
IDEA2021
Powering the Future: District Energy/CHP/Microgrids
Sept. 27-29 | Austin Convention Center | Austin, Texas

THE NEW MODULAR:
Breaking the "Chiller in a Box" Stereotype

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INTERNATIONAL DISTRICT ENERGY ASSOCIATION

FIELD ERECTED vs. MODULAR

Field Erected

Modular

EARLY MODULAR CHALLENGES

Modular Benefits:

- Condensed **footprint**
- Superior **quality**
- Enhanced **safety**
- Compressed **schedule**
- Reduced **risk**
- Minimized **on-site disruption**
- Improved **cost certainty**

Early Modular Challenges:

- **Maintenance and serviceability** issues
- Lack of **architectural enhancements**
- Limited **expansion/phasing** capabilities
- Lack of **control system** robustness and integration

Early modular construction afforded clear benefits; however, **early challenges required additional refinement.**

EARLY MODULAR CHALLENGES

Maintenance and Serviceability: lack of access, narrow aisles, tight enclosures

EARLY MODULAR CHALLENGES

Maintenance and Serviceability: lack of external access; **Aesthetics:** lack of options

THE HYBRID TRANSITION

1990 2000 2010 2020

THE HYBRID TRANSITION: MEETING AESTHETIC REQUIREMENTS

Photo Source: Stellar Energy

Jumeirah Lake Towers District Cooling Plant

Dubai, UAE

- **Modular, off-site manufacturing** of chilled water skids combined with on-site building construction
- Strict aesthetic requirements drove hybrid approach.

THE HYBRID TRANSITION:
MINIMAL SITE DISRUPTION & LIMITED FOOTPRINT

Photo Source: Stellar Energy

University of the Incarnate Word
San Antonio, TX

- Screening constructed prior to modular delivery with parallel construction schedules
- **Modular enabled minimal site labor and site disruption**

THE HYBRID TRANSITION:
REDUCED FOOTPRINT & HARMONIOUS FACADE

Photo Source: Stellar Energy

Kansas State University
Central Utility Plant
Manhattan, KS

- Improved footprint reduction and optimization combined with aesthetically homogenous exterior
- **Screen wall structural support not integrated into modular structure**

THE HYBRID TRANSITION: ART MEETS FUNCTION

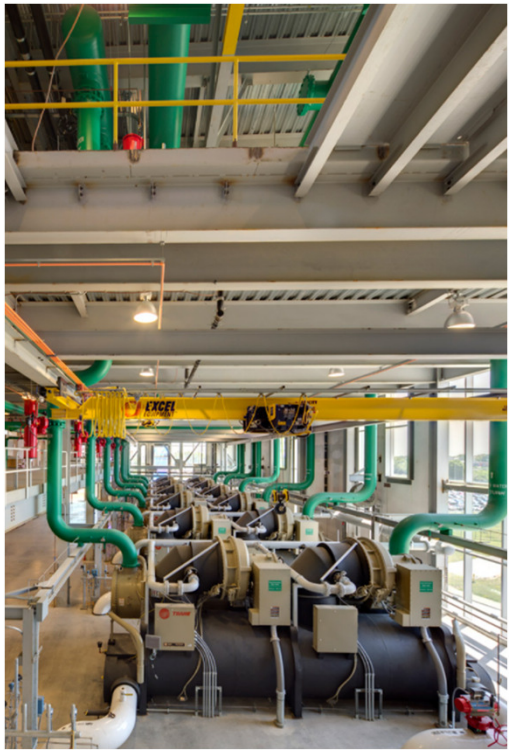


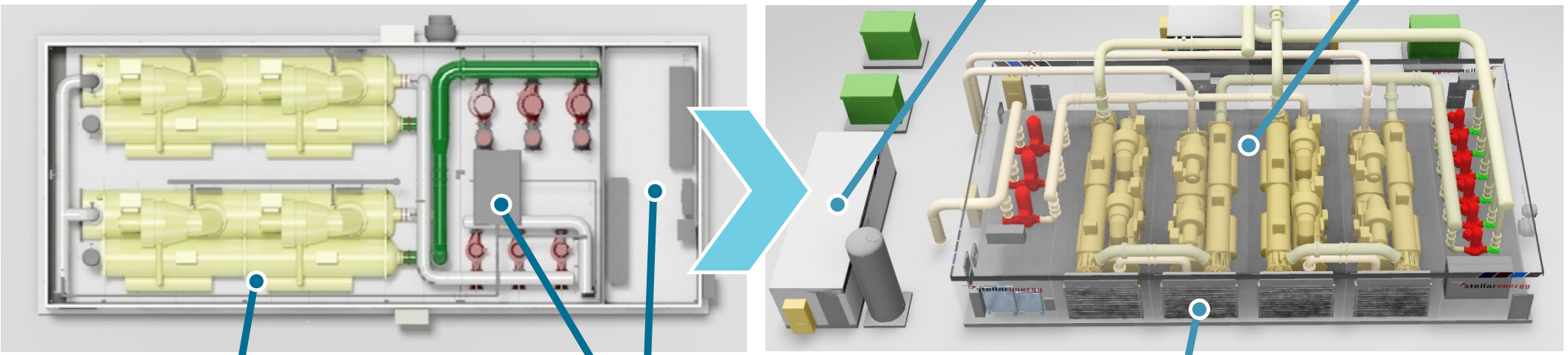
Photo Source: http://www.r-barc.com/projects/osu-south-campus-chiller-plant/ (Ross Barney Architects)

Ohio State University South Campus Chiller Plant
Columbus, OH

- Further modularization of building façade combined with traditional stick-built interior industrial space

MODULAR EVOLUTION: Design for Serviceability

1990 2000 2010



THE NEW MODULAR:
A FOCUS ON SERVICEABILITY

Maintenance and Serviceability: Centralized electrical and controls, easy access to equipment, wide walkways

THE NEW MODULAR:
A FOCUS ON SERVICEABILITY

Maintenance and Serviceability: Wide walkways, roll-up doors, monorail systems

THE NEW MODULAR: ACCESSIBILITY ENHANCEMENTS

Maintenance and Serviceability: Roof hatches for accessibility

FULLY UNLOCKED MODULAR

1990 2000 2010 2020

Photo Source: Stellar Energy

Photo Source: Fidelity Investments Centercore Data Center | HED

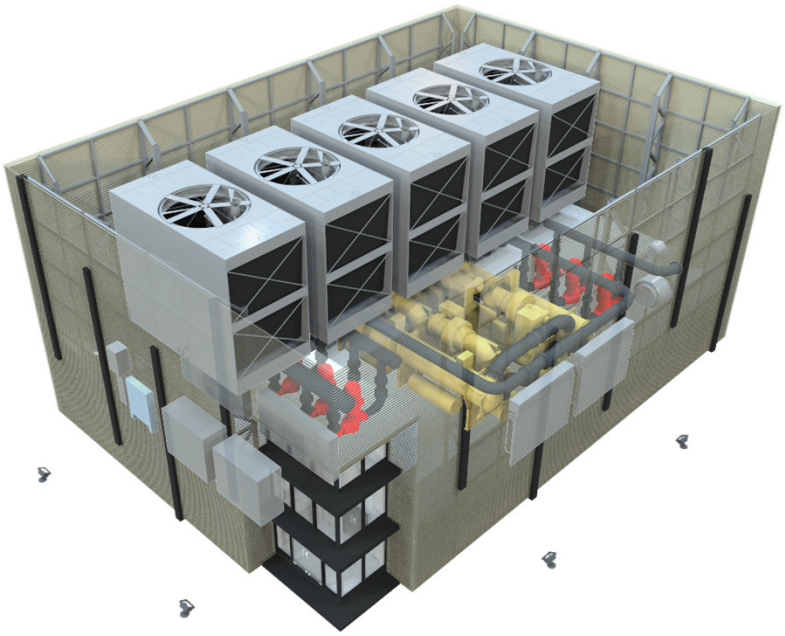
FULLY UNLOCKED MODULAR:
NEXT GENERATION DISTRICT ENERGY SOLUTION

Photo Source: Stellar Energy

Mueller Energy Center
Austin Energy
Austin, TX

- Reduced **footprint**
- Enhanced **aesthetics**
- Improved **serviceability**
- Fully automated **controls**
- Compressed **schedule**

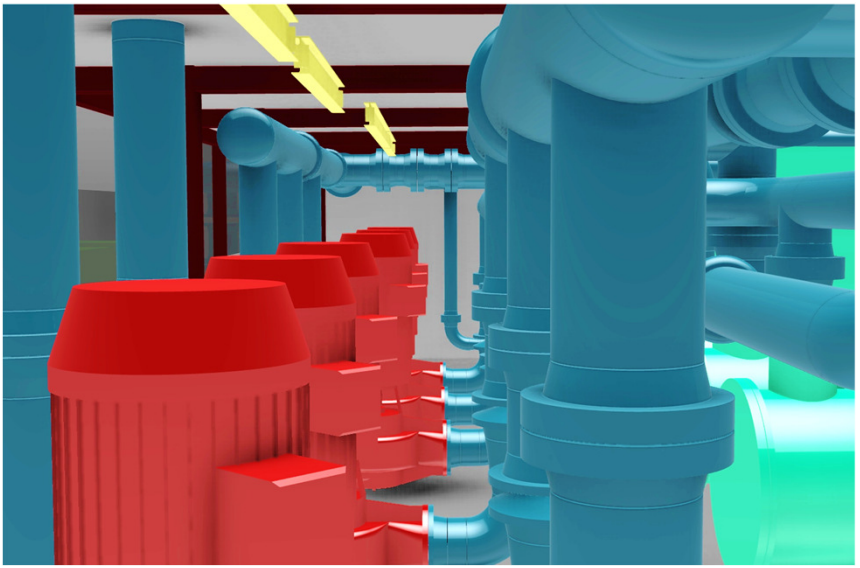
FULLY UNLOCKED MODULAR:
NEXT GENERATION DISTRICT ENERGY SOLUTION



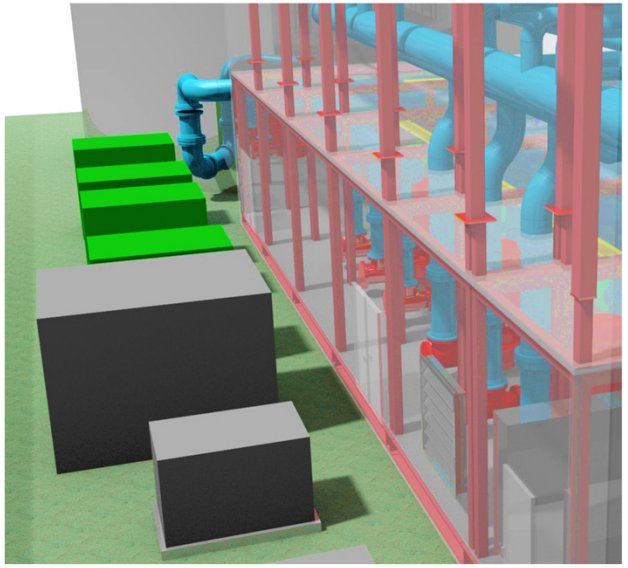
Footprint: 1.0 sqft/ton; **Aesthetics:** integrated screenwall to meet requirements

FULLY UNLOCKED MODULAR:
NEXT GENERATION DISTRICT ENERGY SOLUTION

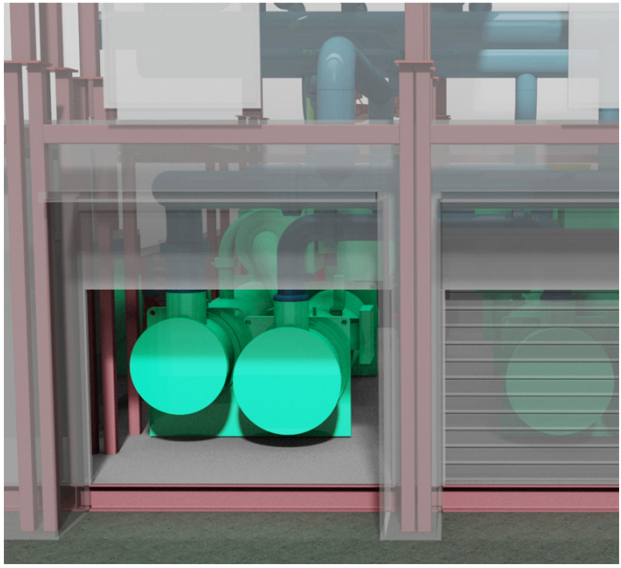
Pump I-beam Access



Electrical Alley Access

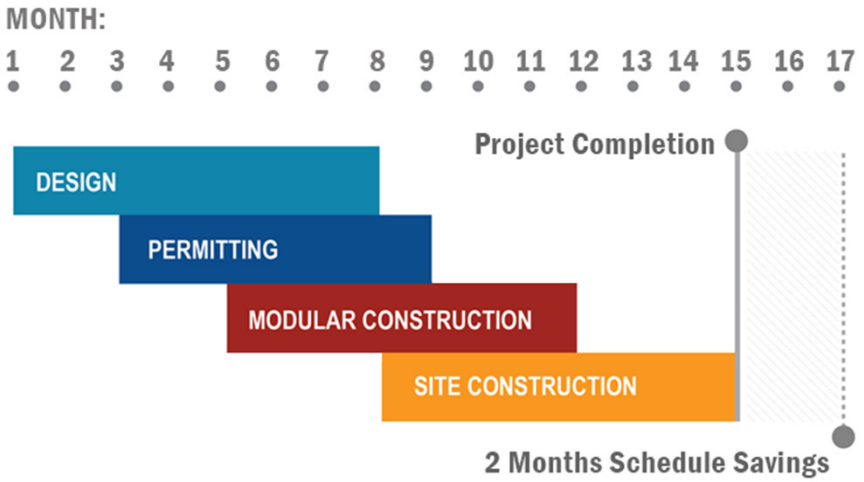


Chiller Tube Access



Serviceability: accessible equipment and optimized design; **Controls:** remotely operated plant with fully automated processes

FULLY UNLOCKED MODULAR:
NEXT GENERATION DISTRICT ENERGY SOLUTION



Schedule: parallel construction, reduced site man-hours; **Cost:** improved cost certainty

LESSONS LEARNED

- Sufficient allowances for all maintenance and serviceability activities
- Clarity on scope delineation between on-site and off-site activities
- Consideration of entitlement plant capacity and phasing methods
- Alignment of FAT, pre-ship plant testing and on-site commissioning
- Application of open-source control platforms at the modular plant level
- Efficient site staging for large modular deliveries

Modular evolution enabled via project lessons learned applied through continuous improvement procedures


Q&A

THANK YOU

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