Delivering the Promise of Eco-Districts

MEP Associates & GI Energy IDEA 2017

gi energy

Presenters

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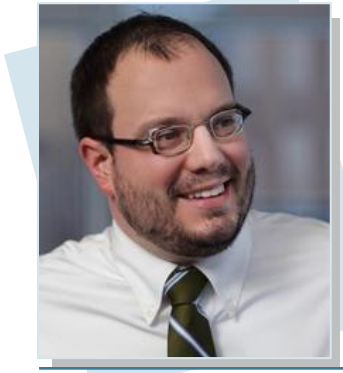
CEO, GI Energy



Mike Walters

Principal & Campus Energy Market Leader, MEP Associates

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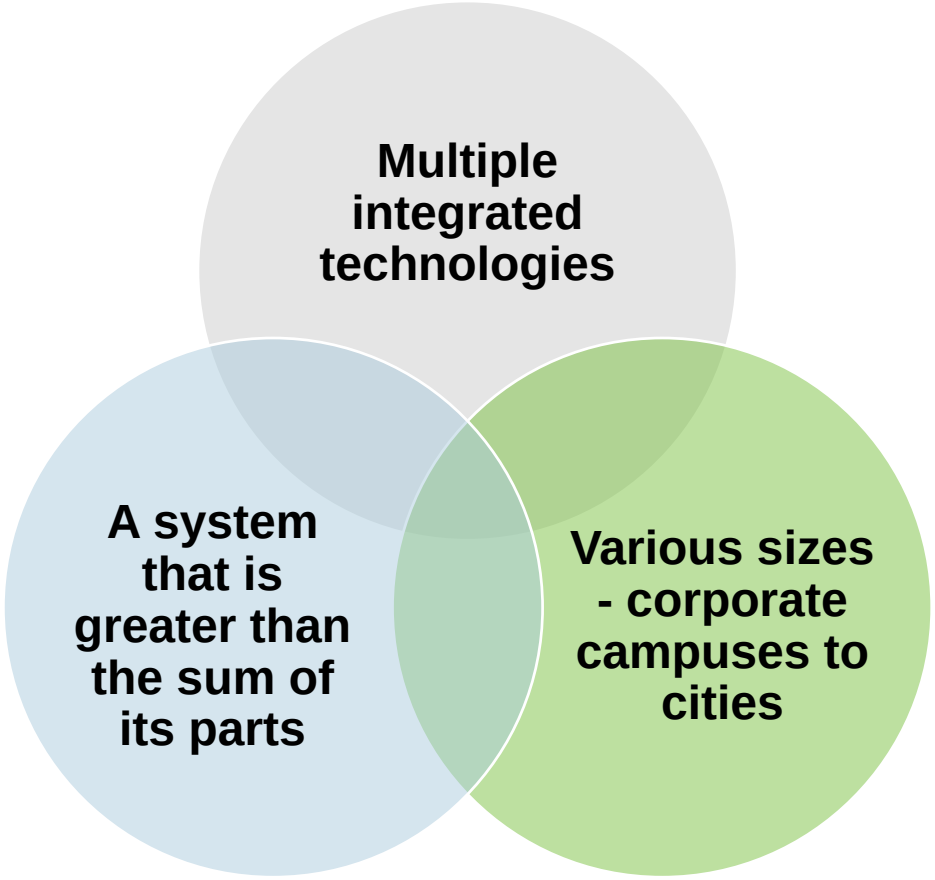
VP Development & Analytics, GI Energy

Today's Topics

- What is an Eco-District?
- Technology Overview
- Case Studies
- …the Money
- Questions?

What is an Eco-District?



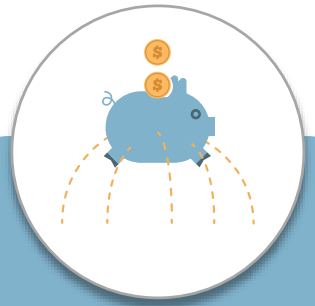
Benefits

Environmental

Resiliency

Health

Lower maintenance costs



Reduced capital and operating expenditure

Future-proofing

Integrated Technologies

Sustainable energy generation & storage






Advanced IT

Resource reuse

Other smart infrastructure

Case Studies

Epic Systems, Madison, WI

Carlton College, Northfield, MN

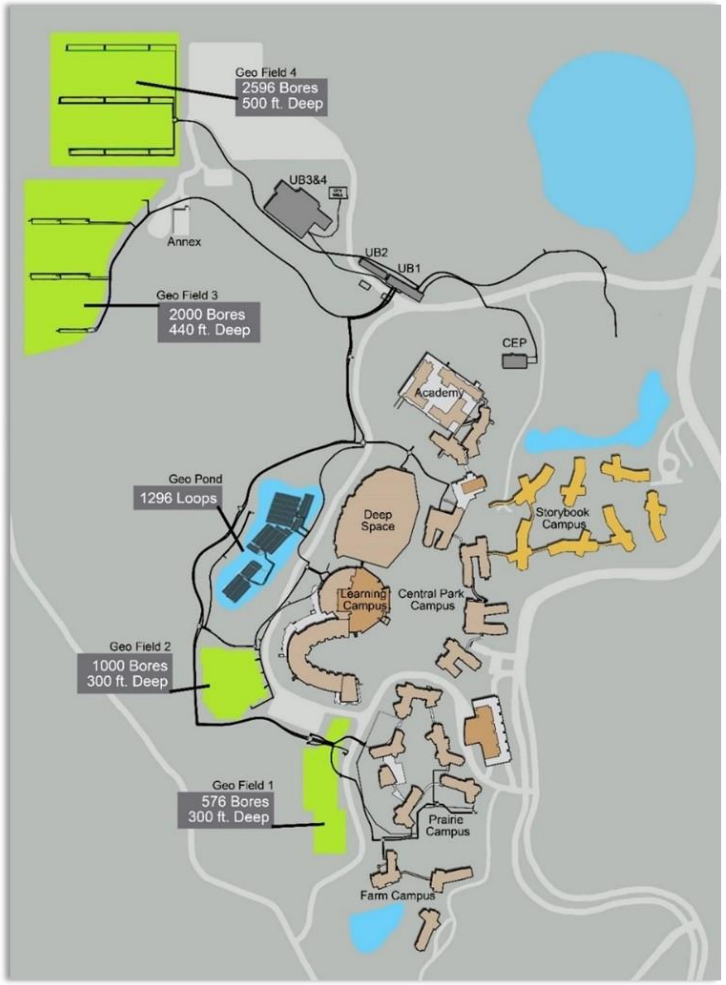
Ford Motor Company, Dearborn, MI

Bay Area Eco-District, San Francisco, CA

Epic Systems – Healthcare Tech Campus

- Entire campus approximately 1,051 Acres
- 9,000+ employees in 27 buildings, with 12 more under construction
- Over 7 Million sq ft occupied space including 7,338 underground parking stalls
- 1.5 MW Solar PV
- 10 MW Wind Generation

Epic Systems – Eco-District Scope



- Water-to-air & water-to-water heat pumps
- Distributed Central Energy Plants
- Geothermal bore fields and pond system
- Open lake water system
- Domestic water heating system utilizing geothermal water
- Snow/ice melt systems
- Photovoltaic solar panels
- Wind farm

Epic Systems – Impacts

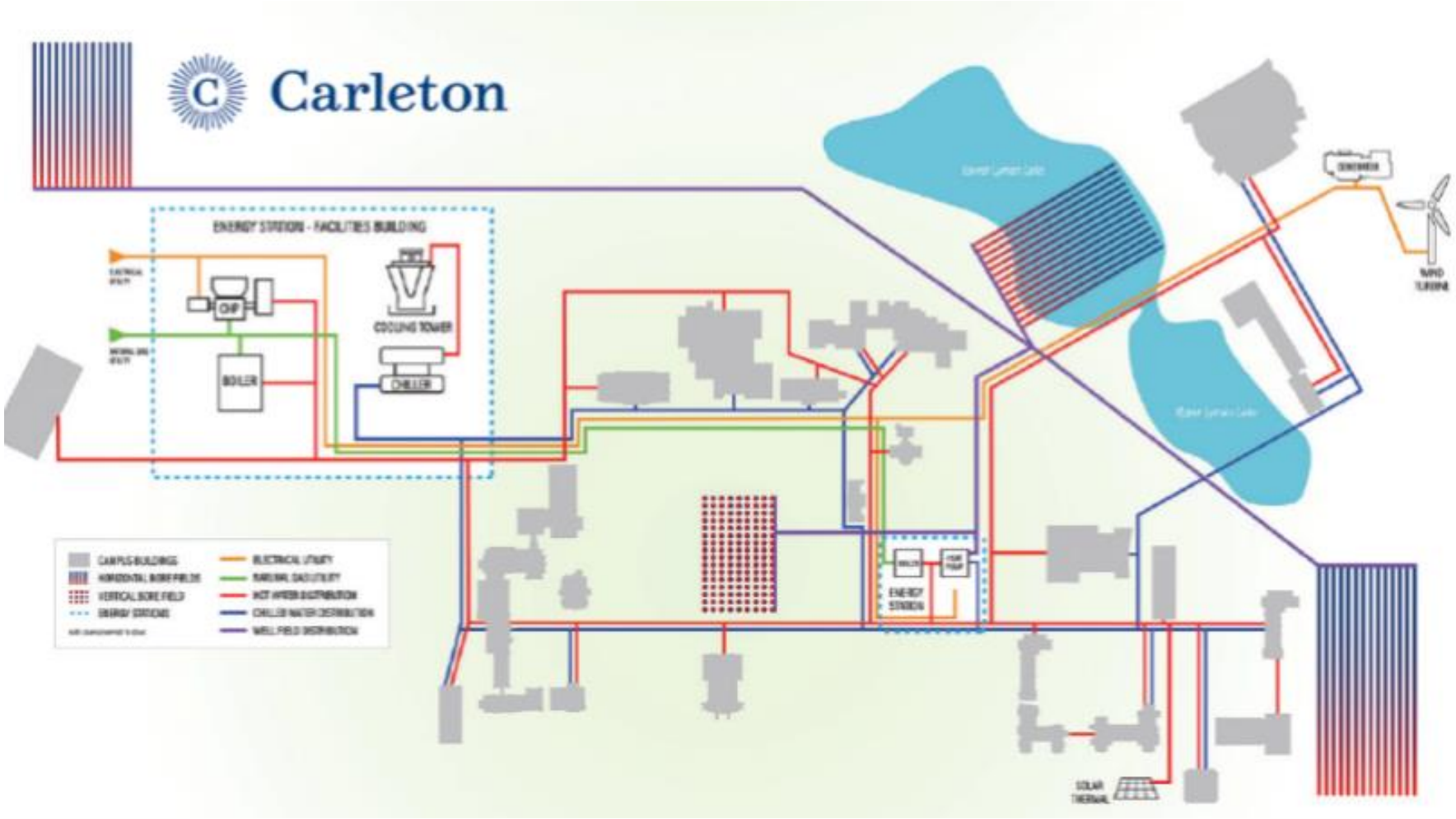
EPIC SYSTEMS – VERONA, WI PHOTO CREDIT: KATIE WHEELER

Carleton College

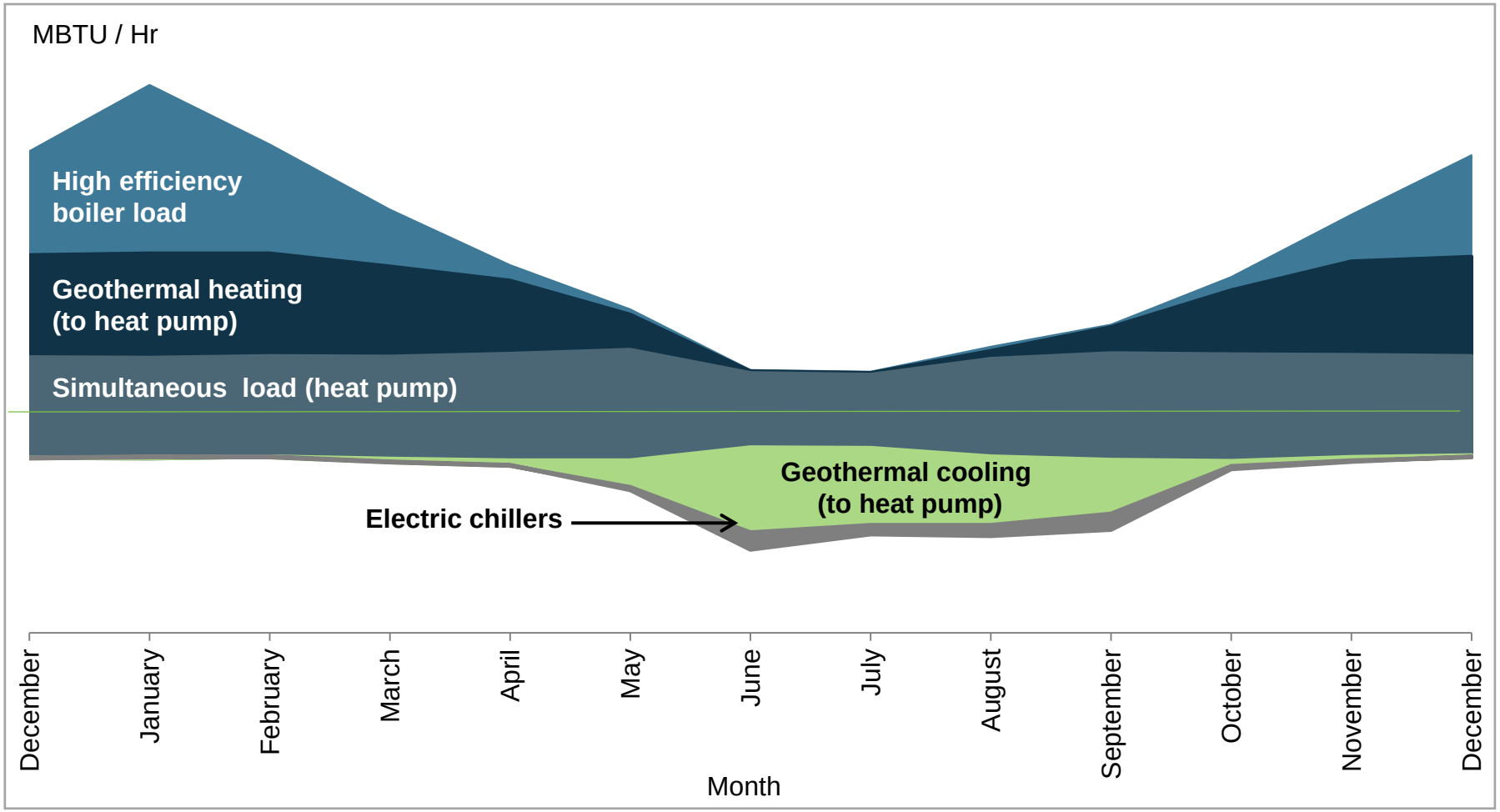
Highly selective undergraduate college, 2,100 students and 250 staff on 1,040 acre campus.

With a focus on **replacement** and **renovation**, Carelton anticipates only **3% net growth** in total campus square footage over the next 25 years.

Carleton College – Project Scope

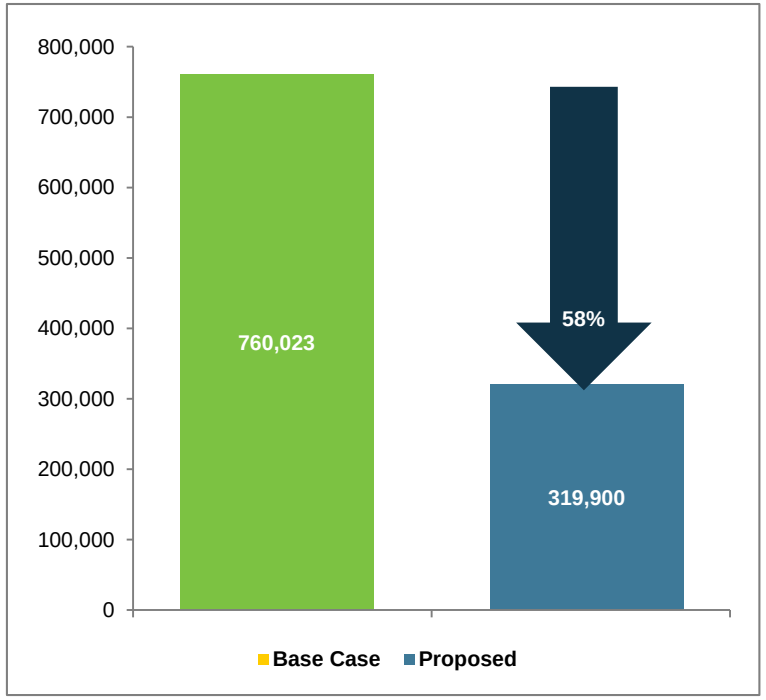


Carleton College – Seasonal Load Profile

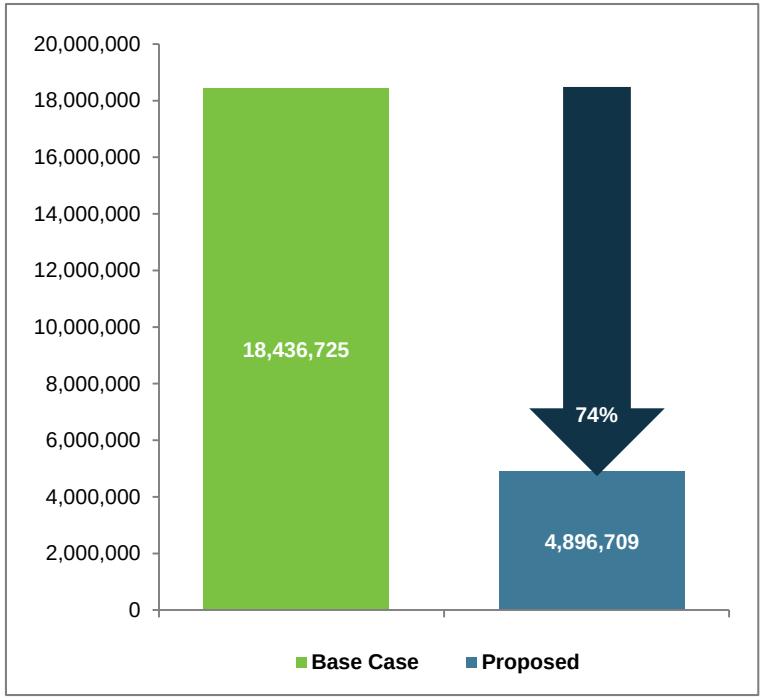


Carleton College – Impacts

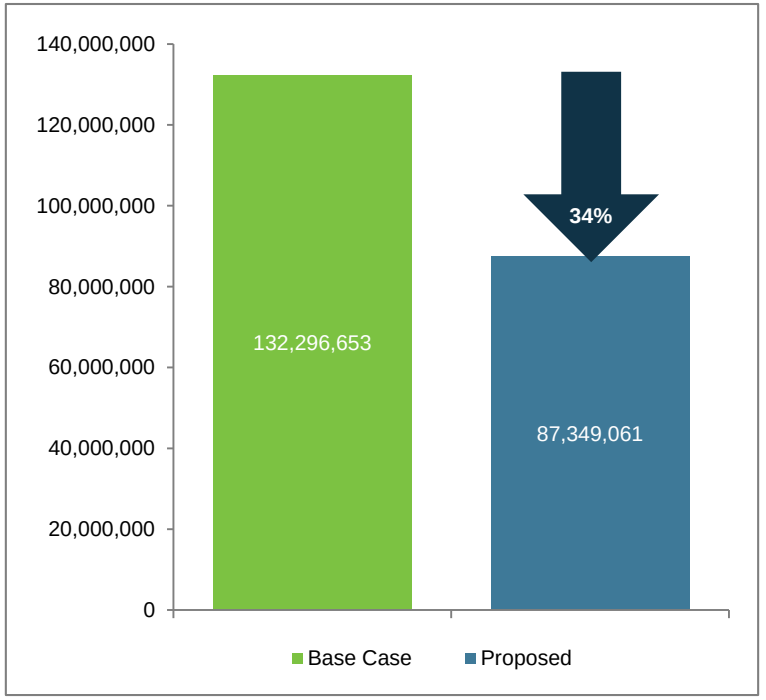
Utility Cost ($/yr)



Carbon Emissions (lb C02/yr)



Energy (MBtu/yr)



Ford Low Entropy Campus Transformation - R&E Center

Low Entropy Campus

Design Goals encompass building heating, cooling, and ventilation systems:

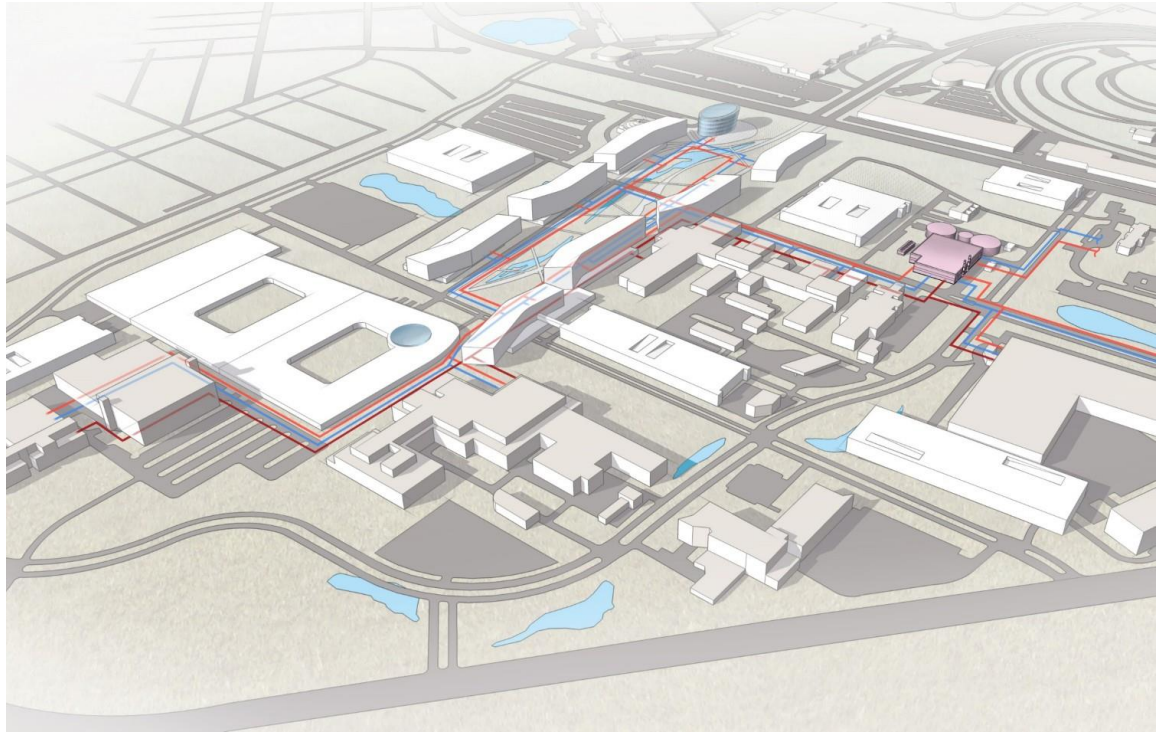
1. Provide comfortable, effective, well-connected work environments
2. Heat and cool with energy streams as close to room temperature as possible
3. Recycle energy streams effectively and introduces new ones judiciously
4. Minimize energy system distribution losses
5. Bank and retrieve energy flows over time

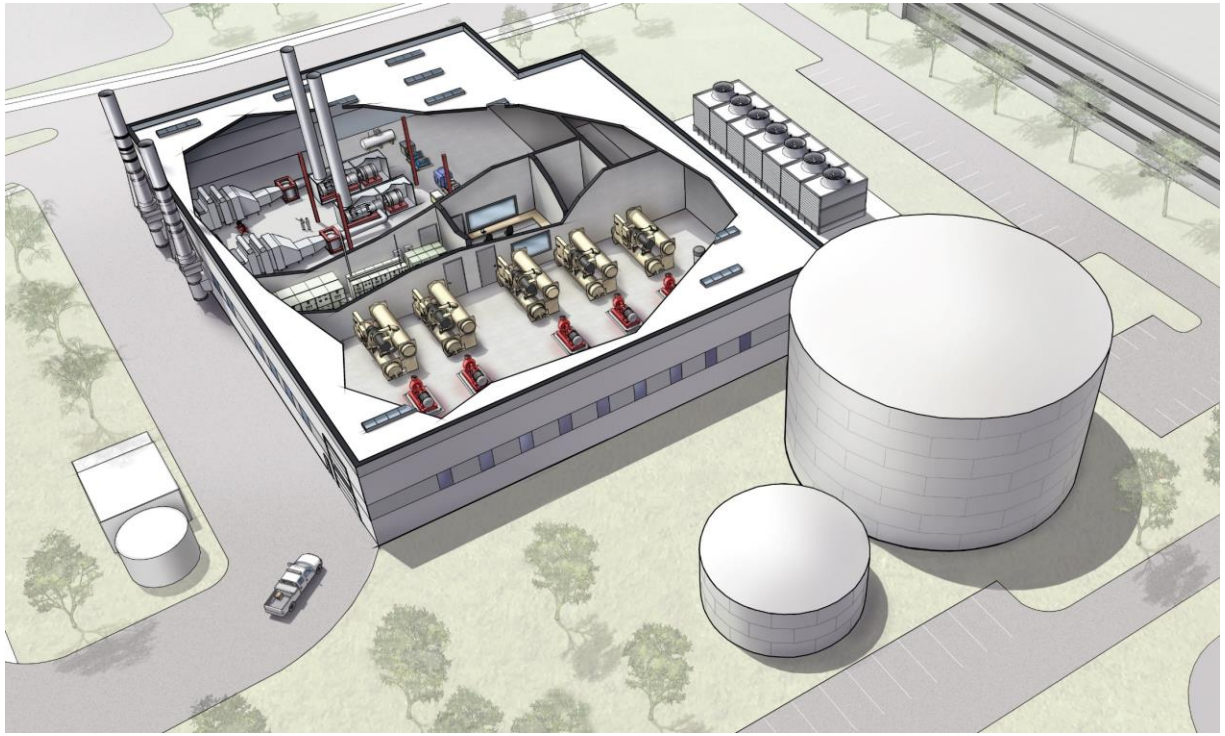
Led to

- Central heat pumps, chillers, cooling towers, geothermal heat exchange, thermal storage, cogeneration, and photovoltaics

Ford Campus Transformation – 2025 Master Plan

Ford Campus – Energy Infrastructure & Central Plant





Ford Campus – Impacts

Bay Area Major Redevelopment & Eco-District

- 8,000,000+ square feet of new development
- New Master Utility Plan designed along with street grid and development blocks
- Third party funded systems: Solar PV & energy storage, geo-exchange HVAC, recycled water, automated waste collection, EV charging and self-sustaining street lights
- Mix of direct-use third party offtake contracts, and partnerships with local municipal utilities

Bay Area Eco-District – Details

- Over 800 acres for residential, commercial & municipal use
- Master planned site under single real estate developer, with GIE as eco-district development partner
- ~450,000 GPD water recycling system
- 10-15MW of rooftop PV planned
- 15,000 ton capacity geothermal heating & cooling system

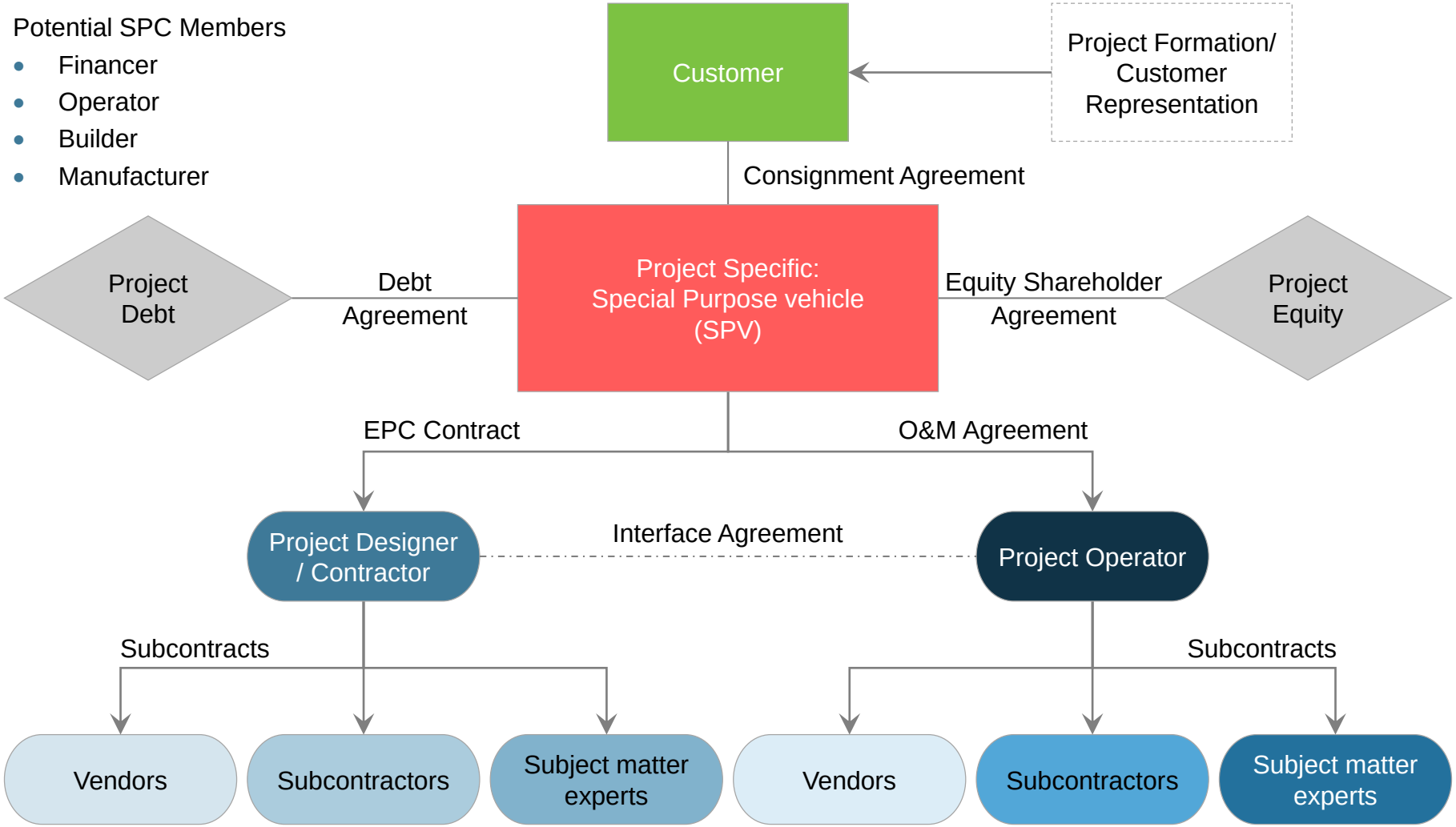
Financing – Third Parties

What	Capital Markets are chasing investment opportunities in renewable and sustainable energy
Who	Private equity, infrastructure funds, venture capital and institutional investors are all interested
Why	Mix of revenue types create diversified portfolio in single project
So…	No longer as reliant on tax credits to unlock financing

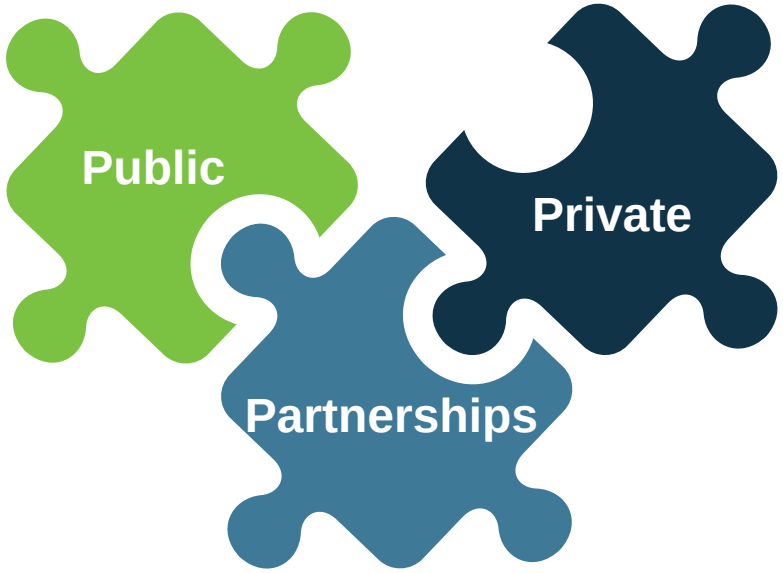
Typical D-BOOM Structure

Potential SPC Members

- Financer
- Operator
- Builder
- Manufacturer



Public Private Partnerships (PPP)



- Tool to help pay for infrastructure that maintains competitive energy prices
- Third party finance + municipalities and local agencies (+ developer) = sustainability services to end users
- Limited public investment in infrastructure

What can you do on YOUR campus?

Power and water purchase agreements

Long-term capital leases

Service and use fees tied to HOAs

Thermal energy management agreements

Subscription-based, user-funded models (EV charging stations)

Any questions?

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