Healthy Schools Program

Creating Healthier K-12 & College Campuses

Your Roadmap to Successful Risk Management & Occupant Well-Being

PURE AIR™
CONTROL SERVICES, INC.
Healthy Buildings, Healthy People

Presented by Frank Santini, Pure Air Controls & Jeff Stokes, ESG

Information Gap
Dept. of Education to Act on Air Cleaning Devices

https://www.youtube.com/watch?v=bcyVfQ4-1lw

Quote

"A lot of these schools were well intentioned but they didn't do their homework." (NBC New report)

X + Y = Confusion

CDC

CENTERS FOR DISEASE™
CONTROL AND PREVENTION

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CDC Confusion

- “Disinfecting surfaces to prevent Covid often all for show, CDC advises” (CNN)
- “New CDC mask guidance adds to a confusing patchwork of rules across US” (Guardian)
- “Fauci defends CDC's roundabout on mask mandates amid confusion from new guidance” (Fox News)

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Snake Oil

- “Schools spending millions on air purifiers often sold using overblown claims” (CNN)
- “Sac City schools paid $6 million for costly air cleaners with unnecessary features” (SacBee)
- “Watchdog group, Georgia Tech professor question school district’s COVID-19 spending”
- “As schools spend millions on air purifiers, experts warn of overblown claims and harm to children” (PBS)

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Basic Stuff

* Mask
* Vaccine
* Hand Washing
* Ventilation

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It’s not about Covid, it’s about a game plan.

- **Covid is the immediate obstacle, but we have a long season ahead of us.**
- **The key guiding force should be: what is going to make our buildings optimal learning environments in the long term.**
- **Answer: a Healthy Building**

Why

Healthy Buildings, Healthy People

- **Better IAQ = more productive**
- **Reduce transmission of contaminants – flu, allergies, mold, legionella**
- **Comfortable**
- **Energy Efficient**

American Rescue Plan

https://www.congress.gov/117/bills/hr1319/BILLS-117hr1319enr.pdf

Sec. 2001(e)(2)(p) ". . . Inspection, testing, maintenance, repair, replacement, and upgrade projects to **improve the indoor air quality** . . . Including ventilation and air conditioning systems. . . And other air cleaning, fans…"

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American Rescue Plan

Sec. 2001(e)(2)(o) ". . . Facility repairs and improvements to enable operation of schools to reduce risk of virus transmission and **exposure to environmental health hazards** . . ."

https://www.congress.gov/117/bills/hr1319/BILLS-117hr1319enr.pdf

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How?

- **Assess the Air Quality**
  - **Ventilation**
  - **Roof**
  - **Building Envelope**
  - **Test for microbes & contaminants**
  - **Gather Actionable Data**

IAQ Baseline Evaluation

A comprehensive field and laboratory analysis to determine the biological conditions and performance of a building.

- Contaminant Source & Risk
- Allergen, Bacteria, Mold, Viruses
- Infrared Imaging
- CO_2, Temperature & Humidity

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IAQ Baseline Testing & Investigations

- Indoor Environmental Evaluation
- Investigative Approach
- Contaminant Source & Risk Assessment

(Allergens, Bacteria (*Legionella*), Fungi (Mold), Viruses, etc.)

Air Quality

Matrix	Parameter	Unit	Guideline*	Ref.	Supply Room	AHU-G4	AHU-31/11425	Cafeteria	AHU-17481	AHU-11369	Outside Air
					Supply Room	Hallway	Exec Board Rm - 2nd Fl	Dining Area	Psyche Intake	LTC 1	Average
Spore Traps	Opaque Particles	cts/m³	≤35,000 or 1/3 OA	3	9,070	27,200	10,300	627	13,000	16,200	36,700
	Skin Cell Fragments	cts/m³	≤7,500	3	7,430	4,870	2,310	1,330	2,460	6,090	860
	Insect Biodetritus	cts/m³	≤200 or 1/3 OA	3	BDL	13	BDL	BDL	BDL	BDL	BDL
	Fibers	cts/m³	≤500	3	746	493	239	186	266	1,380	120
	Fiberglass fibers	cts/m³	≤66	3	53	93	26	13	26	53	27
	Pollen	cts/m³	≤66 or 1/3 OA	3	BDL	BDL	BDL	BDL	BDL	BDL	40
	Fungal Elements	cts/m³	≤1000 or 1/3 OA	3	52†	3,390	624	13	505	1,200	6,120
	Other	cts/m³	≤6000 or 1/3 OA	3	4,670	15,900	4,460	2,770	5,720	8,320	5,595
Comfort	Temperature	°F	72 to 78	1	69.5	70.4	69.8	68.5	70.5	70.7	83.1
	Relative Humidity	%	30 to 60	1	53.6	56.3	39.9	53.9	NA	63.3	60.7
Particle	Respirable size	p/l	≤25,000 or 1/3 OA	3	12,354	7,036	1,765	4,507	12,599	16,165	46,555
Ventilation	Carbon Dioxide	ppm	700+OA	2	638	583	716	537	615	727	359

Foot Notes

Units	Reference	Notes
cts/m³ = Counts per Cubic Meter of Air	1. ASHRAE Handbook Fundamentals 2017 p10.16	BDL = Below Detectable Limit
°F = Degrees Fahrenheit	2. ASHRAE 62.1 - 2016	OA = Outside Air
% = Percent	3. Pure Air Control Services, Inc.	Red = Unacceptable, Remedial Action Highly Recommended
ppm= parts per million		Yellow = Marginal Condition. Remedial Actions Optional
		† = Stachybotrys/Memnoniella-Like Spores Detected
p/l = particles per liter of air		NA = Not Applicable
		* = See Guidelines Section

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HVAC Assessment

Prioritize system maintenance, restoration and replacement for optimal IAQ and energy efficiency.

- Visual Inspection of Conditions
- Environmental Analysis of HVAC conditions
- Consulting with staff on air changes and change implications

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Prioritizing Ventilation Needs

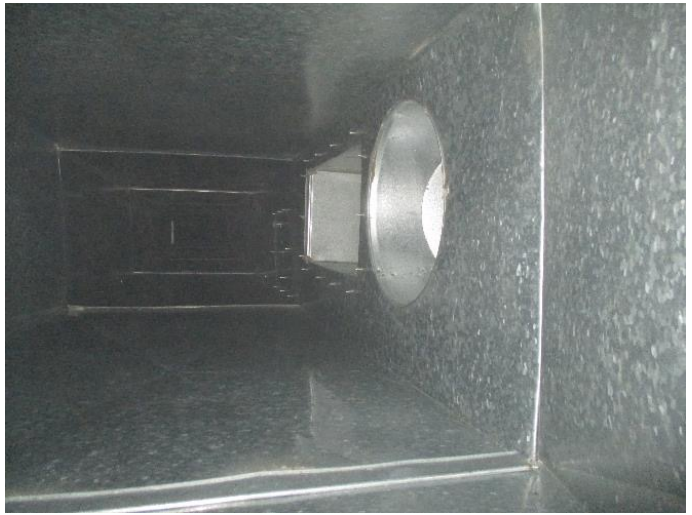
HVAC Hygiene Assessment

- Assess Conditions of Equipment
- Ductwork Inspection
- Create Maintenance Prioritization

AHU Identification	HCS	ACS
17852	39.58	37.50
17481	40.74	35.19
11329	46.30	31.48
14048	48.61	43.06
13287	53.03	46.97
11330	54.17	43.75
13288	54.55	50.00
12147	59.26	48.15
16725	60.00	51.67
11338	61.90	38.10
ID# G4	62.96	61.11
11956	64.81	62.96
12016	66.67	61.11
11463	66.67	66.67
11162	66.67	68.75
11982	66.70	55.56
11754	68.52	70.37
11952	68.75	54.17
11547	72.22	70.37
11369	72.22	68.52
11555	75.93	62.96
12015	77.08	70.83
12022	77.08	79.17
12021	77.78	70.37
11425	79.63	72.22
Total = 25	**63.27**	**56.84**
0-40% = Acceptable/Adequate		
40.1 - 60% = Marginal/Moderate		
>60% = Unsatisfactory/Advanced Aging or Fouling		

Example Air Conveyance (Duct)

Ductwork - Before Remediation



Ductwork - After Remediation

Ventilation Assessments

ASHRAE Equivalent Outdoor Air Calculator

- Designed for pre and post occupancy flush timing if utilized by the client.
- Testing data gather at the air handling unit, package unit, or heat pump.
- Calculate standard air changes per hour or effective air changes per hour (weighted for higher MERV, in room filtration etc.)
- https://docs.google.com/spreadsheets/d/1GUCcjAyhzrTATHD8SQvNcF7JnuWKpadSVT6LA_8SUII/edit#gid=1504155005

Air Change Effectiveness Test – Tracer Gas
https://www.airah.org.au/Content_Files/Divisionmeetingpresentations/QLD/PPQLD_13-06-2012-MJ.pdf

Room by Room Tests

- Provide standard air changes per hour on a room-by-room basis.
- Results help identify room that may have had airflow adjusted over time and allows for future balancing (does not include balancing)
- Information and report can be used by client to back check total system and/or building air changes.
- This service does not include balancing and does not include certification.

Address Priority Needs

- Remediation of identified IAQ issues
- Ventilation upgrades
- Infrastructure upgrades
- Cleaning and Restoration

HVAC Upgrades

- Replace
- Where applicable, Environmentally and mechanically refurbish aging air handling equipment.
- Environmentally Clean

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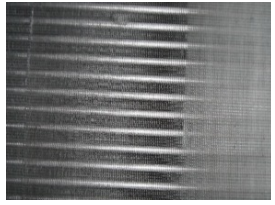
Steam HVAC Cleaning







Thorough, deep sanitization utilizing high temperature and low-pressure steam along with bio-enzyme coil treatments.

- Sterilize Air Handlers
- Coil Cleanliness Verification
- Improves IAQ & Performance
- Increases Energy Efficiency
- Reduces Work Orders
- Extends Equipment Life

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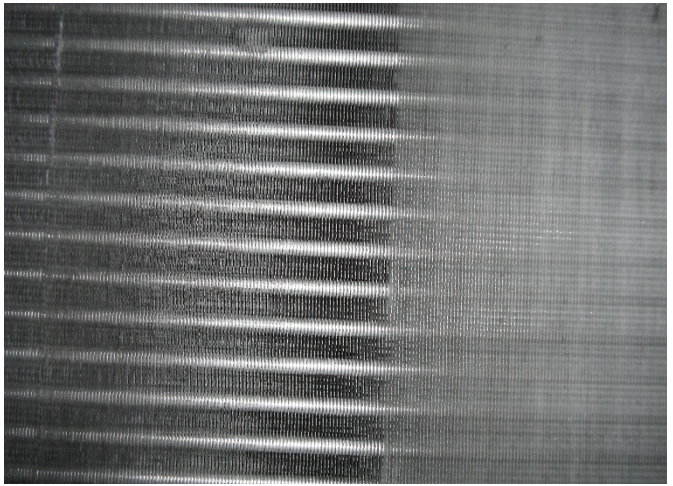
Importance of Physical Removal (unlike UV)

Before Steam Cleaning



After Steam Cleaning

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HVAC Environmental Restoration

Environmentally and mechanically refurbish aging air handling equipment.

- Antiviral, Antimicrobial & Waterproof
- Fiberglass Free Insulation
- Fan Array Air Flow redundancy Retrofit

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Interior Decon & Anti-Microbial/Protective

Before

After

Insulation / Fan Array Installation

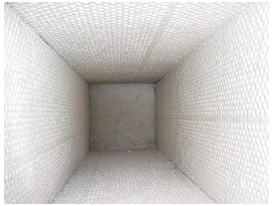
Before

After

Environmental Air Conveyance System Cleaning





Mechanically engineered methods for total air conveyance system cleaning including VAV and Reheat terminal boxes.

- Reduces Bacteria & Mold & Viruses
- Removes Dust & Particulates
- Improves Airflow & Ventilation
- Minimizes Allergies & Asthma

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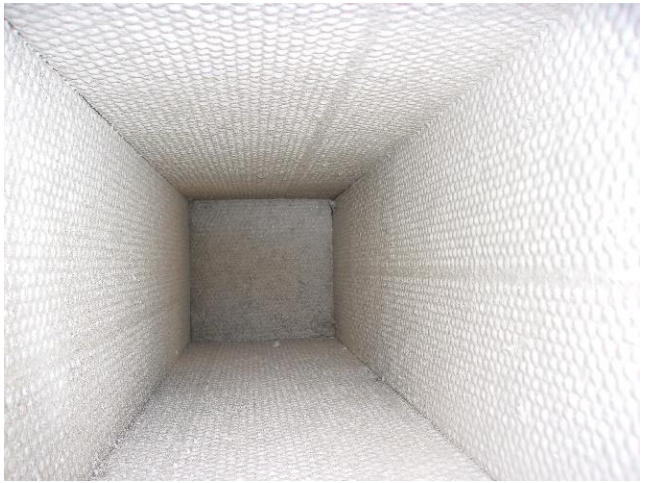
Duct Environmental Cleaning

Ductwork - Before Remediation



Ductwork - After Remediation

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Before/After

Ductwork - Before Remediation

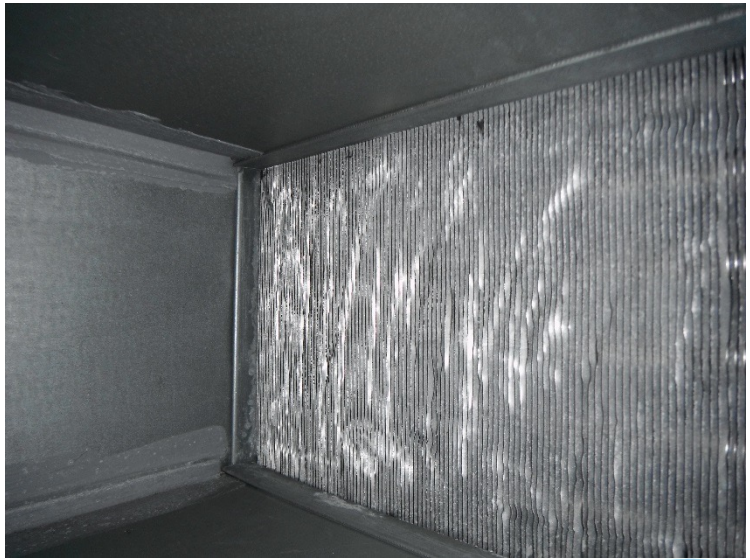
Ductwork - After Remediation

PURE-DUCT

PureAir Control Services, Inc.

Reheat Coils Air Flow Obstruction

Reheat Coil - Before Remediation

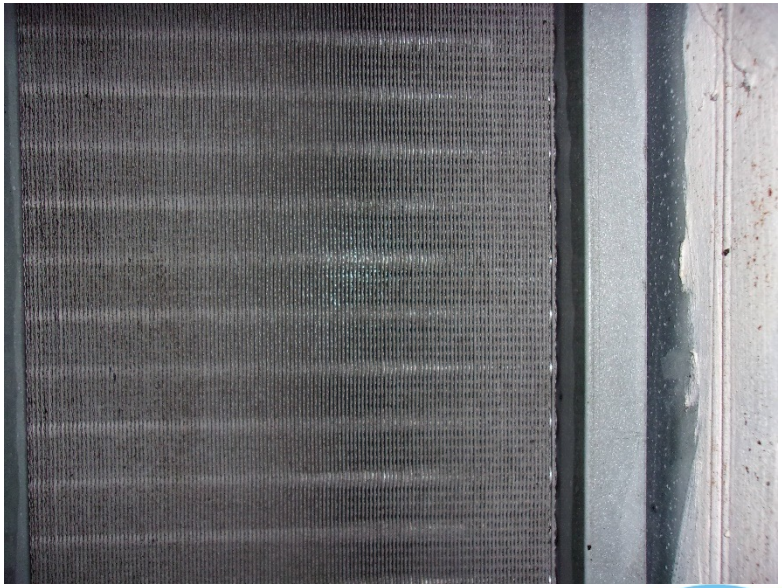


Reheat Coil - After Remediation

PURE AIR CONTROL SERVICES, INC.

Reheat Coils Airflow Obstruction

Reheat Coil - Before Remediation



Reheat Coil - After Remediation

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Inside the Duct

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Check up on your Janitorial Provider

Sustained Success

Creating a Sustainable Culture

- Evaluate how we keep this going
  - Permanent Filtration and Purification
  - Janitorial
  - Preventative Maintenance
  - Training of Facilities and Janitorial Staff
  - Infrastructure plans
- Continuous indoor air quality monitoring

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Technology Upgrades

- Autonomous Robotic Disinfection
- Temperature Scanning
- HVAC controls technology
- Basics like HEPA vacuums

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Bipolar Ionization

Bipolar Ionization

- Inside HVAC System
  - Distributes positively and negatively charged Ions into air distribution system
  - Ongoing research on Covid-19 uses

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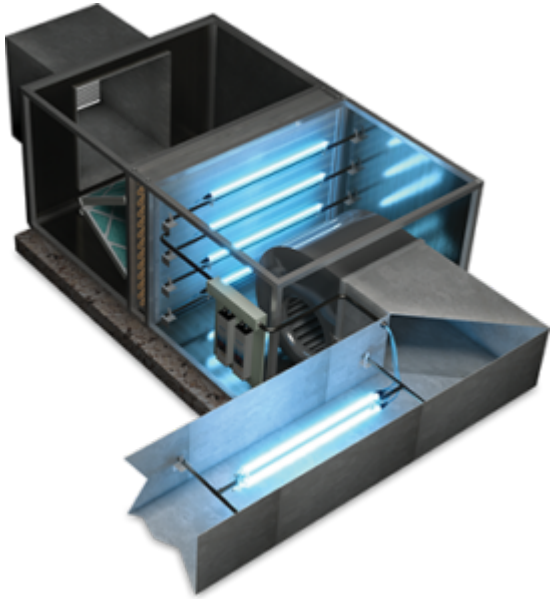
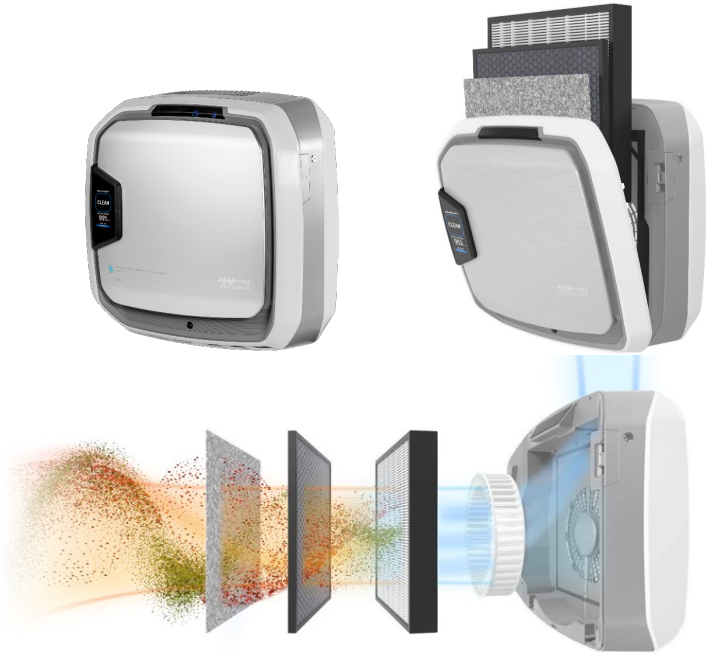
UVC Lighting



Features

- Germicidal Ultraviolet Light irradiates coil & air handler interior
- Kills mold, bacteria, and viruses in the HVAC system
- Saves energy by keeping components cleaner
- Lowers maintenance costs – reduced required cleanings

Localized Air Purifiers



In-Room Solution

- Address Highest Priority Rooms First
- Multi-Stage Filter System
- True HEPA Filtration
- IAQ Sensing Technology
- Quiet Operation

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Permanent/Continuous IAQ Monitoring

Nodes with sensors placed throughout a building that logs conditions to a browser-based dashboard.

- Continuously Evaluate Conditions
- Temp, RH, CO2, PM, TVOCS
- Establish Standards for Operations
- Monitor Trends for Early Detection
- Ensure Building Compliance

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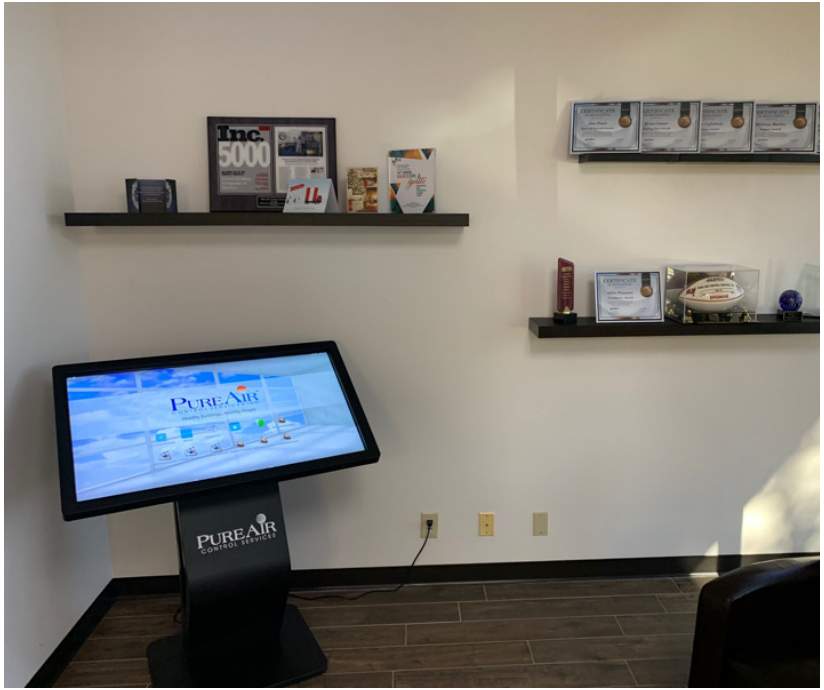
Promoting the Message



- Promoting Healthy Building initiatives to student body, faculty and potential applicants

- Consulting on Healthy Building Certifications

What Optimized IAQ Looks Like

HVAC CLEANED & RESTORED:

The HVAC units are hygienically cleaned using 350° F steam. Then restore them with air flow redundancy (where applicable) and anti-microbial and ant-viral coatings.

IAQ BASELINE EVALUATION

Baseline environmental (including for COVID-19 or Coronavirus) and HVAC testing to verify building safety or identify priority needs.

AIR PURIFICATION:

HEPA and other technologies are installed in the building for the continuous cleaning of the air to remove allergens, microbes, odors & particles.

PARTICLES REDUCED:

Air Conveyance ductwork is hygienically cleaned incorporating negative air machines with HEPA filtration. Fiberglass duct board is also encapsulated to prevent degradation.

PATHOGENS NEUTRALIZED:

Consulting with janitorial provider on latest research and CDC protocols for most effective and efficient cleaning and disinfecting methods and continuous testing.

CONDITIONS MONITORED:

Indoor Air Quality monitoring to monitor/alert the facility 24/7 for IAQ concerns.

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Phased Approach

- Phase I - Assess
  - IAQ Baseline Evaluation
  - HVAC Assessment
  - Janitorial and Covid-19/IAQ Protocols Assessment
  - Discovery of relevant campus needs

- Phase II – Address Priorities
  - Address Priority IAQ Concerns discovered in evaluation
  - Ventilation Equipment & Controls
  - HVAC Cleaning & Restoration
  - Address deficiencies in Janitorial, Covid-19/IAQ protocols, and infrastructure

- Phase III – Sustainable Practices
  - Permanent Filtration and Purification Solutions that make sense
  - Training of Facilities Staff
  - Continuous Indoor Air Quality Monitoring
  - Promoting the Healthy Buildings message and achieving Certifications

Healthy Buildings, Healthy People

Your Healthy Buildings Partner

- Founded in 1984
- 3 Specialized Divisions
  - Building Sciences, EDLab, Building Remediation
- Focus: Health, Comfort and Energy
- 800 Million+ Square Feet of Experience
  - 15,000+ Buildings Serviced
  - Commercial, Healthcare, Education, Government
- Industry Standard Certifications & Affiliations
  - USGBC, Green Clean Institute, CERC
- Certified Minority Business Enterprise

Scientific Expertise

- PhD Aerobiologist
- Microbiologists
- Mechanical Engineer
- Building Scientists
- Industrial Hygienists
- Test & Balance Certified Technicians

Building Sciences

EDLab
Environmental Diagnostics Laboratory

PureAir
Control Services, Inc.

Air Purification

Environmental Test Chamber

- Product Efficacy Testing
  - Simulates a Variety of Conditions
  - Inoculated with Variety of Contaminants
    - Bacteria, Particles, VOC, etc.

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EDLab Environmental Diagnostics Laboratory

PureAir Control Services, Inc.

Project Implementation

- Jeff Stokes

- Flexibility
- Speed
- Risk Transfer

energysystemsgroup.com

Energy Efficiency Contracting Legislation (FS 1013.23 or FS 489.145)

The 2020 Florida Statutes

Title XLVIII K-20 EDUCATION CODE | Chapter 1013 EDUCATIONAL FACILITIES | View Entire Chapter

1013.23 Energy efficiency contracting.—

(1) LEGISLATIVE INTENT.—The Legislature finds that investment in energy conservation measures in educational facilities can reduce the amount of energy consumed and produce immediate and long-term savings. It is the policy of this state to encourage school districts, Florida College System institutions, and state universities to invest in energy conservation measures that reduce energy consumption, produce a cost savings, and improve the quality of indoor air in facilities, and, when economically feasible, to build, operate, maintain, or renovate educational facilities in such a manner so as to minimize energy consumption and maximize energy savings. It is further the policy of this state to encourage school districts, Florida College System institutions, and state universities to reinvest any energy savings resulting from energy conservation measures into additional energy conservation efforts.

(2) DEFINITIONS.—For purposes of this section, the term:

(a) "Energy conservation measure" means a training program, facility alteration, or equipment to be used in new construction, including an addition to an existing facility, that reduces energy costs, and includes, but is not limited to:

1. Insulation of the facility structure and systems within the facility.
2. Storm windows and doors, caulking or weatherstripping, multiglazed windows and doors, heat-absorbing, or heat-reflective, glazed and coated window and door systems, additional glazing, reductions in glass area, and other window and door system modifications that reduce energy consumption.
3. Automatic energy control systems.
4. Heating, ventilating, or air-conditioning system modifications or replacements.

The 2020 Florida Statutes

Title XXXII REGULATION OF PROFESSIONS AND OCCUPATIONS | Chapter 489 CONTRACTING | View Entire Chapter

489.145 Guaranteed energy, water, and wastewater performance savings contracting.—

(1) SHORT TITLE.—This section may be cited as the "Guaranteed Energy, Water, and Wastewater Performance Savings Contracting Act."

(2) LEGISLATIVE FINDINGS.—The Legislature finds that investment in energy, water, and wastewater efficiency and conservation measures in agency facilities can reduce the amount of energy and water consumed and wastewater produced and produce immediate and long-term savings. It is the policy of this state to encourage each agency to invest in energy, water, and wastewater efficiency and conservation measures to minimize energy and water consumption and wastewater production and maximize energy, water, and wastewater savings. It is further the policy of this state to encourage agencies to reinvest any savings resulting from energy, water, and wastewater efficiency and conservation measures in additional energy, water, and wastewater efficiency and conservation measures.

(3) DEFINITIONS.—As used in this section, the term:

(a) "Agency" means the state, a municipality, a political subdivision, a county school district, or an institution of higher education, including all state universities, colleges, and technical colleges.

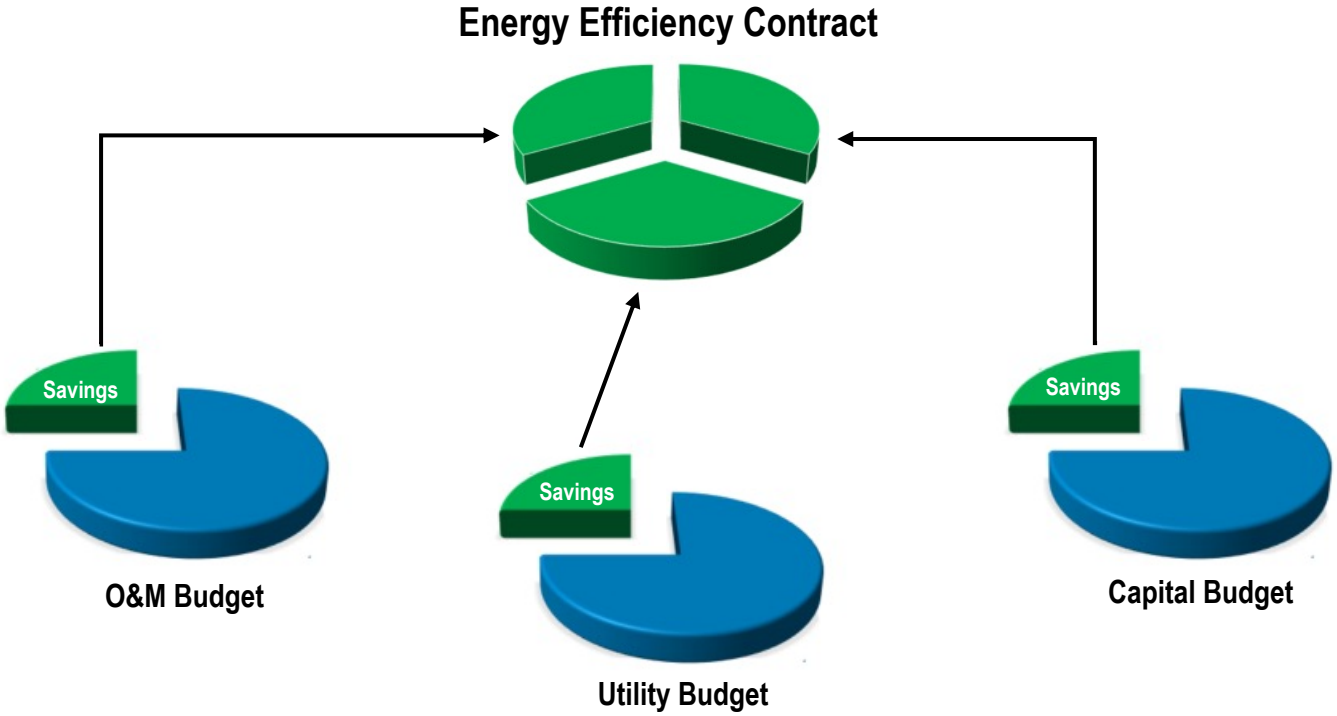
(b) "Energy, water, and wastewater efficiency and conservation measure" means a training program incidental to the contract, facility alteration, or equipment purchase to be used in a building retrofit, addition, or renovation or in new construction which reduces energy or water consumption, wastewater production, or energy-related operating costs and includes, but is not limited to, any of the following:

1. Installing or modifying any of the following:

Why FS 1013.23 or FS 489.145

- Flexibility
  - Cash, Financing, Federal Funds or Combination
  - Use Client Preferred Local Contractors (Shortlist of Bidders)
  - IAQ, HVAC, LED Lighting (Interior, Exterior & Sports), Building Envelope, Renewables, etc.
- Speed to Implementation
  - Selection of Firm Through “Piggyback” or Simple RFQ (20-30 Page Response)
  - Progressive Design-Build Approach
  - Meet Federal Requirements and Deadlines for COVID-19 Related Funding
- Guarantee of Results
  - Guaranteed Fixed Price (No Change Orders)
  - Guaranteed System Performance & Energy Savings
  - Single Point of Responsibility/Accountability

Potential Funding Streams (Flexibility)

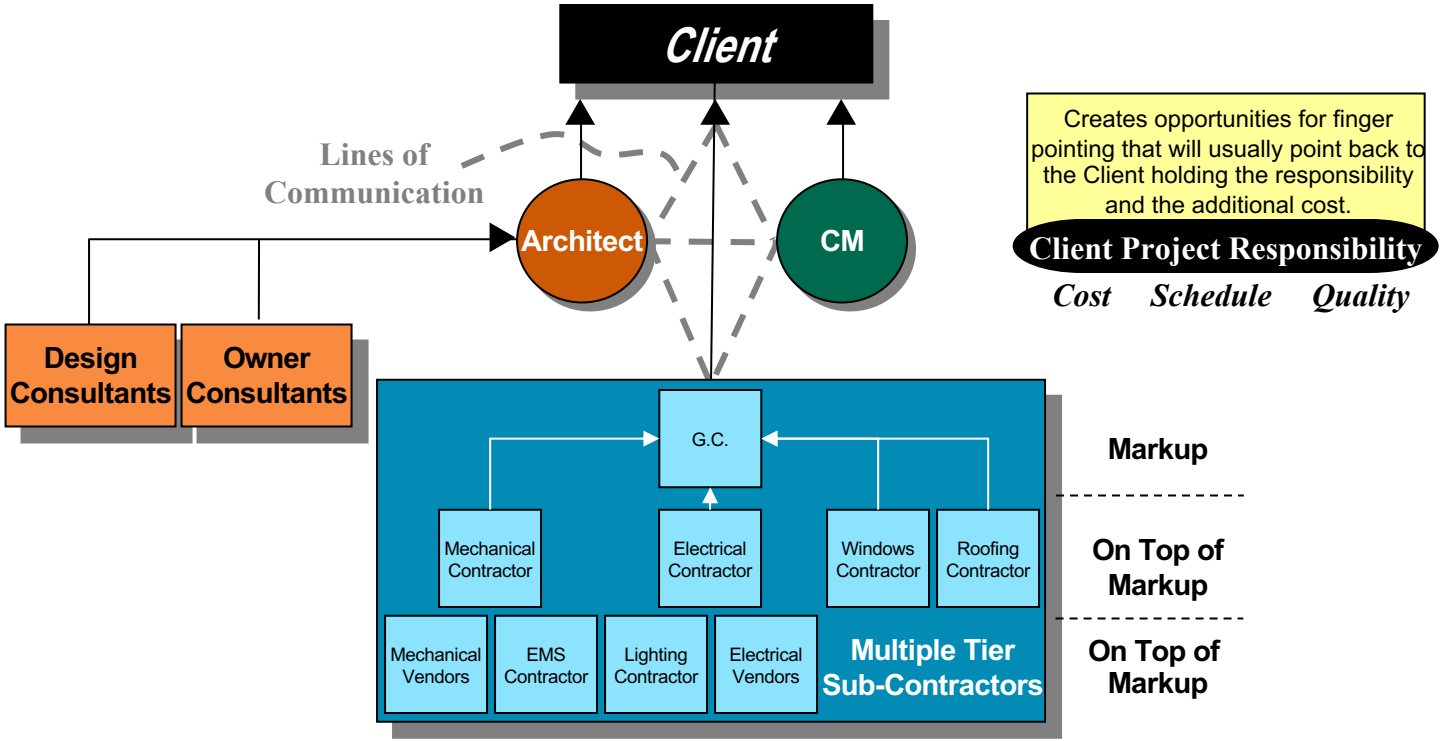


Funding Sources (Flexibility)

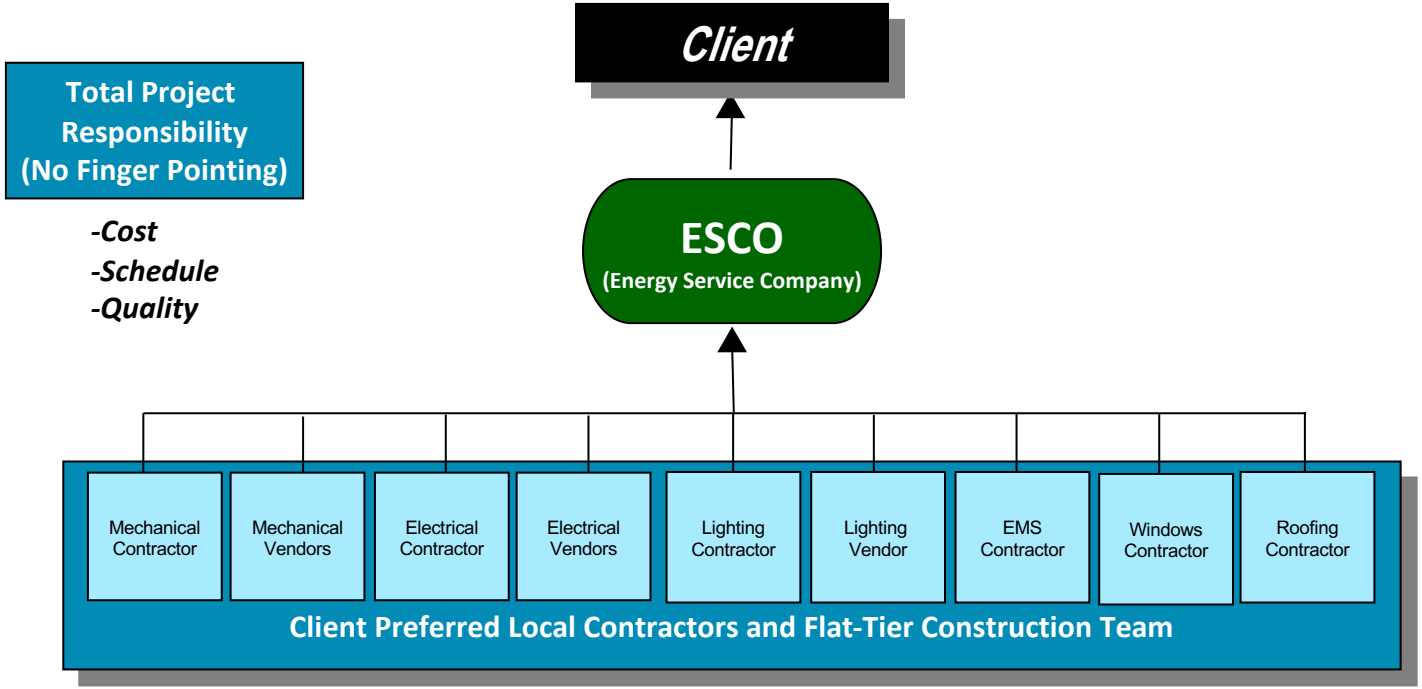
- Federal Funding, Grants & Rebates
- Low Interest Tax Exempt Loans
- Alternative Financing
  - Off Credit
  - Off Balance Sheet
- Utility Savings
- Operational Savings
- Capital Funds (Cash)

Common Customer Concerns

Traditional Bid Spec Approach



Energy Efficiency Contracting Approach



International Performance Measurement & Verification Protocol (IPMVP)

	Description	Typical Applications
A **Partially Measured Retrofit Isolation**	Savings are determined by partial field measurements of the energy use of the system(s) to which an ECM was applied. Some, but not all, parameters may be stipulated.	Lighting retrofit where pre - and post-retrofit fixture Wattages are measured. Operating hours of the lights are typically agreed upon.
B **Retrofit Isolation**	Savings are determined by field measurement of the energy use of the systems to which the ECM was applied.	Variable speed drive on a pump. Electricity use is measured by a kWh meter installed on the electrical supply to the pump motor.
C **Whole Facility** **(Utility Bills)**	Savings are determined by measuring energy use at the utility meter level. Bills may be corrected for weather.	Several ECMs affecting many systems in a building. Utility Bills are used.
D **Calibrated Simulation**	Savings are determined using building simulation. This option is rarely used, and is used primarily when there is no pre-retrofit utility data available.	Multifaceted energy management program affecting many systems in a building but where no base-year data are available.

EPA's Cash Flow Opportunity (CFO) Calculator

The Cash Flow Opportunity Calculator helps inform strategic decisions about financing energy efficiency projects. Using the tool, you will be able to estimate how much new equipment you can finance using anticipated savings, as well as whether you should finance now or wait for a lower interest rate. Use the CFO Calculator to get answers to critical questions, such as:

- How much new energy efficiency equipment can be purchased from the anticipated savings?
- **Should this equipment purchase be financed now, or is it better to wait and use cash from a future budget?**
- Is money being lost by waiting for a lower interest rate?

https://www.energystar.gov/CFOcalculator

(Google "EPA CFO Calculator")

Questions?

energysystemsgroup.com

Thank You

EnergySystemsGroup.com

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