

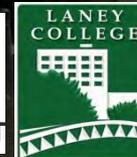
# The Center for Energy Conservation & Advanced Manufacturing



Center for Energy Conservation  
& Advanced Manufacturing  
**ECAM**  
MILWAUKEE AREA Technical College



National Science Foundation  
Advanced Technological Education  
**B.E.S.T. Center Workshops**



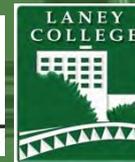


ECAM

Center for Energy Conservation and Advanced Manufacturing



National Science Foundation  
Advanced Technological Education  
**B.E.S.T.** Center Workshops



Milwaukee A

## Energy Engineering Technology Certificate

Energy Auditing	SUSTN 10 481 104
Commissioning	SUSTN 10 481 103
Measurement & Verification	SUSTN 10 481 106
Energy Technician	SUSTN 10 481 107

# ECAM

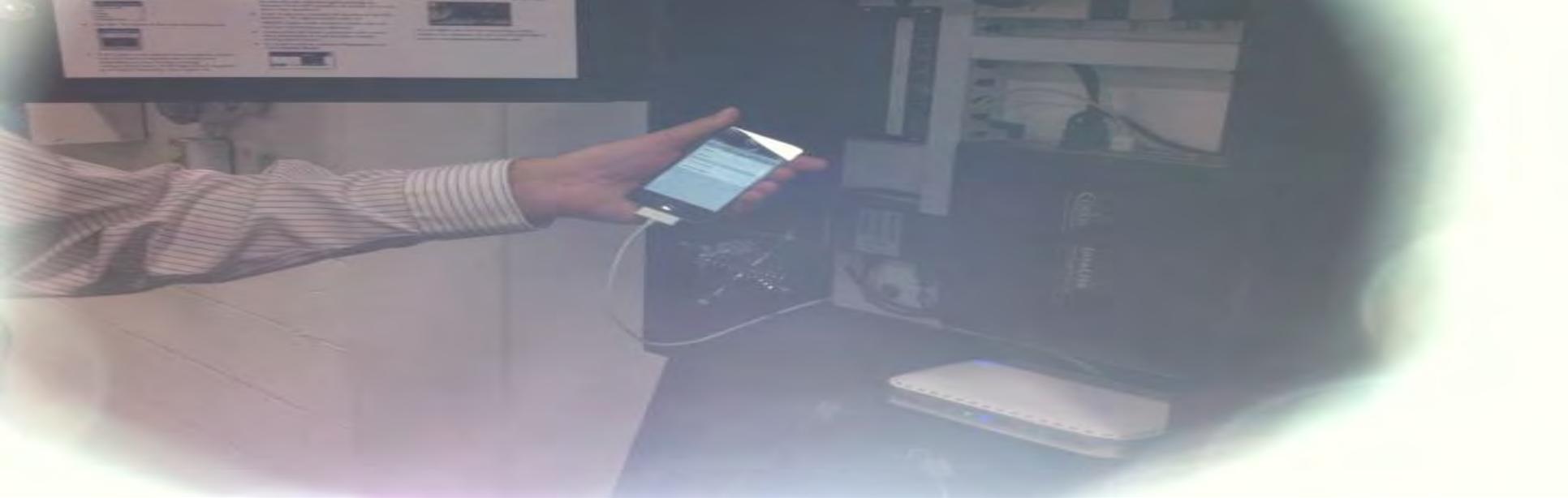
Center for Energy Conservation and Advanced Manufacturing

## Sustainable Facilities Operations Certificate

LEED	SUSTN 10 481 105
Sustainable Facilities	SUSTN 10 481 100
Sustainable Systems	SUSTN 10 481 102



**Center for Energy Conservation and Advanced Manufacturing**



## Advanced Energy Engineering Technology Certificate

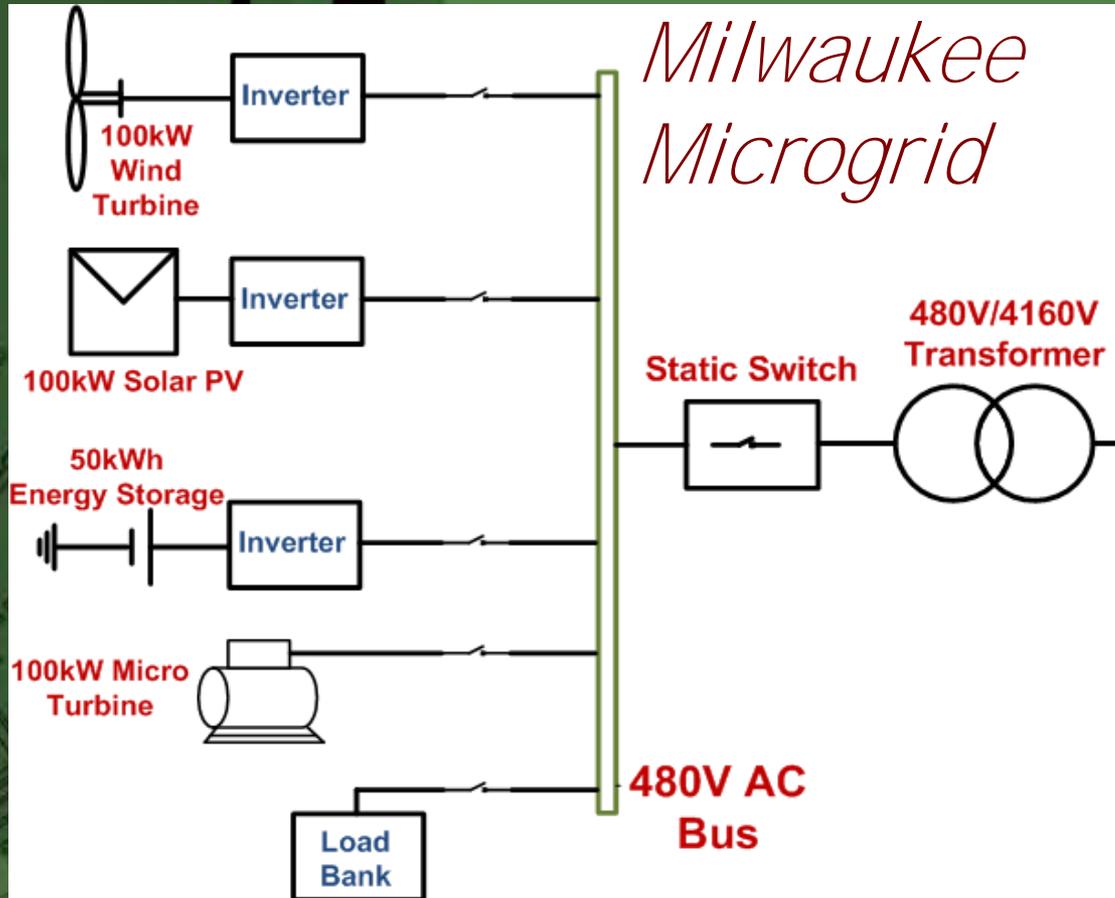
Energy Modeling	SUSTN 10 481 108
Intelligent Lighting Systems	SUSTN 10 481 109
MicroGrid	SUSTN 10 481 110
Advanced Commissioning	SUSTN 10 481 111



# ECAM

Center for Energy Conservation and Advanced Manufacturing

# Proposed Microgrid Facilities



- 100kW PV solar, with Eaton S-Max inverter in voltage and current mode.
- 100kW wind turbine w/ induction gen.
- 100kW gas turbine w/ synchronous gen.
- 50kWh, 25kW Zn-Brom. energy storage

Milwaukee  $\mu$ grid provides practical (experiential) pathways to university engineering and science for MATC students.

ECAM

Center for Energy Conservation and Advanced Manufacturing

# EC Certificates and Courses

## Energy Engineering Technology Certificate

1. Energy Auditing
2. Commissioning Agent
3. Measurement & Verification Specialist
4. Energy Technician

## Sustainable Facilities Operations Certificate

1. LEED Associate & AP
2. Sustainable Facilities Operations
3. Systems Performance: reporting and presenting

## Advanced Energy Engineering Technology Courses

1. Energy Modeling
2. Intelligent Lighting Systems
3. Micro-grid: optimal supply and demand in real-time
4. Geothermal Systems
5. Solar Thermal Systems
6. Advanced Retro & Continuous Commissioning
7. Energy Project Management
8. Photovoltaic
9. Policy/Politics/Nature/Society
10. Advanced Power Engineering



Center for Energy Conservation and Advanced Manufacturing

# Energy Conservation & Advanced Manufacturing Certificates & Certifications

- Energy Engineering Technology
- Sustainable Facilities Operations
- Energy Modeling
- Energy Auditing
- Measurement & Verification
- Commissioning
- LEED
- Test & Balance
- Six Sigma Green Belt
- Six Sigma Black Belt
- Lean Certificate
- 3D Solid Modeling
- Flux Core Welding



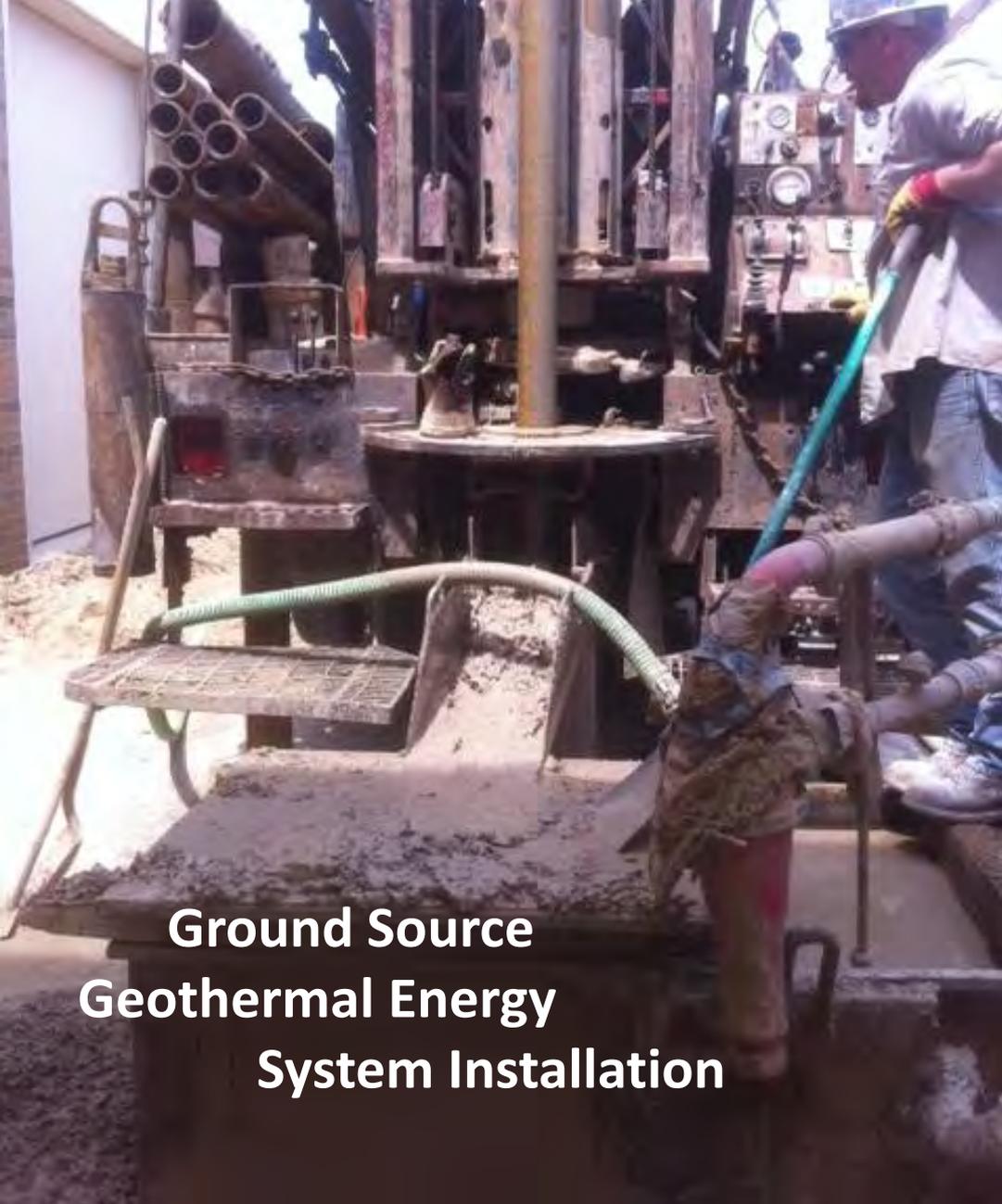
Center for Energy Conservation and Advanced Manufacturing

# Where new knowledge comes from

- 4 New Advisory Committees
  - 1 Sustainable Facilities Operations
  - 2 Renewable Energy
  - 3 Quality Engineering Technology
  - 4 Power Engineering
- 4 DACUMs
  - 1 Sustainable Facilities Operations
  - 2 Power Engineering
  - 3 Quality Engineering Technology
  - 4 Advanced Energy Engineering Technology



Center for Energy Conservation and Advanced Manufacturing



**Ground Source  
Geothermal Energy  
System Installation**



**ECAM**

**Center for Energy Conservation and Advanced Manufacturing**

# Geothermal Energy Systems

Energy Systems

RENEW 10 480 11

Geothermal Systems

RENEW 10 483 170



# ECAM

Center for Energy Conservation and Advanced Manufacturing

Milwaukee Area Technical College



## Photovoltaic Energy Certificate

Renewable Energy Systems	RENEW 10 480 110
Introduction to Photovoltaic	RENEW 10 482 150
Energy Site Assessor	RENEW 10 480 111
Sustainable Industry	SUSTN 10 481 115

**ECAM**

**Center for Energy Conservation and Advanced Manufacturing**



**Solar Thermal Energy**  
Energy Systems  
Solar Thermal Systems

RENEW 10 48110  
RENEW 10 483 160

**Solar Thermal  
System**

**ECAM**

**Center for Energy Conservation and Advanced Manufacturing**



**Test and Balance Certification**

**ECAM**

**Center for Energy Conservation and Advanced Manufacturing**

Name of Grantor & Institutions	Title	Purpose	Outcome	Amount
US Department of Energy UW Milwaukee Milwaukee Area Technical College	Wind 2020	Develop a certificate in UWM/MATC Pathway Develop Wind Energy Certificates and respective courses	2 MATC wind courses: introduction and advanced and a general energy course, develop undergrad and graduate wind certificates at UWM	\$310,000
US Department of Energy Milwaukee Area Technical College UW Milwaukee	Advanced Energy Engineering Technology	Develop a certificate in advanced energy technical studies Short term training for 100% green jobs initiative	microgrid, energy modeling, intelligent lighting systems, advanced power engineering, advanced commissioning, geothermal, solar thermal, photovoltaic, energy project management,	\$740,000
Distributed Arch. Microgrid (WERC) UW Madison UW MKE & MATC	Distributed Architecture of a Microgrid	Development of architecture and formula for optimization of a microgrid	Under development	\$100,000
Wisconsin Energy Research Consortium (WERC) MATC, MSOE, JCI Milwaukee Medical Research College	Retrofit Aging Buildings	Tools for the transformation of aging buildings to energy efficient buildings	Under development	\$100,000



US Department of Labor WISTEC -	Sustainable Facilities Operations (SFO) and Energy Engineering Technology (EET)	Develop 7 core courses in sustainable facilities operations.	SFO and EET, 7 new courses titled: 1) SFO, 2) LEED, 3) Measurement & Verification, 4) Energy Auditing, 5) Commissioning, 6) Energy Technician, 7) Sustainable Systems Performance	<b>\$21,000</b>
Wisconsin Technical College System - NEO	Quality Engineering Technology	Major modification of the Suspended Industrial Engineering AAS degree	New AAS degree in Quality Engineering Technology, 2 certificates in Six Sigma and a new certificate in Lean.	<b>\$143,000</b>
Wisconsin Technical College System – RISE	Green Technologies	Develop a pathway from pre-college to Env.Health and Water Quality or Sustainable Facilities Operations.	Two new courses that ladder to the two degrees and a certificate in environmental studies.	<b>\$20,000</b>
Milwaukee Workforce Investment Board	Photovoltaic	Three sections of a photovoltaic installation helper certificate for neighborhood youth.	Modification of existing courses to	<b>\$10,000</b>
Milwaukee Community Service Corp	Solar – THERMAL and Power Engineering prep course for green jobs	Develop a solar certificate with an emphasis on general energy systems and power engineering.	Under development	<b>\$100,000</b>
Milwaukee Community Service Corp	Geothermal	Develop a course and deliver a course in general geothermal technology	Developed a course and delivered a course at ECAM	<b>\$10,000</b>

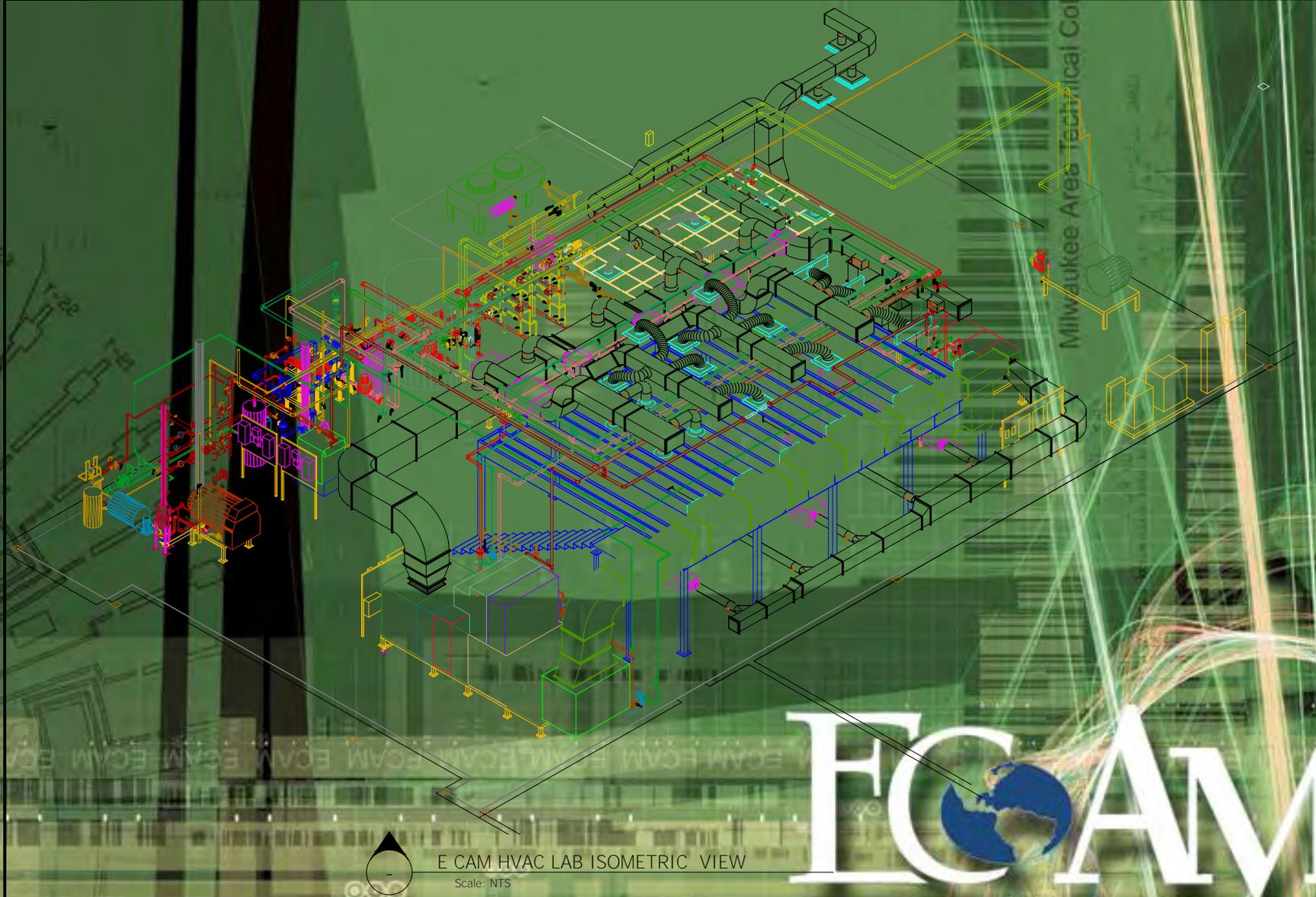




The MATC/UWM Energy Education Collaborative: efficient and effective use of facilities, equipment and faculty to create a workforce that meets the needs of sustainable businesses and industries







E CAM HVAC LAB ISOMETRIC VIEW

Scale: NTS

# FCAM



MILWAUKEE AREA TECHNICAL COLLEGE  
 OAK CREEK CAMPUS  
 6665 S. HOWELL AVE.  
 OAK CREEK, WISCONSIN 53154

NO.	DATE	COMMENTS

DRAWN BY	PATRICK M. WISNIEWSKI
CHECKED BY	
DATE	11/2010
SCALE	

MATCH HVAC TAB LAB  
 ISOMETRIC VIEW

SHEET -  
 M-8



Intelligent Lighting Lab



271D



UNIVERSITY of WISCONSIN  
UWMILWAUKEE



National Science Foundation  
Advanced Technological Education  
B.E.S.T. Center Workshops

