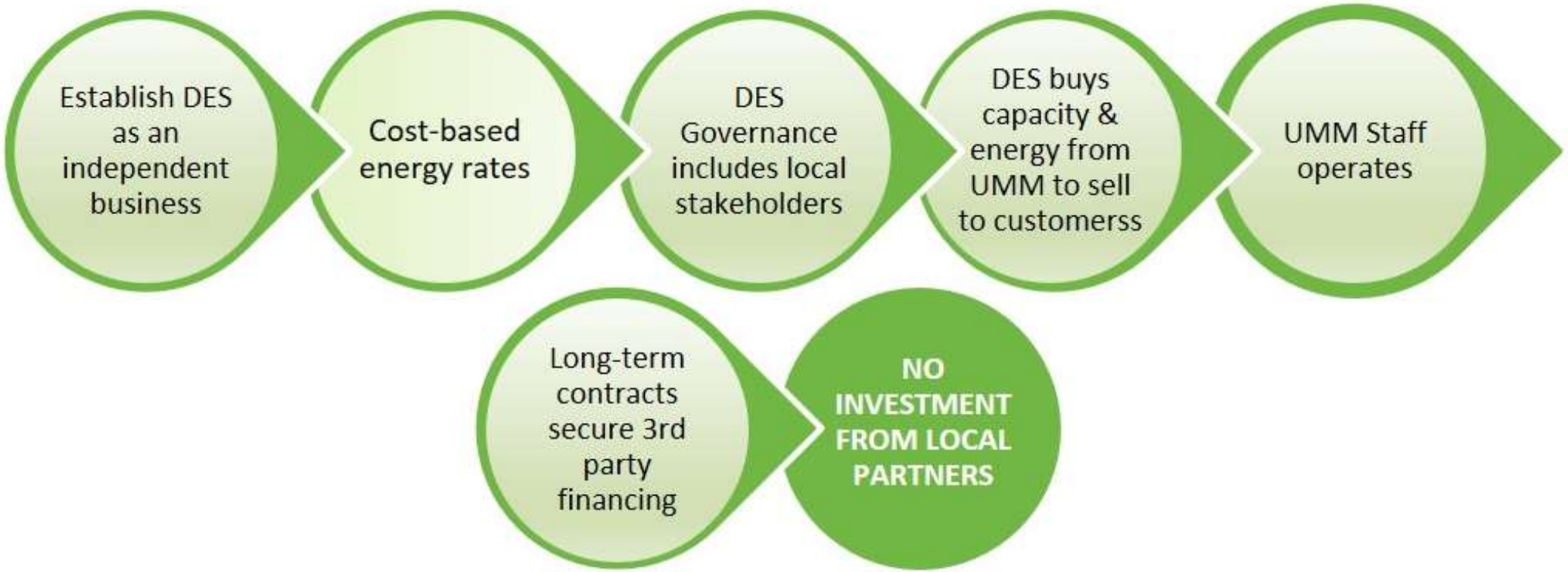
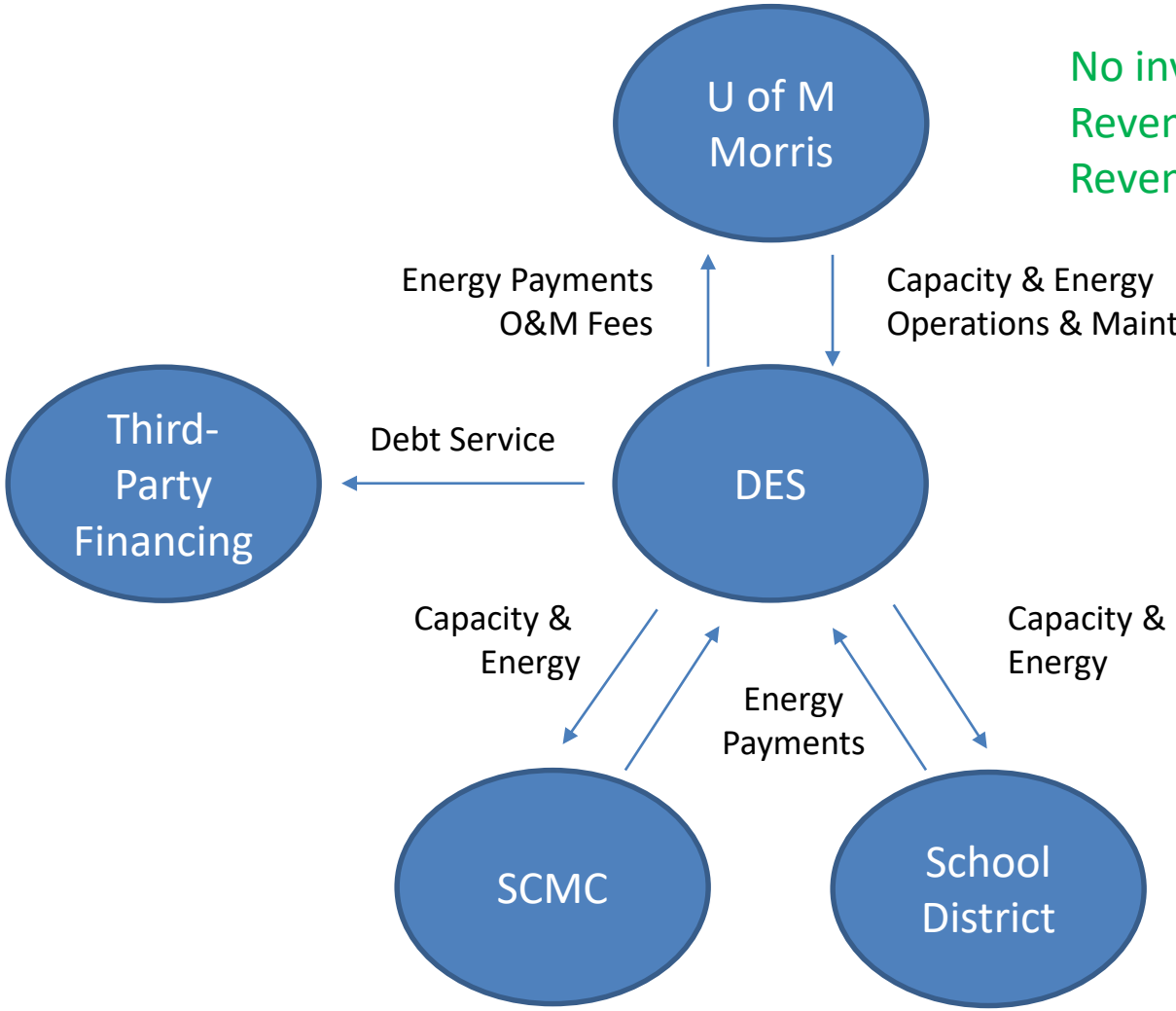
UMM Implementation Structure



UMM Implementation Structure



No investment from UMM
Revenue stream for capacity and energy
Revenue stream for operations

Achieving Carbon Neutrality at Oberlin College

OBERLIN

COLLEGE OF ARTS & SCIENCES
CONSERVATORY OF MUSIC

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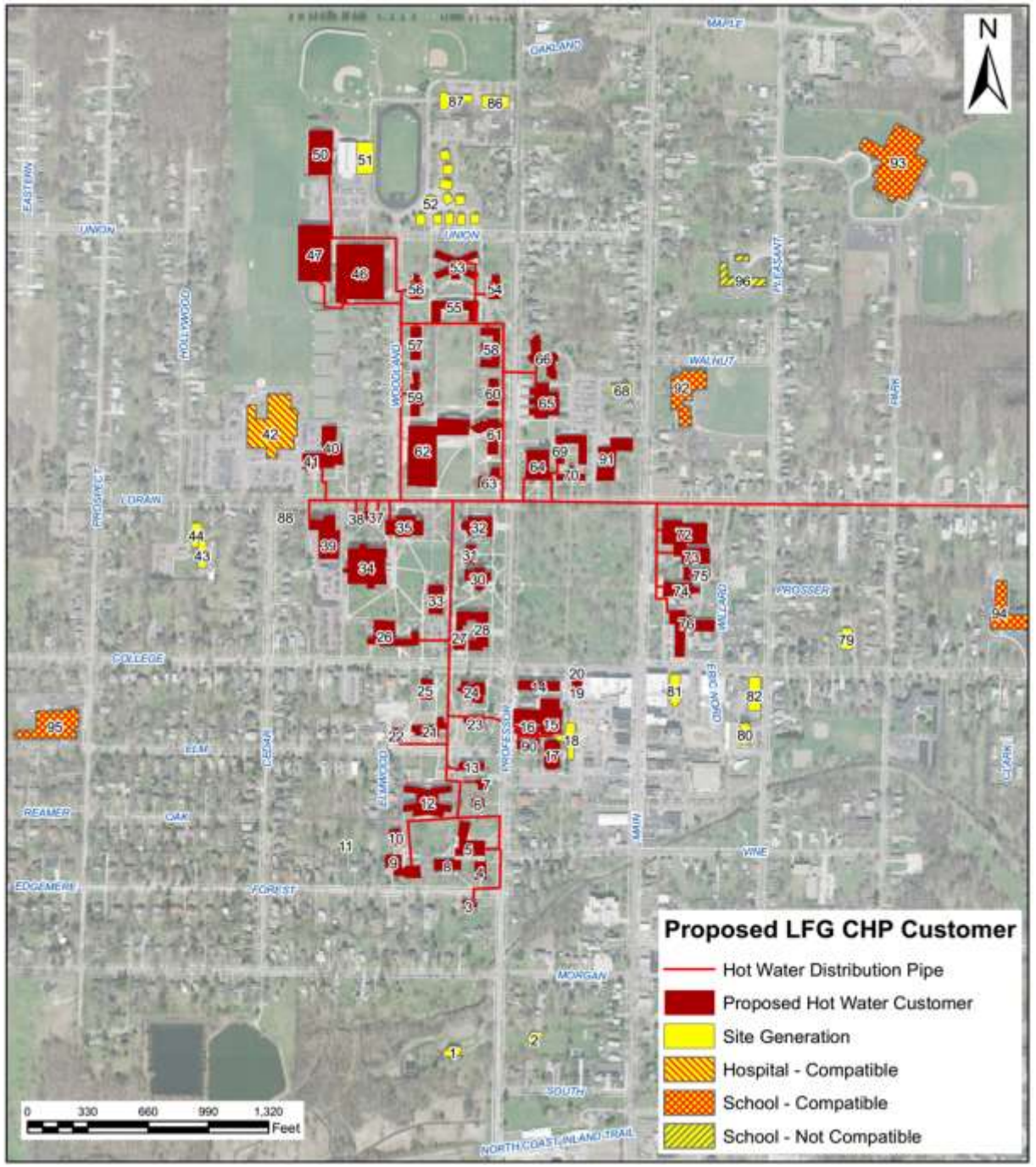
Oberlin's Opportunity

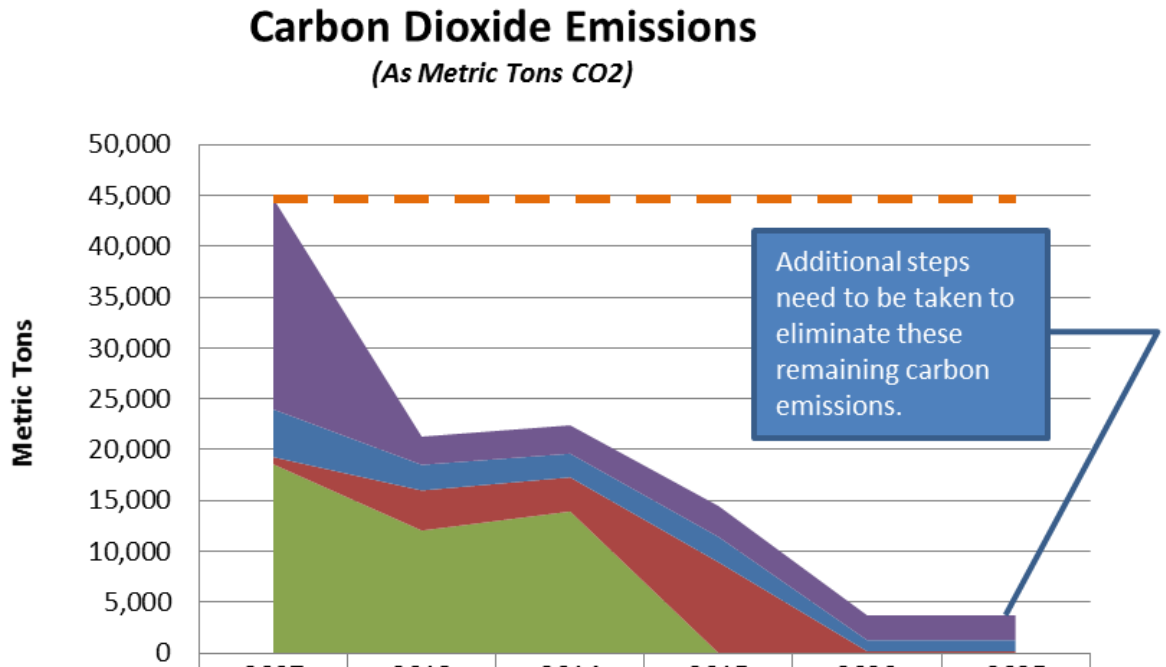
Reduce current scope 1 and 2 carbon emissions by 73%

- 92% reduction from the 2007 baseline.
- Annual water reduction of 7.5 million gallons
- Annual sewer discharge of 5.8 million gallons
- Implementable without capital investment from Oberlin

Transforming from Steam to Hot Water with Landfill Gas CHP



Projected Scope 1 & 2 Carbon Reductions



	2007	2013	2014	2015	2020	2025
Electric	20,720	2,777	2,790	3,030	2,450	2,450
Natural Gas Other	4,693	2,516	2,333	2,493	1,082	1,082
Natural Gas Central Plant	710	3,943	3,347	8,933	191	191
Coal	18,570	12,054	13,934	0	0	0
Total CO2	44,693	21,288	22,404	14,456	3,724	3,724
2007 Baseline	44,693	44,693	44,693	44,693	44,693	44,693
% Reduction (2007 Baseline)	0%	52%	50%	68%	92%	92%

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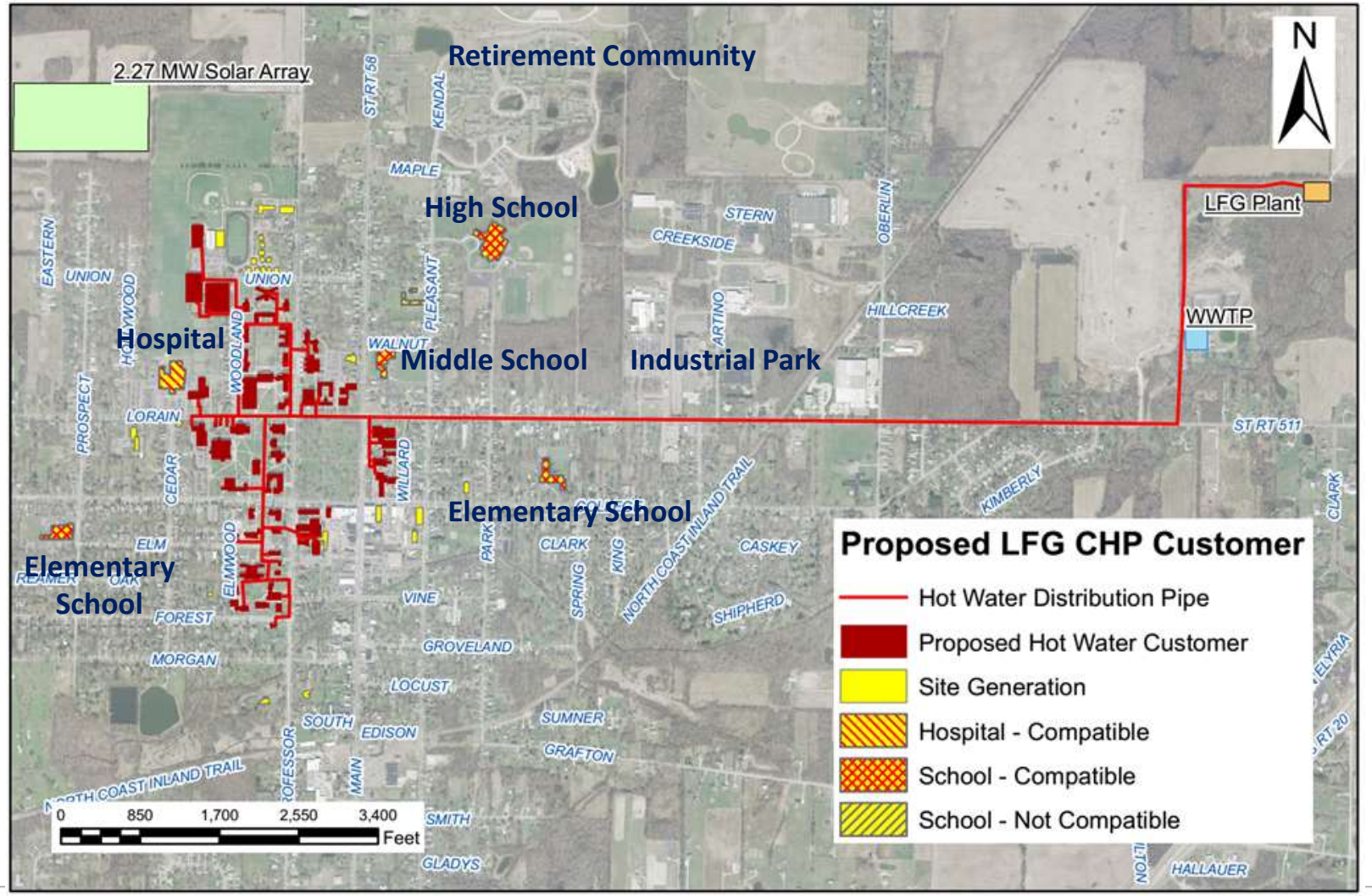
Integrating with the Oberlin Community



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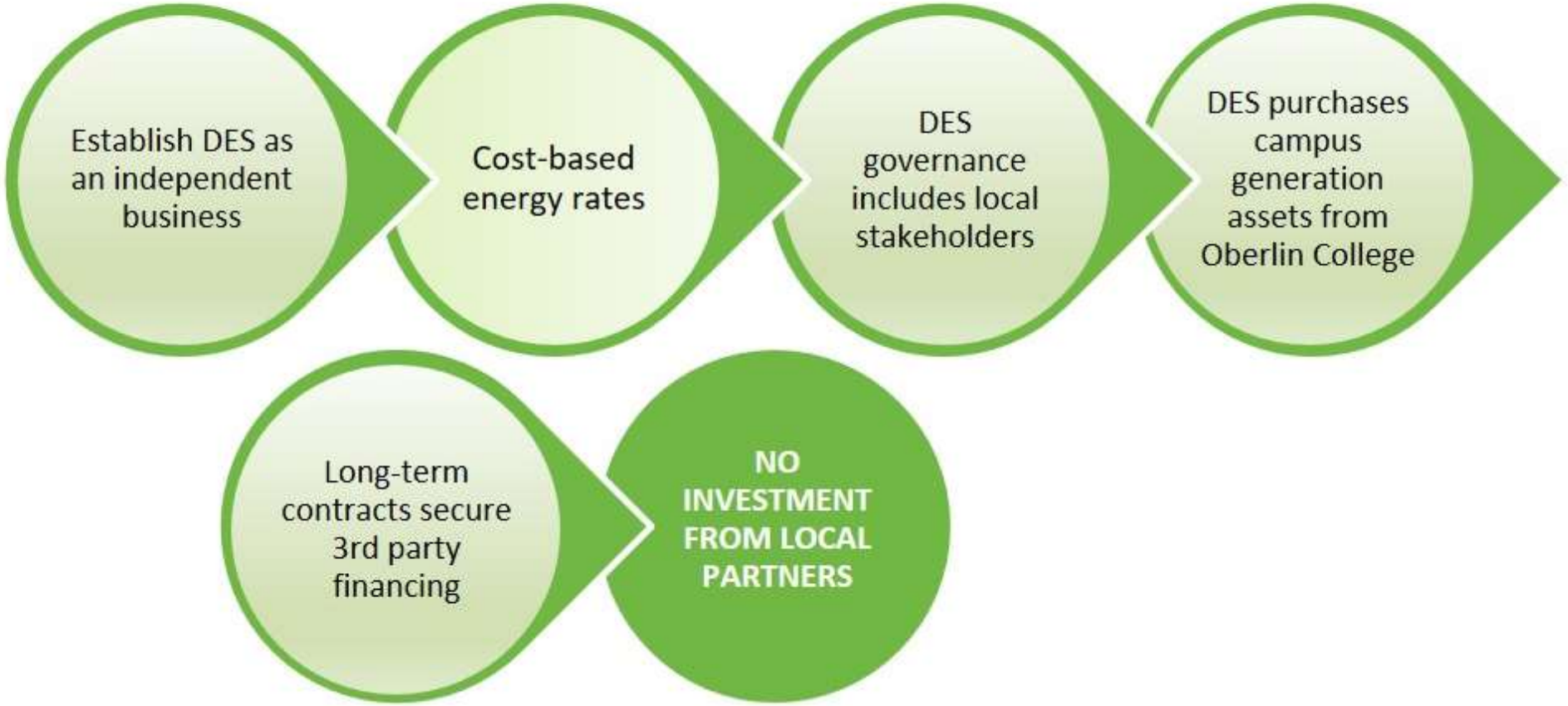
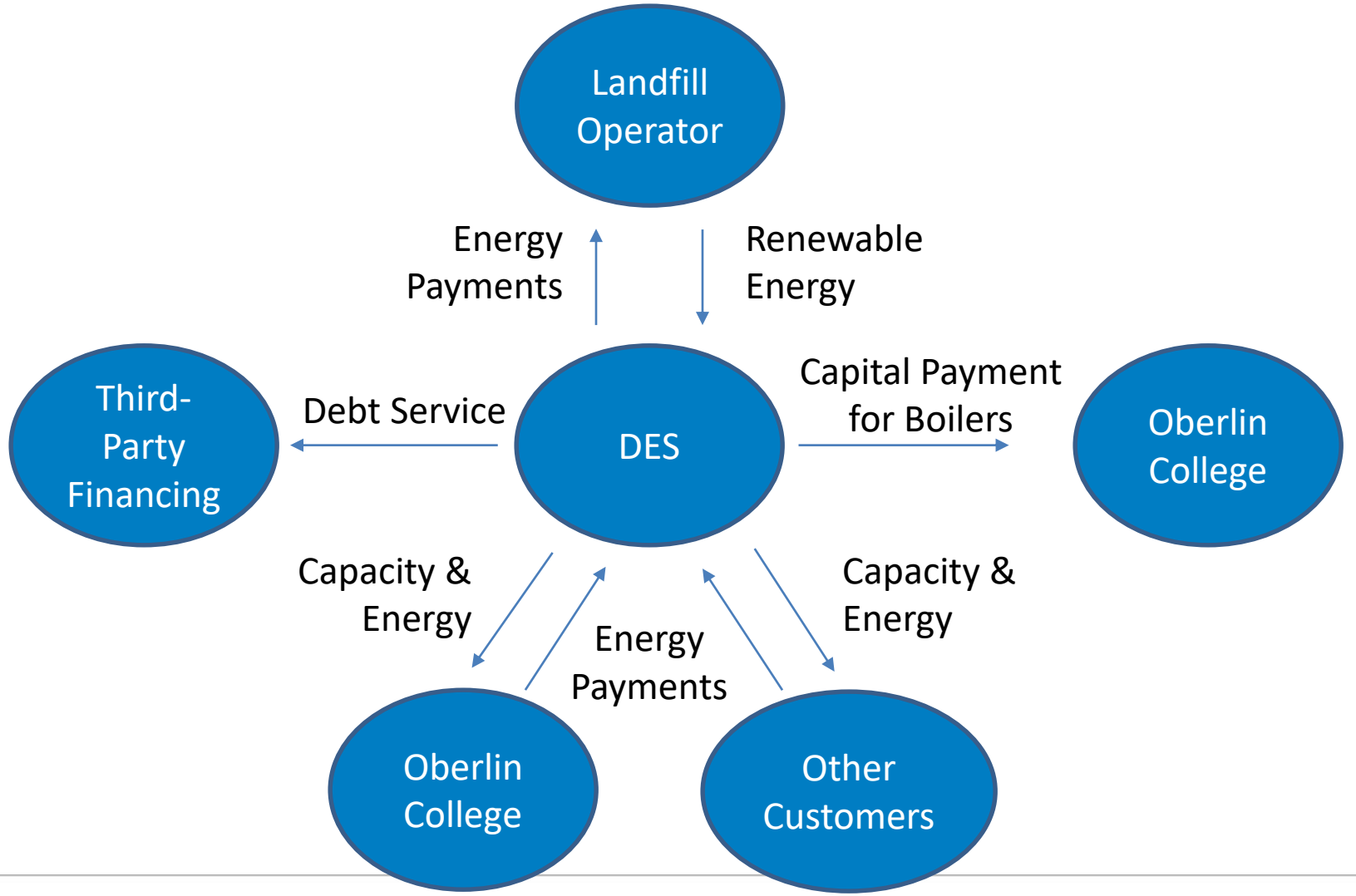
Advancing Integration with the Community

- Expansion of the Oberlin Project
- Oberlin Community Services collaboration
- Community benefits agreement
- Community engagement forum

Oberlin Implementation Structure



Oberlin Implementation Structure



92% of carbon eliminated
Reduced energy costs
No investment from Oberlin
Retirement of boiler plant debt

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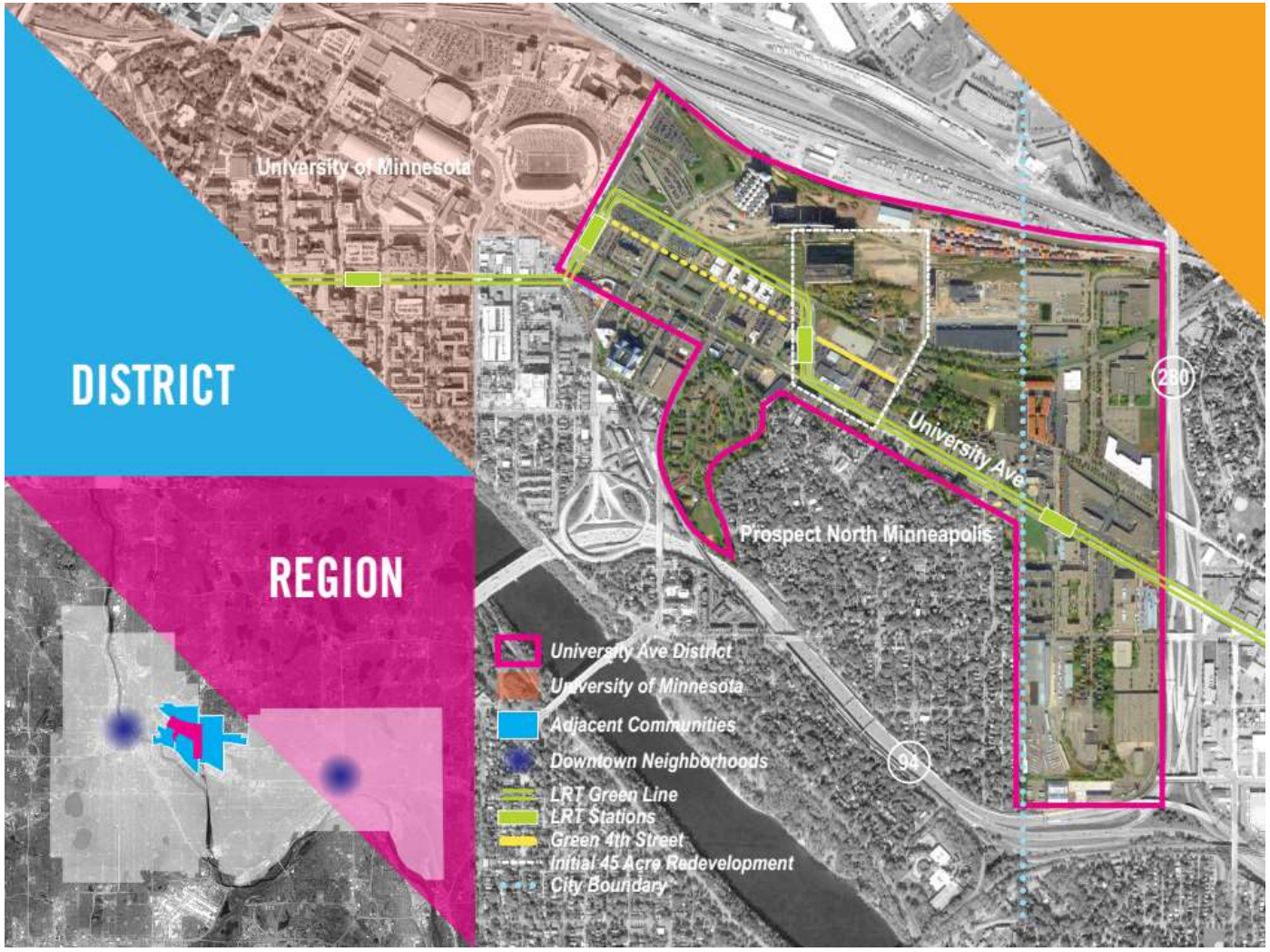
Redeveloping the Towerside District Adjacent to the University of Minnesota



Towerside Partnership

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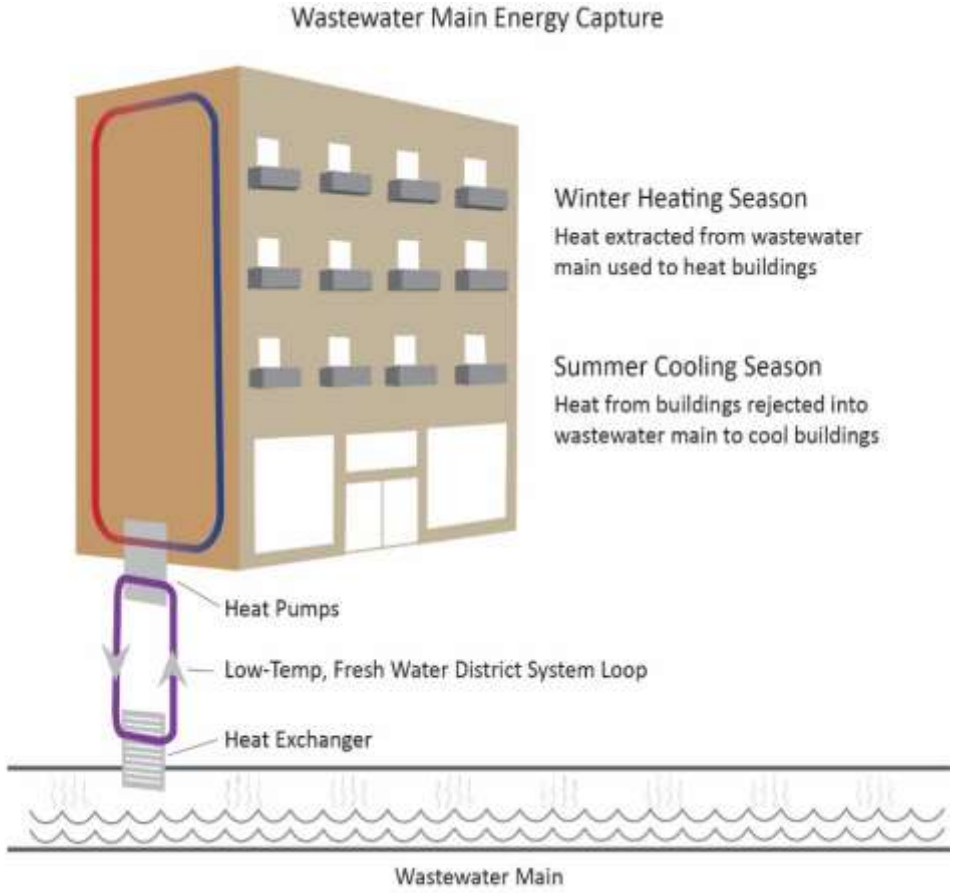
The Initial District Energy System: Wastewater Energy Recovery



Integration with the University of Minnesota

- Heating redundancy and peak
- Cooling redundancy and peak
- Location of energy exchange facility
- Carbon-free energy supply for future buildings

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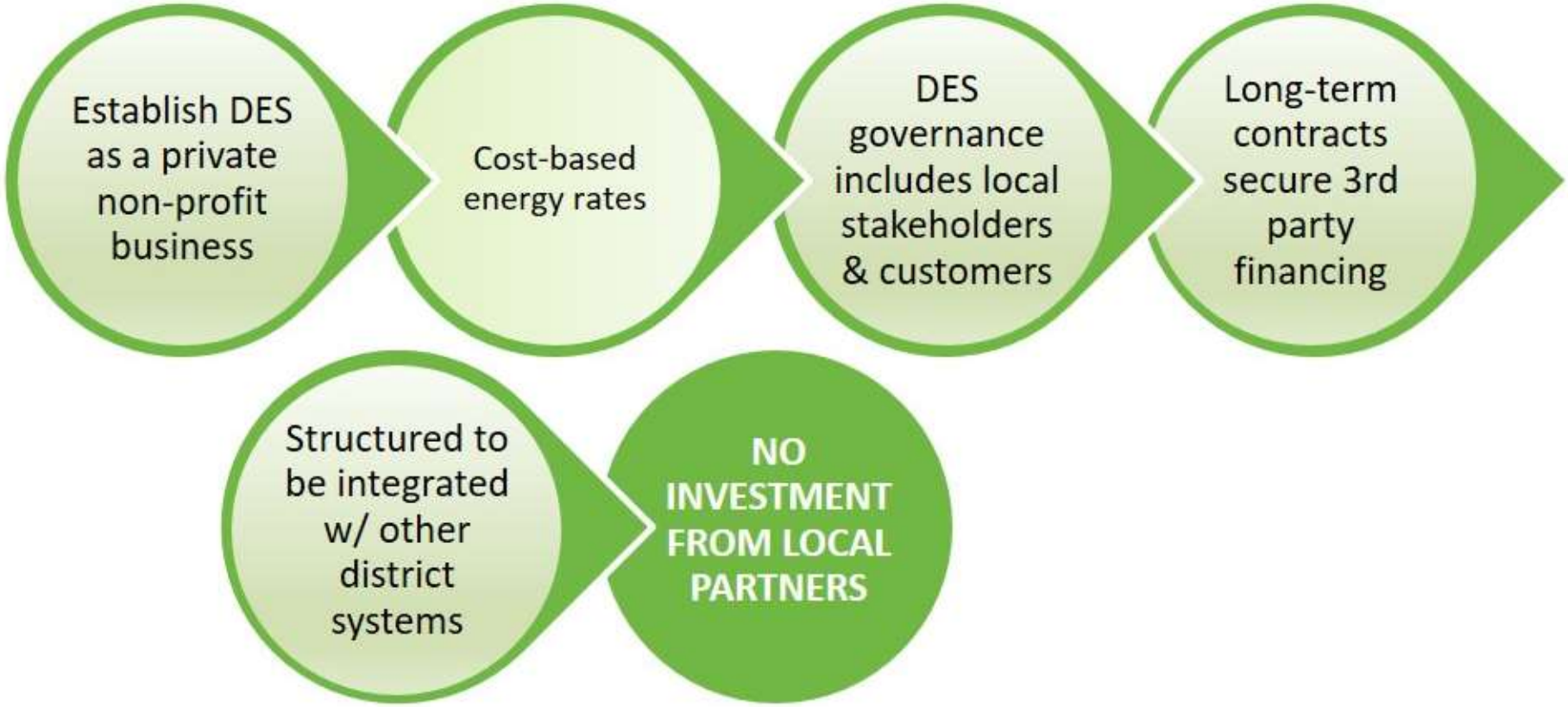
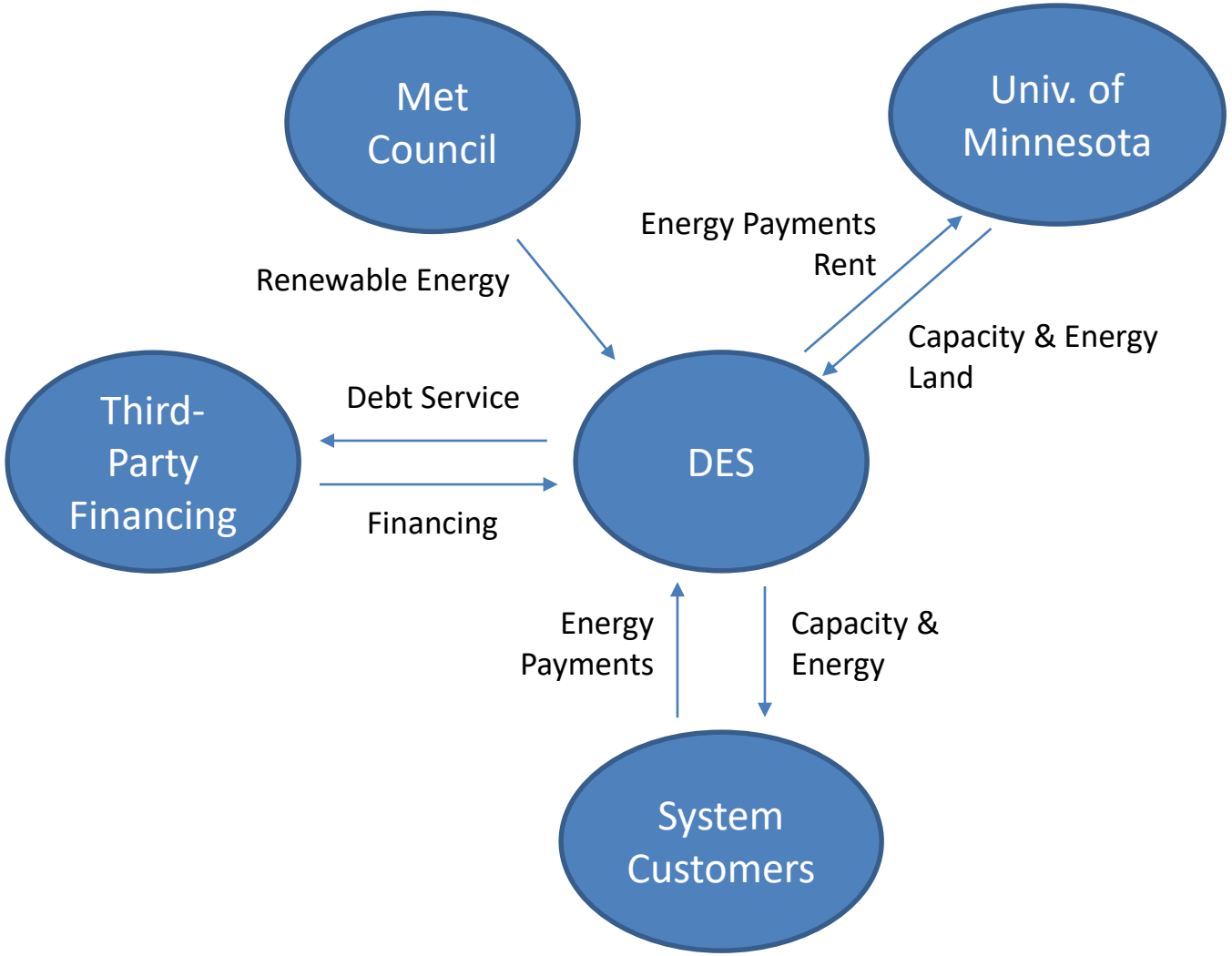
Towerside Implementation Structure



Towerside Implementation Structure



Access to carbon-free energy supply
No capital investment
Energy payments
Rent payments

Summary

- Campus system advancement can take many forms and structures – what are your goals?
- Goals can be achieved without capital investment from campuses
- Campuses can be:
  - Developers
  - Operators
  - Energy and capacity sellers
  - Exclusively customers
- Campuses need to be champions of advancement

QUESTIONS?

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