Planning for Facilities Improvements, Workforce Development, and Student Engagement in STEM

Steve Corson, LEED AP
Trane Florida Energy Services Leader

Bio: Steven Corson

30 Years of Experience

- Experience in HVAC industry since 1990
- Trane associate since 1995

Education

- B.S. Industrial and Systems Engineering, University of Florida

Areas of Expertise

- Performance Contracting, Energy Engineering , Life Cycle Cost Analysis, Project Financing & Construction Management

Professional Summary

- Specialized field and executive experience in complex projects, energy efficiency and energy management.
- Developed over $200M of ESCO projects.
- Expert in leading institutional customers through the procurement process.

Emergency Education Relief Funding

Emergency Education Relief Funding – ARP, ESSER, GEER

ESSER I: **$770M** available through end of 2021

- Literacy, achievement, safety, health
- Nearly all budgeted/committed. 10% set aside.

ESSER II: $2.82B available through Sept 2023

- Fund use includes "***Repairing and improving school facilities*** *to reduce the risk of virus transmission and exposure to environmental health hazards"*

ARP ESSSER: $7.04B available through Sept 2024

- 20% set aside to address learning loss due to pandemic
- Fund use includes "***School facility repairs*** *to reduce risk of virus transmission and support student health*"

GEER: $174M available through Sept 2023

- Emergency support for costs due to pandemic and CTE Infrastructure

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Opportunities to Repair and Improve Facilities

Federal Guidance / Specific Language

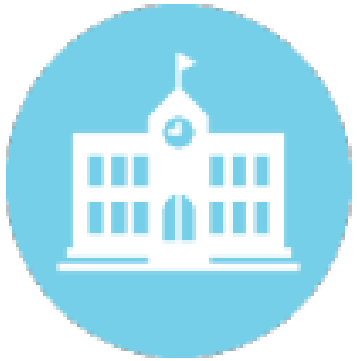
- ***Repairing and improving school facilities*** *to reduce the risk of virus transmission and exposure to environmental health hazards*
- Inspection, testing, maintenance, repair, replacement, and upgrade projects to improve the indoor air quality in school facilities, **including mechanical and non-mechanical heating, ventilation, and air conditioning systems, filtering, purification, and other air cleaning, fans, control systems, and window and door repair and replacement.**

State of Florida Guidance / Specific Language

- "Districts should allocate these funds for **nonrecurring needs**; in other words, needs that will not exist after Florida's recovery from the pandemic." per Commissioner Corcoran's Memo dated March 16, 2021
- Florida GEER funding includes $10.9M for Career and Technical Education infrastructure (CTE).

Districts are encouraged to use funds *holistically*

Develop strategies & implement public health protocols with guidance from the CDC for the reopening and operation of school facilities to address the well-being of students, educators & staff



School facility repairs and improvements to enable operation of schools to mitigate health risks and exposure to environmental health hazards, and to support student learning environments

Improve Indoor Air Quality by upgrading HVAC systems, filtering, and other air cleaning, fans, control systems, and window and door repair & replacement

The U.S. Centers for Disease Control and Prevention (CDC) and ASHRAE® both stress the importance of IAQ and HVAC optimization in mitigating COVID-19 spread and reopening our schools safely.

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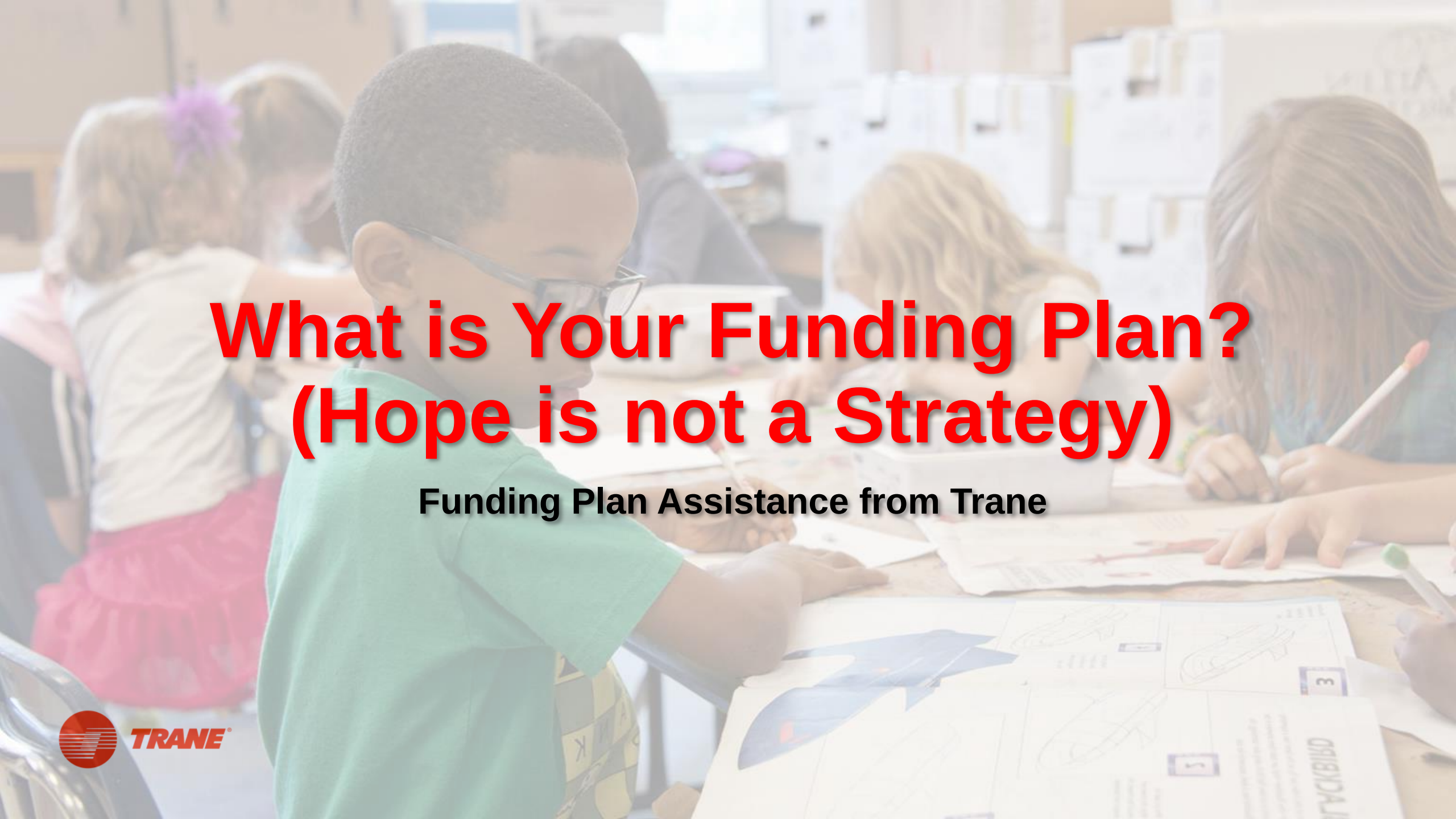
Funding Opportunity Repairs and Improvements

Funding Opportunity	Work Scope	On-Going Benefit
Replace / Refurbish **Air Handlers & Outside Air Units and Exhaust Fans**	Improve **ventilation** and **control humidity**	Address deferred maintenance / reduce maintenance costs
Implement **IAQ Strategy and Technologies**	Reduce risk of virus transmission	Implement a program that does not increase on-going costs
Replace / Refurbish **Chillers**	Improve chilled water system / humidity control	Address deferred maintenance / create energy savings / reduce maintenance costs
Upgrade **Building Automation System**	Improve **ventilation** / **humidity** control	Create energy savings / reduce maintenance costs
Trane Intelligent Services Building Performance platform upgrade	Automated data analytics to monitor, identify, and fix ventilation / humidity issues	Create energy savings / reduce maintenance costs
Workforce Development CTE	Provide NC3 certification for HVAC/Controls/Data Analytics. Trane is a sponsor.	Provide new certifications and pathways to high paying technical jobs



What is Your Funding Plan? (Hope is not a Strategy)

Funding Plan Assistance from Trane

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Prioritized CapEx Budget

- Complete survey of all systems
- Deferred Maintenance Inventory and Cost by Facility
- Prioritized CapEx Plan based on age and condition

How it Works

- Inventory of site-specific equipment by building
- Condition report and useful life analysis
- Stoplight equipment condition priority
- Replacement budget and date provided by Trane

Results

- Funding Gap Analysis
- 5 Year Funding Plan
- Justification for Funding

Funding Plan Options – CapEx Funding Plan Types

- Primary Cooling
- DX Packaged and Split System Cooling
- Air Handling Systems
- Energy Management Controls/Intelligent Services
- Indoor Environmental Quality
- Lighting
- *Contact Trane to Develop CapEx Funding Plans*

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Trane – CapEx Funding Plan Example

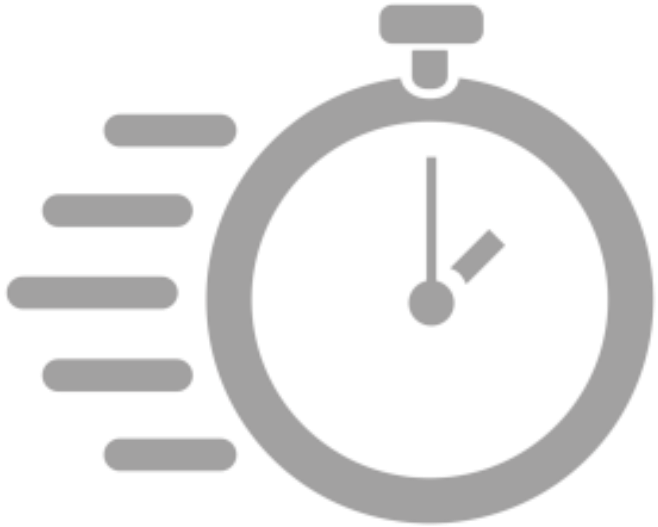
Martin County Cap Ex Planning

General Services
100 SE Ocean Blvd
Stuart, FL 34994

Site	Expenditure	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Notes
Blake Library	Mechanical Service Agreement	$14,684	$15,125	$15,578	$16,046	$16,527	$17,023	$17,533	$18,059	$18,601	$19,159	Existing service agreement on 1 chiller, 2 pumps, & 2 AHUs Expires 9/30/2017
	Intelligent Services Agreement	$10,300	$10,609	$10,927	$11,255	$11,593	$11,941	$12,299	$12,668	$13,048	$13,439	Budget Price for IS Service Agreement - includes (2) on site inspections, (4) remote inspections & (2) Consultation Reports
	Rebuild/ Replace CGAM130 Chiller		$120,000					$200,000				New condenser coils in existing chiller in 2022. Replace existing chiller in 2027. Existing chiller was installed in 2014.
Courthouse/COB	Mechanical & BAS Service Agreement	$124,184	$128,200	$132,353	$136,644	$141,079	$145,663	$150,033	$154,534	$159,170	$163,945	Existing service agreement on chillers, towers, pumps, AHUs, and controls
	Eddy Current Scans			$2,800 Condenser Only		$7,500 Evap & Condenser		$3,000 Condenser Only				Eddy current scans to be done every 3 years on condenser and every 5 years on evaporator - scans will be included in the Rnewal
	VAV Replacements	$325,000	$325,000	$325,000	$325,000	$325,000	$325,000					Replace obsolete VAVs and controllers through courthouse & COB
	AHU Replacement		$350,000	$350,000	$350,000	$350,000	$350,000	$350,000				Replacement of 4 existing air handlers. AHUs previously rebuilt in 2017.
Cummings Library	Equipment Replacements											Plan for future replacements
Indiantown InterGov Ctr	Mechanical Service Agreement	$10,787	$11,111	$11,444	$11,787	$12,141	$12,505	$12,880	$13,267	$13,665	$14,075	Existing service agreement on 1 chiller, 2 pumps, & 3 AHUs Expires 9/30/2017
	SC Upgrade	$40,000										Upgrade from BCU to SC
	Replace CGAM052 Chiller				$125,000							Replace existing chiller like for like. Existing chiller was installed in 2013.

Funding Plan Horizon: Time to Act is Short

- **ESSER I**: **$770M** available through end of 2021
- **ESSER II: $2.82B** available through Sept 2023
- **ARP Esser: $7.04B** available through Sept 2024
- ***Projects must be completed by end of 2023***
- ***Market is expecting lead times to increase and supply chain challenges***
- ***Time to plan, secure funding, and execute projects is NOW***



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AIR

LIGHTING

ACOUSTICS

THERMAL COMFORT

Indoor Environmental Quality, Optimized

The four elements of healthy spaces

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Air

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Air – Studies Show its Impact on People

Health effects
Human well-being can be impacted by excess carbon dioxide, dust particles, VOCs or pathogens.*

Cognition
Students in classrooms with balanced automated ventilation performed better on standardized testing and other indicators of performance than those in unventilated rooms and those in naturally ventilated rooms.**

Productivity
Student illness results in lost workdays for parents, contributing to the $20+ billion annual cost of absenteeism.***

IAQ upgrades can make a positive impact now and into the future.

TRANE

* International Journal of Environmental Research and Public Health, 2015.
** Association between classroom ventilation mode and learning outcomes in Danish schools.
*** The Economic Burden of Non-Influenza-Related Viral Respiratory Tract Infection in the United States.

How We Approach IAQ

- A holistic approach to improving IAQ, specific to your building and its purpose
- Broad equipment portfolio, controls methodologies, nationwide service network
- Expertise to help achieve your goals—for IAQ, energy consumption, comfort and cost

Indoor Air Quality

Trane® Indoor Air Quality Assessment

- Fact based, data-driven analysis of your building's indoor air quality
- Aligned to latest CDC guidelines for operating HVAC systems
- Recommend ways to improve IAQ today
- Highlight opportunities for future investment

Why an IAQ Assessment?

Confidence
Tenants, employees, customers want to know buildings leaders are preparing facilities for their return

Resilience
Today it's a global pandemic; what's next? IAQ is an ongoing priority for building owners

Sustainability
Ensure clean indoor air efforts are in tune with building sustainability goals

Proposal | **Assessment** | **Deliverable**

IAQ – Establish a Baseline. Make a Plan

What we'll do:

- Complete on-site air quality assessment adhering to all current safety guidelines
- Standard walk-through based on 4 key pillars of IAQ:
  - Dilute, Exhaust, Contain and Clean
- When possible, conduct assessment remotely through connected BAS

What you can expect:

- Report of documented findings with strategic recommendations to improve overall IAQ
- Guidance on system updates or improvements to address critical issues ensuring alignment with business drivers
- Options for turnkey implementation of recommendations

Lighting

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Lighting – The Science of Light

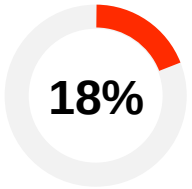
Lighting refers to both the intensity and quality of lighting (light temperature and distribution), and its influence on the activity being performed.

- Knowledge-driven innovation
- Beyond task lighting
- Beyond energy
- Applying lighting science and UV technology to improve human well-being
- Simplifying IEQ management by integrating HVAC and lighting control

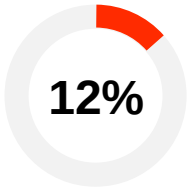
Lighting and People

Commercial Buildings*

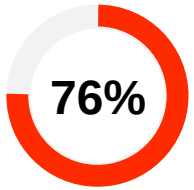
After installation of circadian-friendly lighting…



of employees perceived increase in productivity



increase in work accuracy



of employees said they felt better

said they felt happier

Educational Facilities**

Dynamic lighting can support student classroom learning. Lighting can be optimized for various activities from test-taking to reading.

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* Study by Twente University & Free University Amsterdam.
** Optics Express Journal, 2018.

Trane NC3 Program Overview

Education and Industry Meet

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NATIONAL COALITION OF CERTIFICATION CENTERS

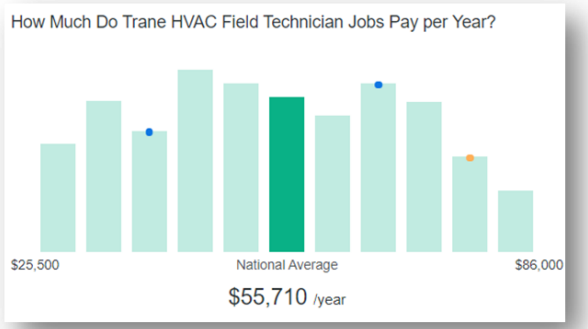
nc3

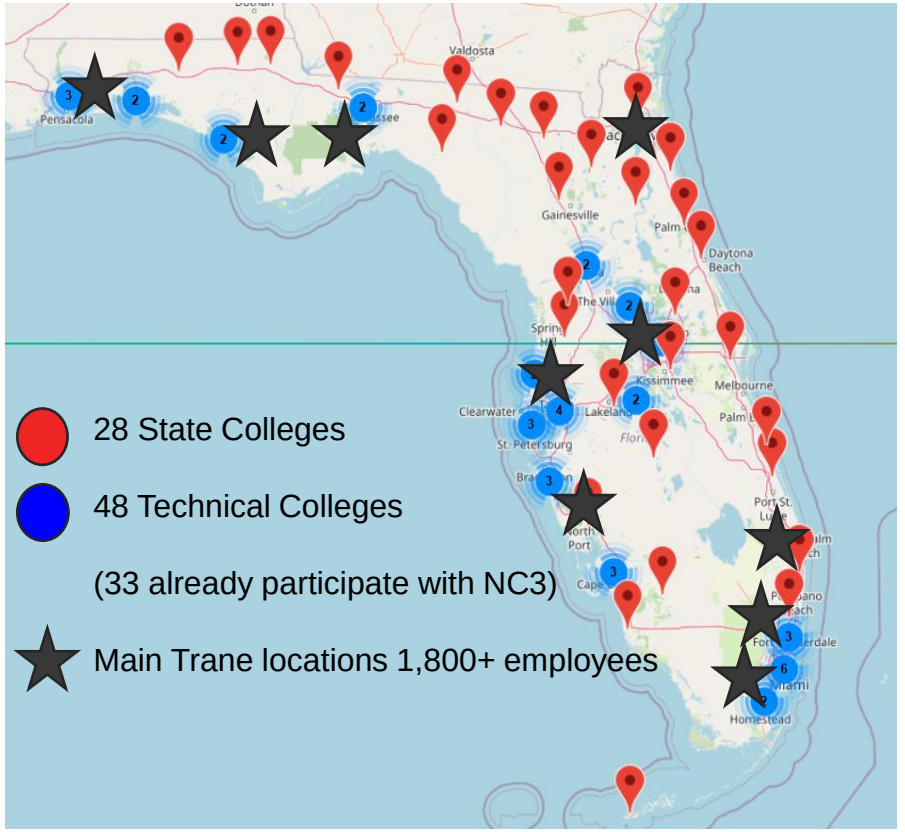
Florida's Workforce Education Initiative – NC3 and Trane

"Make Florida the best state in the nation for work force development by 2030" - Governor Desantis, 2019

"It is now time to double down on our postsecondary career and technical education programs"
-Commissioner Corcoran, 2020

"Yes…We agree!...Our average HVAC technician's age is 59. We have high paying jobs we need help to fill in **Florida** and nationwide! - Trane, 2021





Trane and NC3 in Florida

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GET THERE
Florida's Workforce Education Initiative

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Florida's Workforce Education Initiative – NC3 and Trane

Where Education and Industry Meet

NC3 is a non-profit network of education providers and corporations committed to training the next-generation of skilled workers to meet industry demands.

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Florida's Workforce Education Initiative

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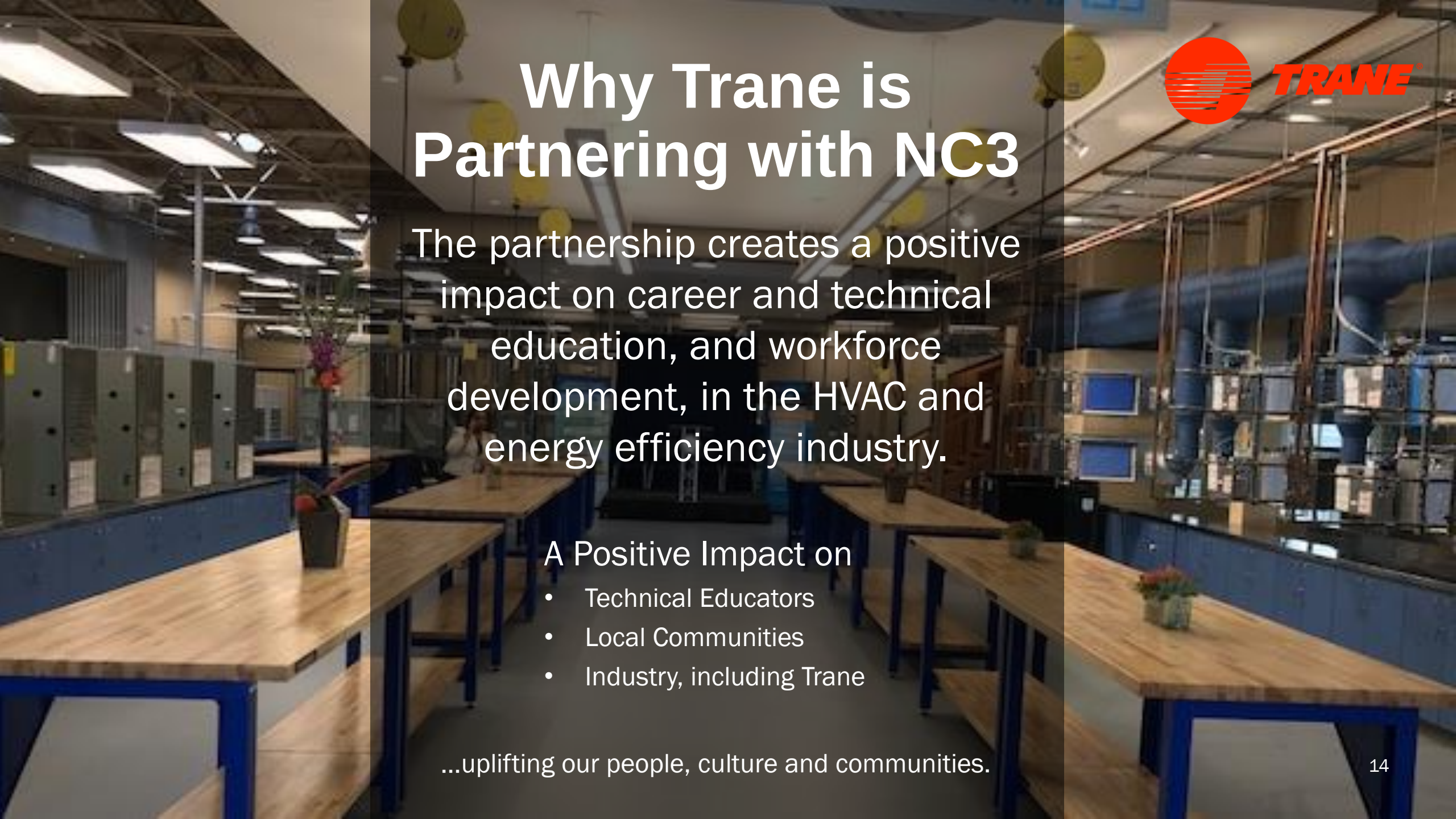


Why Trane is Partnering with NC3

The partnership creates a positive impact on career and technical education, and workforce development, in the HVAC and energy efficiency industry.

A Positive Impact on

- Technical Educators
- Local Communities
- Industry, including Trane

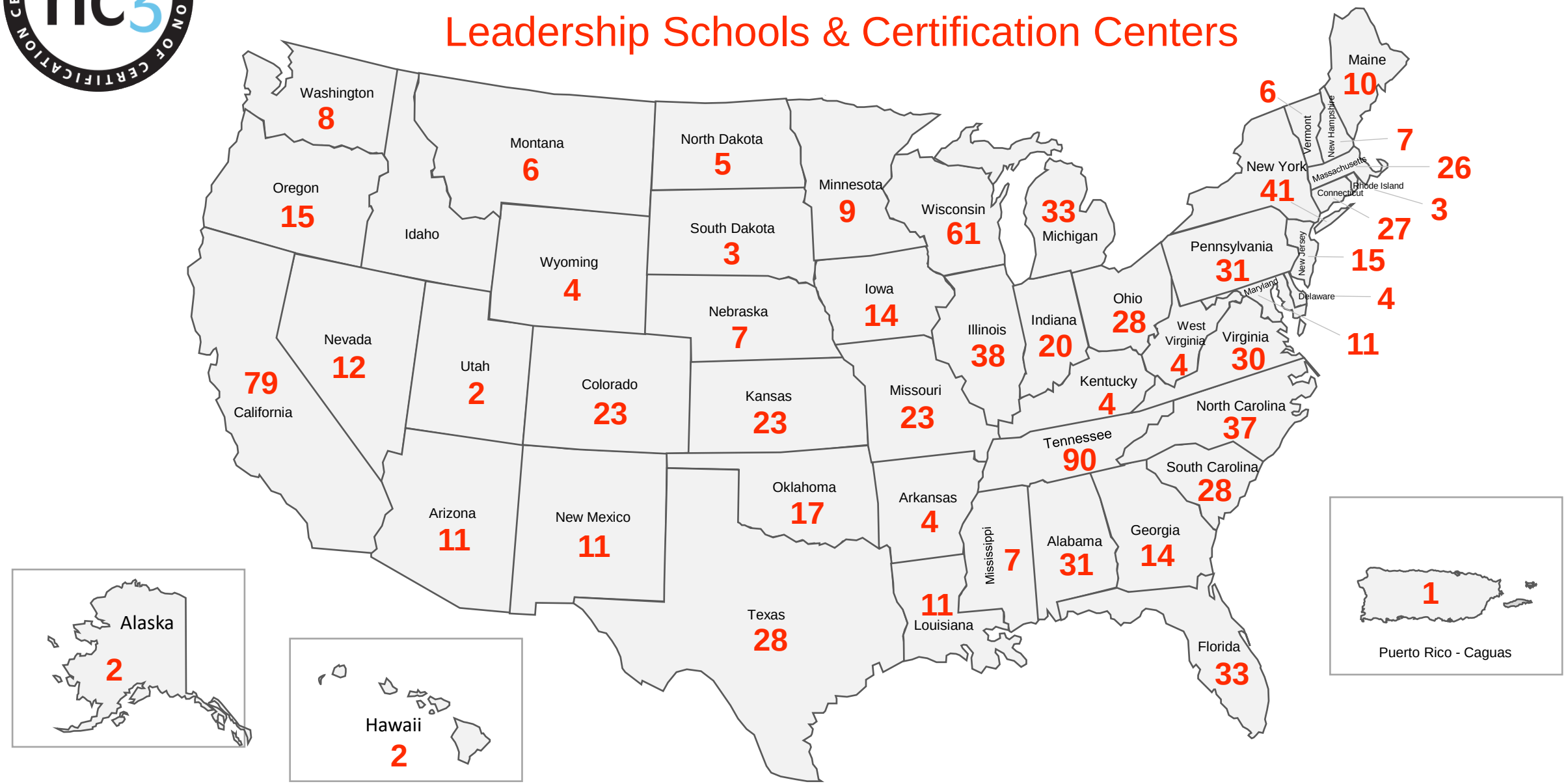
...uplifting our people, culture and communities.

How Technical Educators Benefit

Helping technical educators attract, train, and place students

- A trusted, global industry partner
- Industry-relevant curriculum
- Professional development for instructors
- Access to a broad network of educators
- Proven/low risk labs
- Sustainable models
- Other collaborations with Trane

Leadership Schools & Certification Centers



Industry Partners in Education

185+
Leadership Schools

750+
Certification Centers

TRANE

Closing the Skills Gap City by City, State by State

STATE	CITY	SCHOOL	COMMERCIAL	RESIDENTIAL	TRANE OFFICE
AZ	Tucson	Pima Community College	●	●	Rocky Mountain
CO	Commerce City	Adams 14 School District	●	●	Rocky Mountain
DE	Dover	Delaware Technical Community College	●		Seiberlich Trane
FL	**St. Petersburg**	**Pinellas Technical College**		●	**Tampa**
IN	Kokomo	Ivy Tech		●	Indianapolis
KS	Kansas City	Kansas City Kansas Community College		●	Kansas City
KS	Topeka	Washburn Institute of Technology	●		Kansas City
KS	Wichita	WSU Tech	●	●	Kansas City
MI	Harrison	Mid Michigan Community College		●	Flint
NC	Charlotte	Central Piedmont Community College	●		Charlotte
NC	Lexington	Forsyth Tech		●	Brady Trane
ND	Wahpeton	North Dakota State College of Science	●	●	Twin Cities
NE	North Platte	Mid-Plains Community College		●	Kansas City
NE	Norfolk	Northeast Community College	●	●	Kansas City
OK	Oklahoma City	Metro Tech	●	●	Oklahoma City
OH	Painesville	Lake Erie College	●	●	Cleveland
PR	Caguas	Mech-Tech College		●	Puerto Rico
TN	Alcoa	Alcoa High School		●	Knoxville
TN	Chattanooga	Chattanooga State Community College		●	Chattanooga
TN	Blountville	Crown College		●	Kingsport
TN	Crossville	TCAT Crossville		●	Knoxville
TN	Clarksville	TCAT Dickson	●		Nashville
TN	Elizabethton	TCAT Elizabethton		●	Kingsport
TN	Knoxville	TCAT Knoxville		●	Knoxville
TN	Strawberry Plains	TCAT Knoxville, Strawberry Plains Campus		●	Knoxville
TN	Morristown	TCAT Morristown		●	Knoxville
TN	Murfreesboro	TCAT Murfreesboro		●	Nashville
TX	Sugar Land	Fort Bend Independent School District		●	Hunton Group
TX	Cleburne	Hill College	●	●	Dallas
WI	Kenosha	Gateway Technical College	●	●	Milwaukee
WI	La Crosse	Western Technical College	●		La Crosse
WI	Superior	Wisconsin Indianhead Technical College	●	●	Twin Cities

Industry Certifications

WELDING

Lincoln Electric

Intro

- Welding Safety*
- Principles of Welding*
- Shielded Metal Arc Welding (SMAW)
- Flux-Cored Arc Welding (FCAW)
- Gas Metal Arc Welding (GMAW)
- Gas Tungsten Arc Welding (GTAW)

Advanced

- Shielded Metal Arc Welding (SMAW)
- Flux-Cored Arc Welding (FCAW)
- Gas Metal Arc Welding (GMAW)

AVIATION

Snap-on

- Structural Sheetmetal
- Drop Prevention Systems

Snap-on/DMC

- Precision Electrical Termination (PETC)

HEALTH & SAFETY

3M

- Personal Protective Equipment (PPE)
- Hearing Protection
- Head, Eye & Face Protection
- Respiratory Protection

Snap-on

- Drop Prevention Systems
- Hand Tool Safety *
- Electrical Safety *

Lincoln Electric

- Welding Safety *

STEM

Dremel/Palmer Hamilton

- Idea Builder 3D Printing
- Laser Cutter

Tormach/Palmer Hamilton

- XS Router Desktop CNC Mill Machine

Festo

- Introduction to Mechatronics
- Fundamentals of Electricity

TRANE

Trane (being finalized now)

- Data Analytics

DIGITAL LITERACY

Certiport

- IC3 Digital Literacy

Dremel/Palmer Hamilton

- Idea Builder 3D Printing
- Laser Cutter

* *Certificate of knowledge included with select certification packages.*

Industry Certifications

TRANSPORTATION

Snap-on
- Automotive Diagnostics
- Wheel Service & Alignment
- On-Car Brake Lathe
- Battery Starting and Charging
- Diesel Diagnostics
- Tire Pressure Monitoring Systems (TPMS)

Kubota
Off-Road Diesel Technologies
- Pre-Delivery Inspection (PDI) & Assembly
- Preventative Maintenance Inspection (PMI)
- Maintenance Procedures
- Electrical
- Hydraulics
- Engine
- Powertrain
- Brakes, Steering, Suspension (BSS)

BUILDING TRADES & ENERGY

Trane
Residential HVAC Systems
- Airflow
- Refrigeration Diagnostics
- Variable Speed Motors
- Air-to-Air Heat Pumps

Building Automation Systems
- Intro to HVAC Systems Building Control
- Automation, Spaces, Equipment, Security
- Set Points, Scheduling, Area & VAS, Points
- Chiller Plant Control, Alarms, Events
- Data Logs, Reports, Backup

Greenlee
Electrical Trades
- Hand Bending
- Basic Conduit Bending
- Advanced Conduit Bending
- Wire Pathways
- Fishing Conduits/Raceways and Cable Pulling
- Electrical Branch/Series and Service Level Wire Termination
- 3-Phase Sequencing and Motor Rotation

Snap-on
- Building Performance Instruments
- Drop Prevention Systems

3M
- VentureClad Tape

MANUFACTURING

Festo
STEM Lab
Introduction to Mechatronics

Level 1: Fundamentals
- Fundamentals of Industry 4.0
- Fundamentals of Fluid Power - Hydraulics
- Fundamentals of Fluid Power - Pneumatics
- Fundamentals of Electricity - AC/DC
- Fundamentals of Robotics
- Fundamentals of Mechanical Systems
- Fundamentals of Sensor Technology
- Fundamentals of PLCs - Allen Bradley/Siemens
- Certified Industry 4.0 Associate Fundamentals (Capstone)

Level 2: Advanced Mechatronics
- Applied Robotics
- Applied Fluid Power
- Applied Product ID Fundamentals
- Applied Industry 4.0
- Applied PLC Technology II: Allen Bradley/Siemens

Snap-on/Starrett
- Precision Measuring Instruments (PMI)
- Advanced Measuring Instruments (AMI)

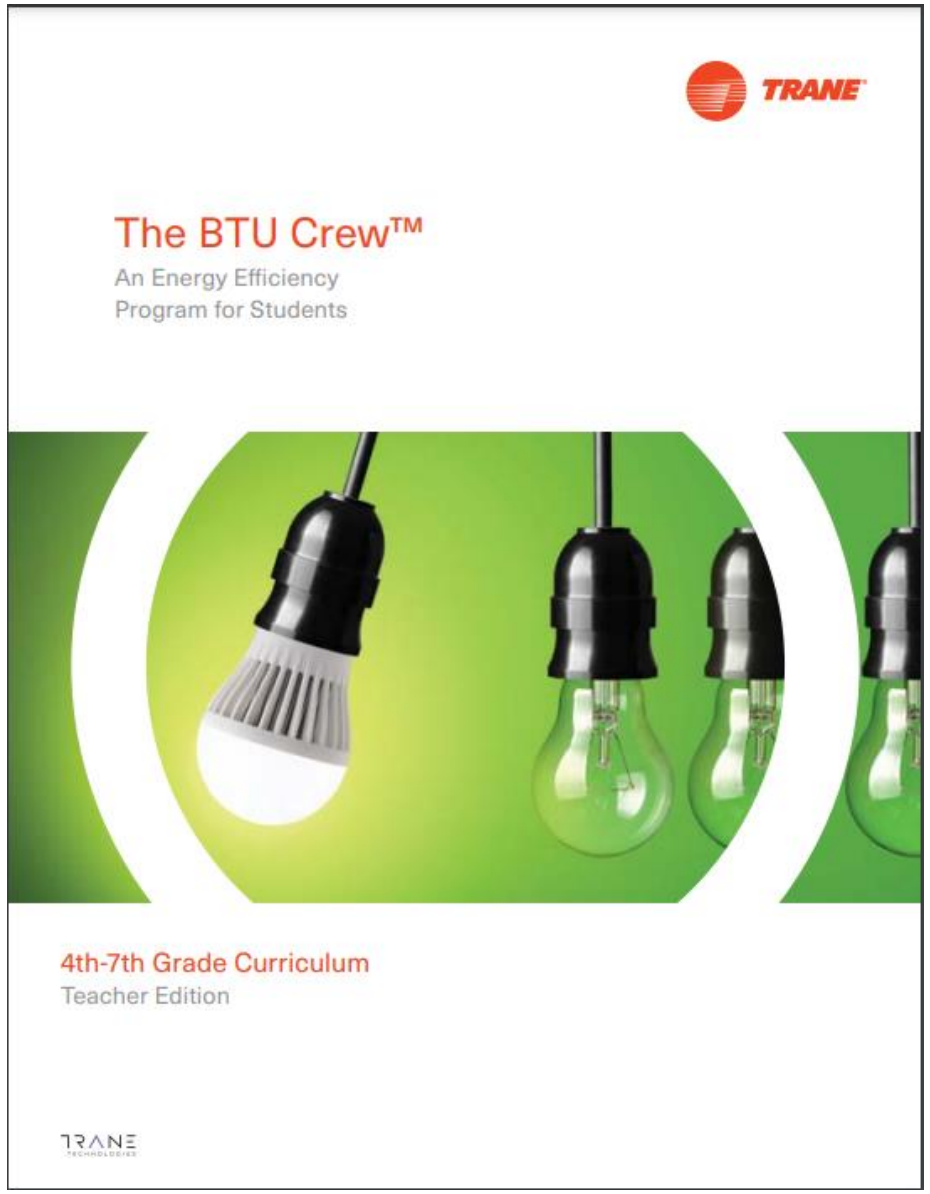
Dremel/Palmer Hamilton
- Idea Builder 3D Printing
- Laser Cutter

Tormach/Palmer Hamilton
- XS Router Desktop CNC Mill Machine

Using your School Building as “Living Learning Labs”

STEM – Using your Schools as Living Learning Labs

- Building energy-aware students
- Utilizes energy analytics from District's schools
- Interactive educational program
- Customizable and adaptable
- Educates on energy use and conservation in buildings
- Encourages interest in science, technology, engineering and math (STEM)



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STEM – Using your Schools as Living Learning Labs

"Concept of STEM encompasses much more than the sum of its parts."

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TABLE OF CONTENTS

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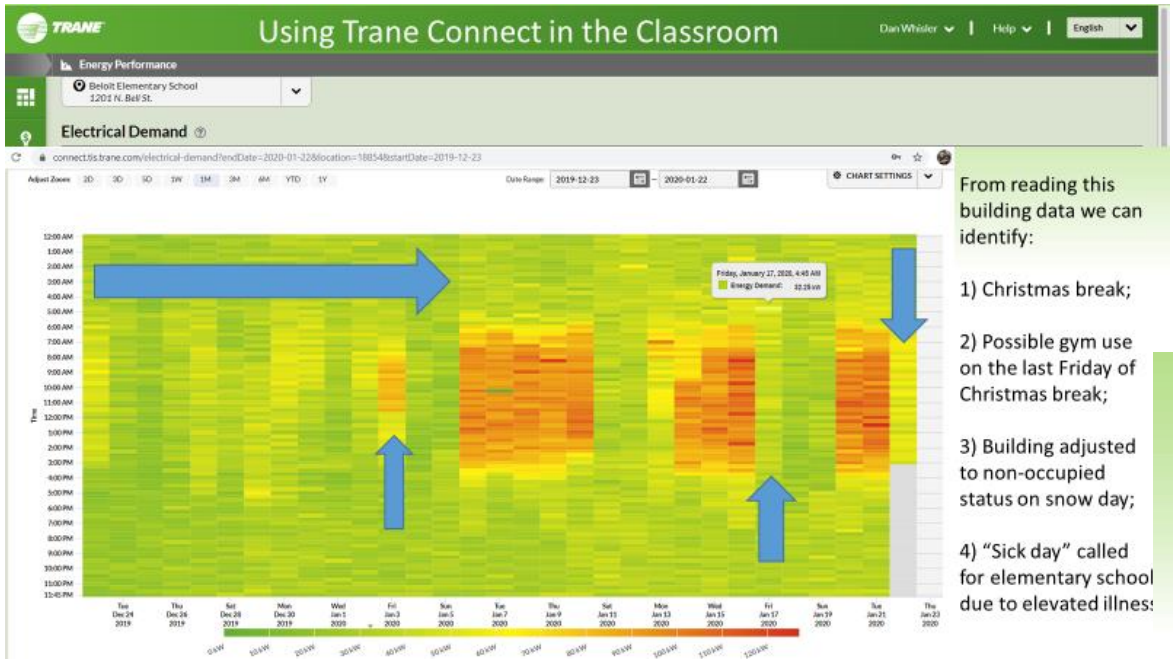
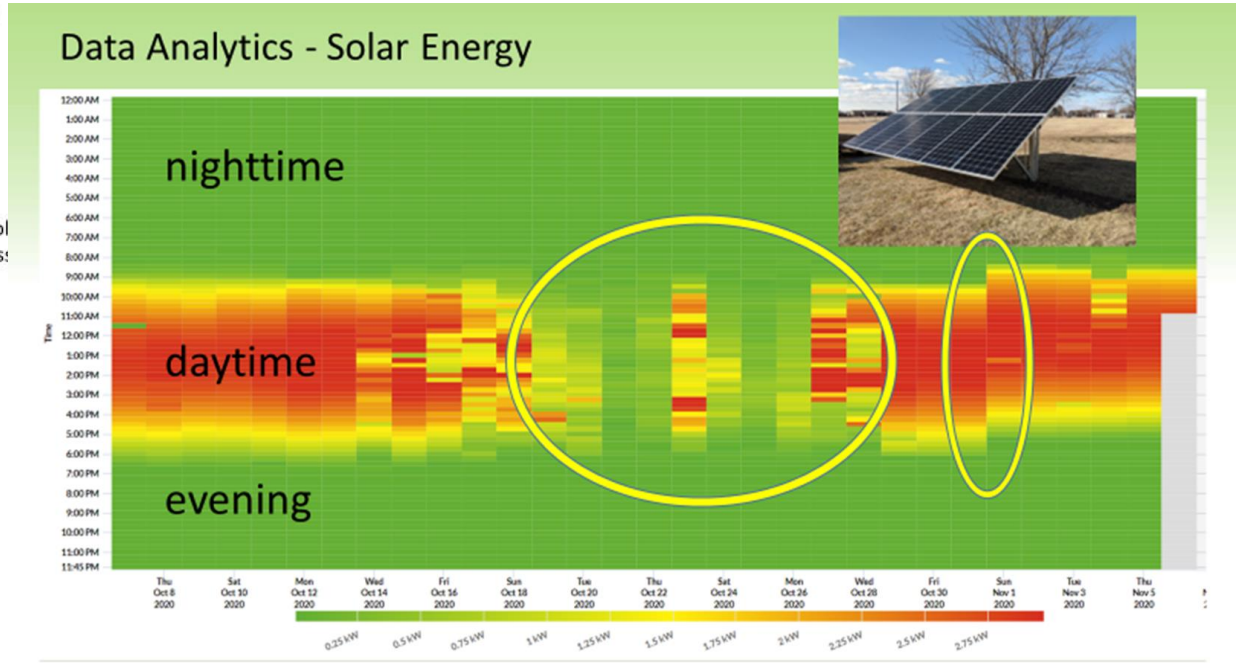
STEM – Using your Schools as Living Learning Labs

"Concept of STEM encompasses much more than the sum of its parts."





Questions

Steven Corson

sdcorson@trane.com

561-596-8727 C