Environmental Air Cleaning Ltd

PYURE DYNAMIC PROTECTION™

Technology Overview

ODOROX

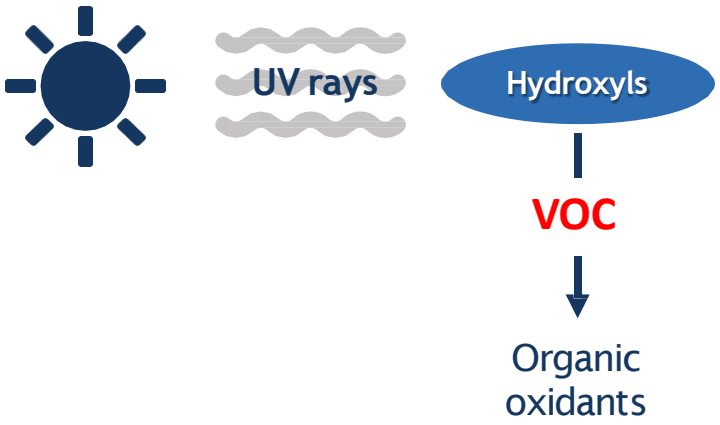
2020

Value Proposition

Replicating Nature: Bringing the cleansing power of the sun indoors

Nature's Process Outdoors

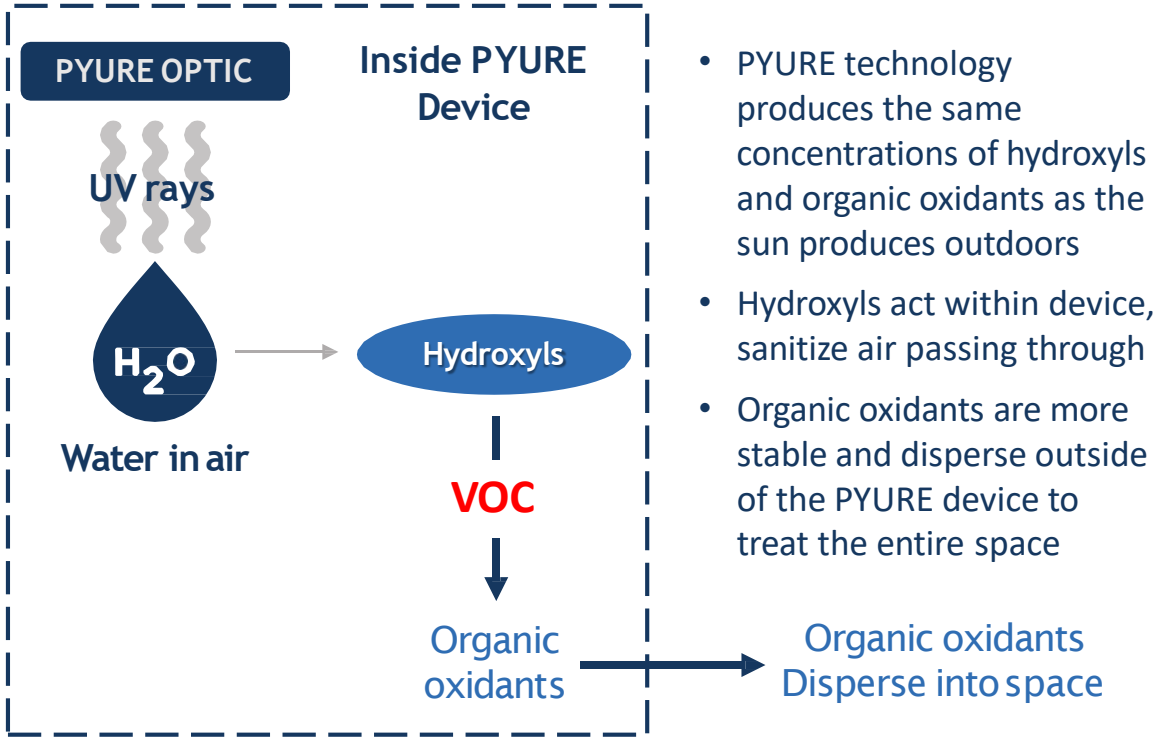
Sunlight Produces Hydroxyls & Organic Oxidants



- Sunlight emits UV rays that produce hydroxyls, the world's most powerful and fastest naturally occurring oxidant
- Hydroxyls react with VOC and form organic oxidants, which are more stable but have similar cleaning action

Indoors with PYURE Technology

PYURE Mimics the Sun, Produces Hydroxyls & Organic Oxidants

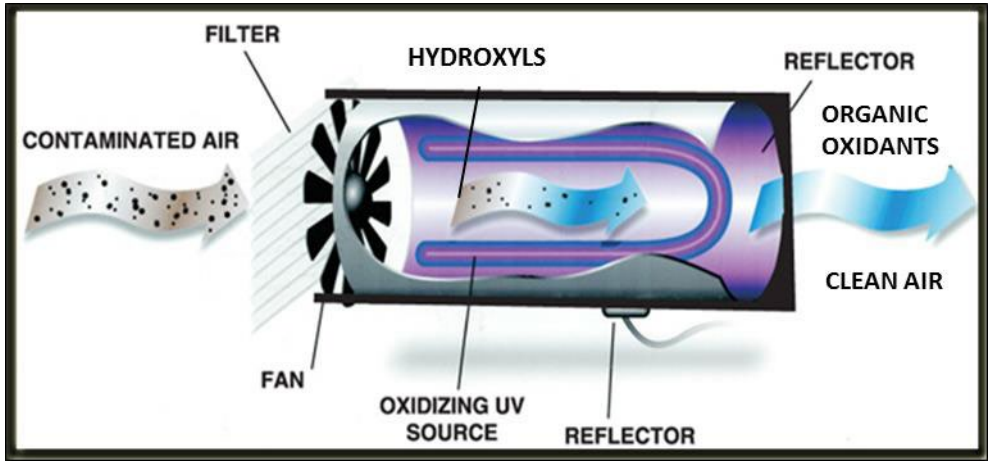


- PYURE technology produces the same concentrations of hydroxyls and organic oxidants as the sun produces outdoors
- Hydroxyls act within device, sanitize air passing through
- Organic oxidants are more stable and disperse outside of the PYURE device to treat the entire space

Unique Benefits

Proven commercial technology that effectively sanitizes air and surfaces

PYURE products have been sold for over 20 years and are proven to deliver industry best performance:

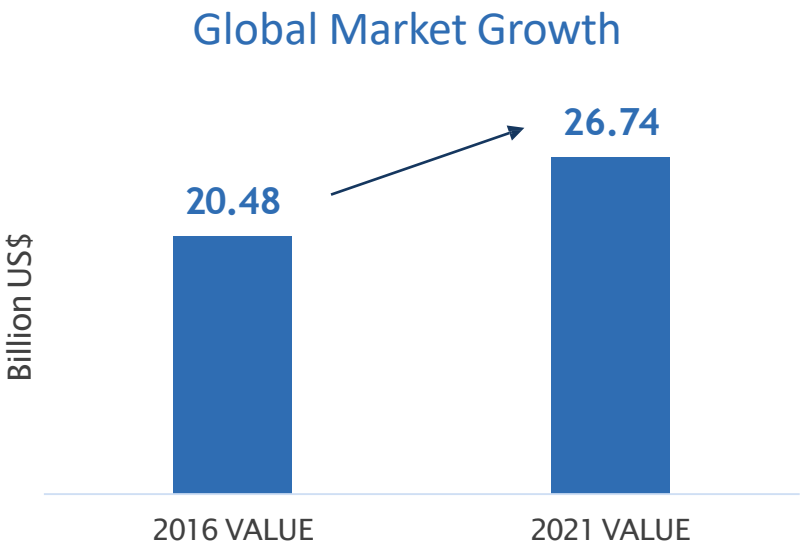


- **SAFE:** Can be operated continuously in occupied spaces
- **EFFECTIVE**:
  - Kill viruses, bacteria and mold in air and on surfaces (porous and non porous materials)
  - Improve indoor air quality by decomposing VOC, eliminating odors, neutralizing allergens
- **SCALABLE**: can effectively treat any size space: from small rooms to millions of cubic feet

Global Air Purification Market & Trends

The GLOBAL MARKET for air purification exceeds $20 BILLION, with equipment sales representing 60% of the total

$6.26 BILLION
5 year projected growth



Source: TechNavio 2018 industry study

Favorable Global Trends

- The COVID-19 pandemic is driving unprecedented demand for pathogen protection
- Hospital borne infections put patients and staff at risk and drive up the cost of healthcare
- Indoor air quality is 5X worse than outdoor air, with growing awareness of “building sickness”
- Employers are increasing their efforts to improve air quality to lower absenteeism, turnover & premiums
- Smoking bans create challenges for the hospitality industry (casinos, hotels, cruise ships, bars)

PYURE Addresses Global Public Health Needs

- **Pathogen Protection**
  - COVID-19 / future pandemics
  - Influenza A and other viruses
  - Bacteria
  - Mold

- **Better Indoor Air Quality**
  - VOC
  - Odors
  - Other pollutants
  - Allergens

PYURE VALUE PROPOSTION

- Is safe for use in occupied spaces
- Treats the entire space
- Operates continuously
- Kills pathogens in air
- Kills pathogens on hard/porous surfaces

- Eliminates volatile organic compounds
- Neutralizes odors
- Eliminates pollutants
- Reduces impact of allergens

Target Markets for Pathogen Protection and Improved Air Quality

Healthcare

- Hospitals
- Outpatient clinics
- GPs / specialists offices
- Dentistry

Senior Living

- Long term care
- Assisted living
- Hospice centers
- Retirement communities

Food & Agriculture

- Production (plants, livestock)
- Processing (food, beverage)
- Storage & transportation
- Cannabis & flowers
- Retail Stores

Commercial

- Offices and buildings
- Academia / daycare
- Retail, theatres, venues
- Fitness / health

Industrial

- Manufacturing
- Restoration / remediation
- Janitorial services
- Waste & water management

Hospitality

- Hotels / casinos / resorts
- Cruise ships / luxury yachts
- Transportation hubs
- Restaurants
- Indoor Attractions

PYURE Efficacy

PATHOGEN PROTECTION

Air Sanitization

- Studies conducted by Aerosol Research and Engineering Labs (ARE Labs) to assess pathogen destruction of PYURE technology on aerosolized viruses, bacteria and mold
- 99% reduction achieved within 15 minutes
- 99.999% reduction achieved within 2 hours

Surface Sanitization

- Multiple studies conducted by ATS to assess pathogen destruction of PYURE technology on hard and porous surfaces
- 99.99% reduction achieved on a variety of pathogens in 3 to 8 hours

IMPROVED AIR QUALITY

Volatile Organic Compounds (VOC)

- Rapid breakdown of VOCs demonstrated in studies by Lovelace Respiratory Research Institute (SRRI)
- No unsafe levels of intermediate VOC, ozone or aldehydes generated (Columbia Analytical Group)
- By-products formed from VOC reactions are also rapidly decomposed (Columbia Analytical Group)

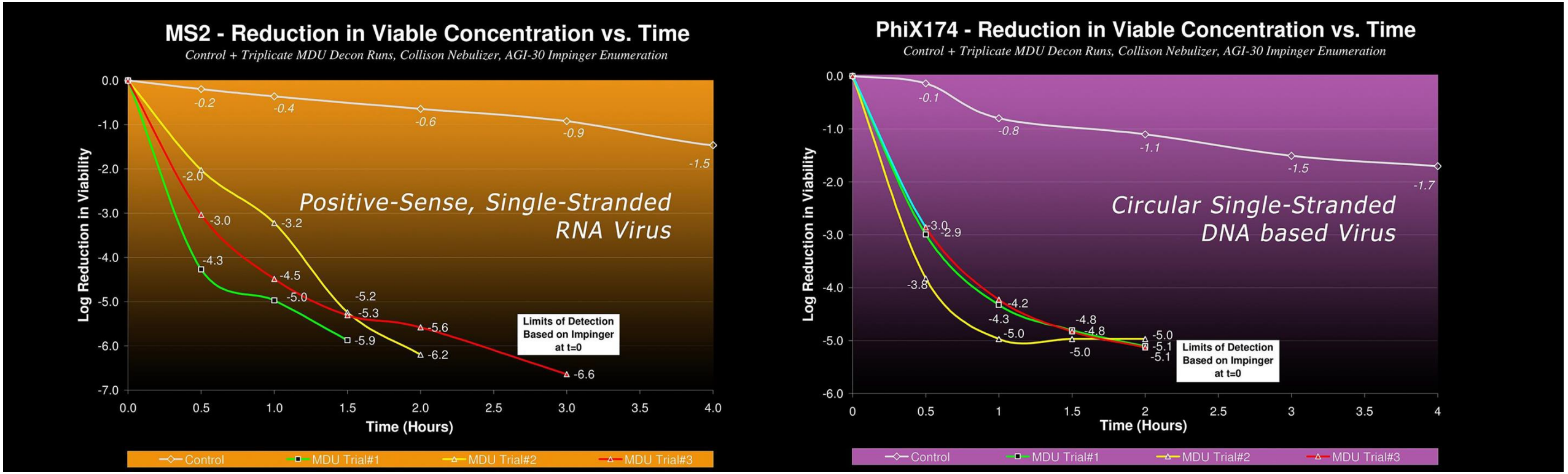
Allergens

- Scientific papers show hydroxyls neutralize allergens
- Extensive anecdotal evidence (testimonials) of people with breathing disorders, asthma and allergies breathing and sleeping better with PYURE

Rapid Destruction of Airborne Viruses

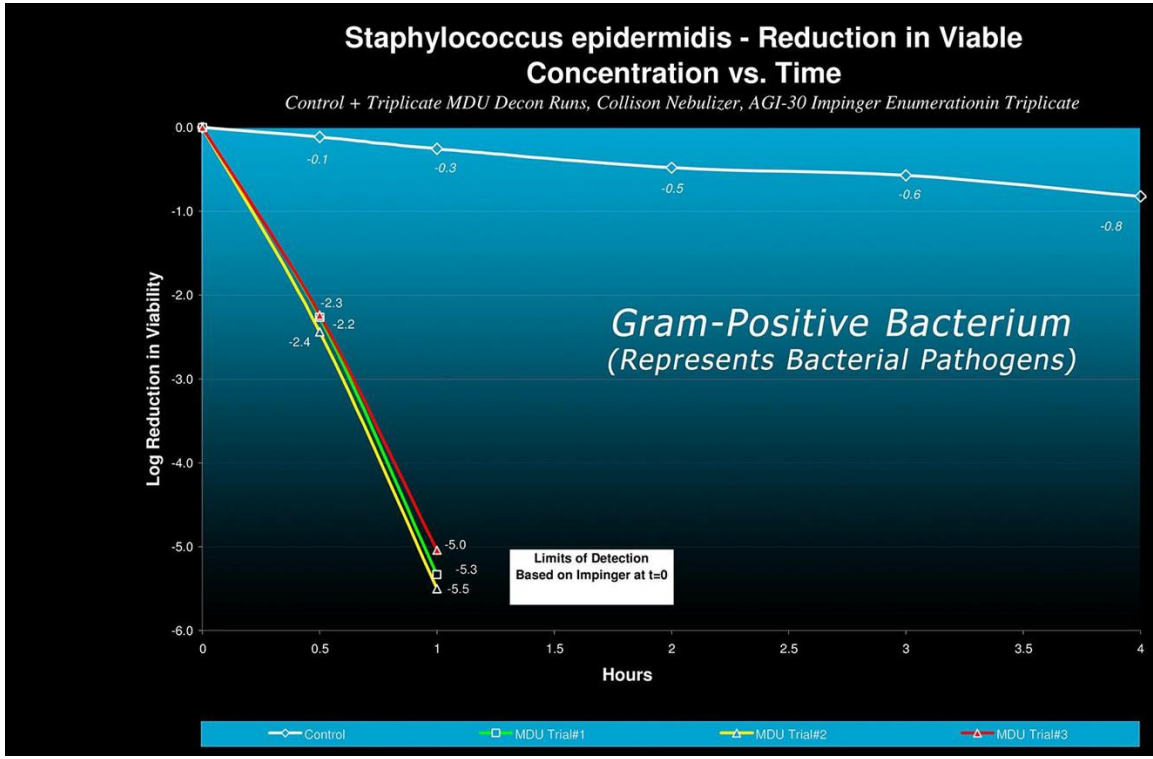
MS-2 Virus is a Simulant for Coronavirus

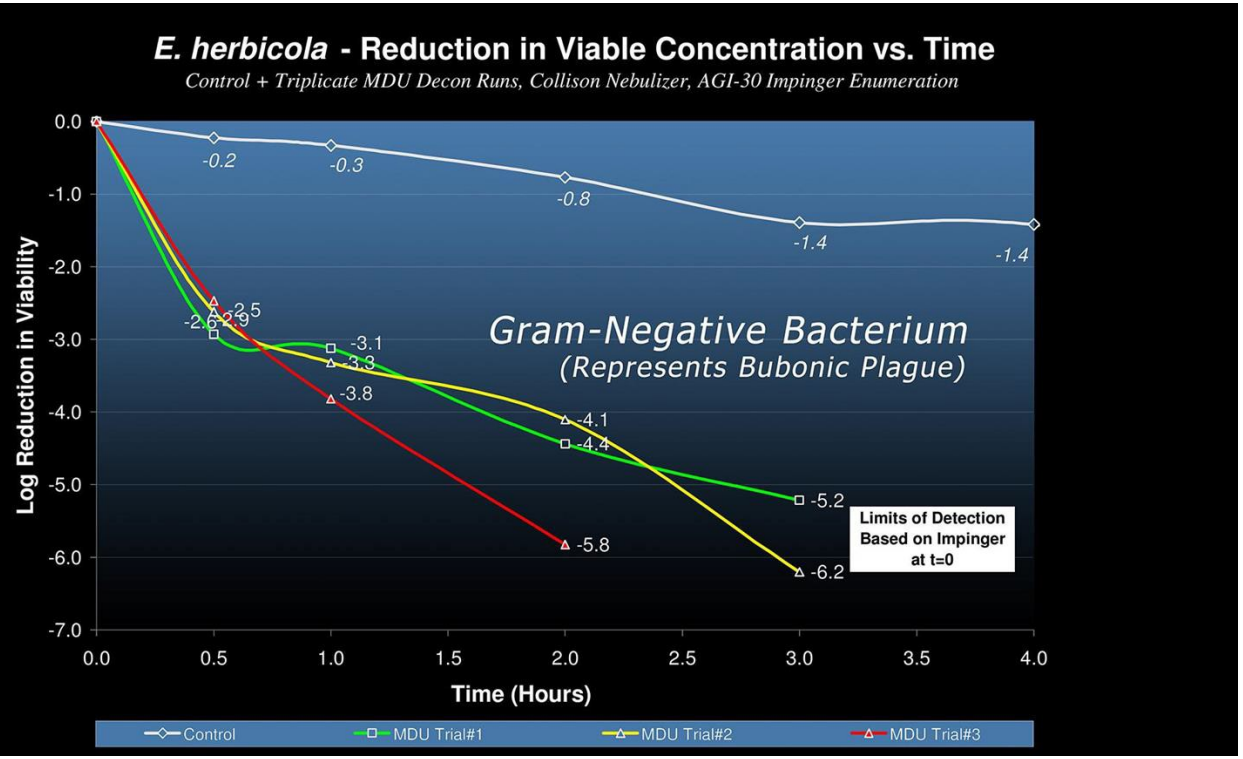
PhiX174 Virus is a Simulant for Smallpox



Source: Aerosol Research and Engineering Labs

Rapid Destruction of Airborne Bacteria





Source: Aerosol Research and Engineering Labs

PYURE Safety

Outdoor vs. Indoor Hydroxyl Concentrations

- At sea level, hydroxyl concentration is 3 to 10 x 10^6 /cm^3
- At higher elevations, concentration several times higher
- PYURE steady state concentrations are 3.25 x 10^6 /cm^3
- PYURE produces the same concentrations of hydroxyls and oxy and peroxy radicals as found outdoors[1]

Safety Data

There is no data in scientific literature suggesting atmospheric hydroxyl concentrations are unsafe (NIH, CDC, OSHA, FDA dbases)

PYURE confirmed the safety of its organic oxidant output with a GLP compliant toxicology study at Comparative Biosciences:

- Rats exposed to 3X the maximum levels generated by PYURE
- Study lasted 13 weeks with continuous, 24/7 exposure
- Results showed no toxicity or other negative impact on rats

Atmospheric vs. Biological Hydroxyls

ATMOSPHERIC HYDROXYLS: are generated in the environment by sunlight and other natural chemical reactions

BIOLOGICAL HYDROXYLS: are generated inside the body by macrophages and other cells as an immune system response

Atmospheric Hydroxyls pose no risk to human beings: our bodies have evolved over millions of years and have natural protection against UV and chemicals including hydroxyl radicals:

- Hydroxyls and organic oxidants cannot penetrate skin – the outer layers that are exposed and damaged are shed daily
- Hydroxyls and organic oxidants cannot penetrate mucosa in eyes, nose and lungs – they are quenched by aqueous fluids

Atmospheric hydroxyls and organic oxidants therefore cannot enter the body: skin and mucosa provide natural protection

Biological hydroxyls inside the body have high toxicity for nearby cells and are the last line of defense for virus/bacteria

[1] David R. Crosley, Connie J. Araps, Melanie Doyle-Eisele & Jacob D. McDonald (2017) Gas-phase photolytic production of hydroxyl radicals in an ultraviolet purifier for air and surfaces, Journal of the Air & Waste Management Association, 67:2, 231-240, DOI: 10.1080/10962247.2016.1229236

PYURE Competitive Advantage

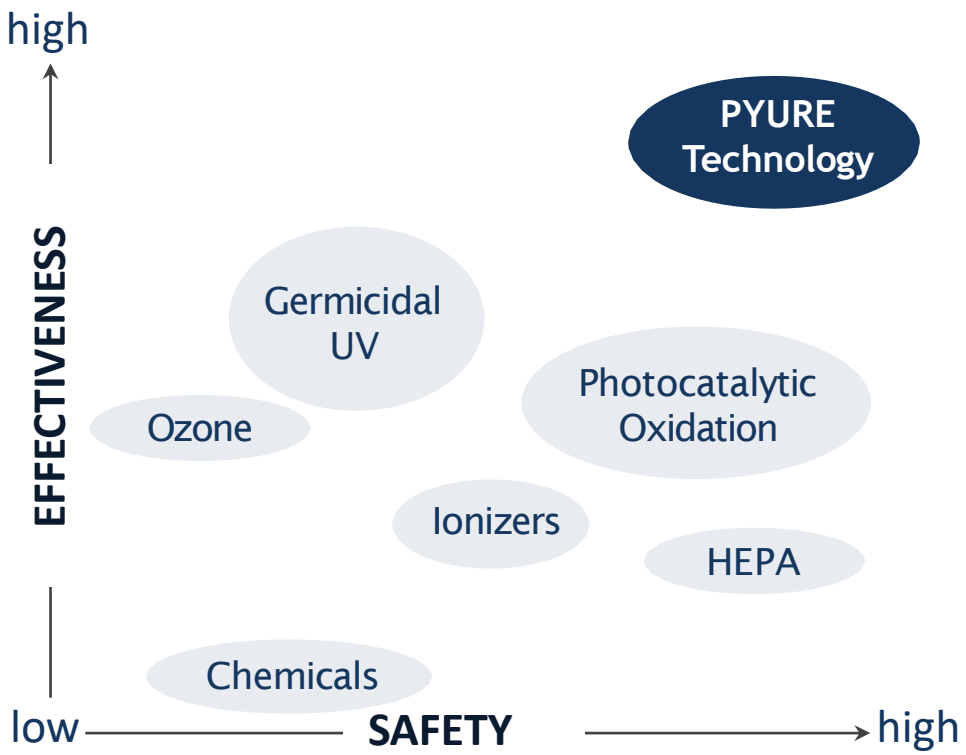
Only PYURE kills surface and airborne pathogens AND is safe for occupied spaces
PYURE technology is the only EFFECTIVE option that can be deployed in large buildings AND is price competitive

	PYURE	Filters (HEPA)	Photocatalytic Oxidation PCO	Ionization	Germicidal UV	Ozone	LED UV Lights (in dev't)
SAFE FOR OCCUPIED SPACES	YES	YES	YES	YES	NO	NO	TBD
KILL PATHOGENS IN AIR	YES	NO*	YES	YES	YES	YES	YES
KILL PATHOGENS ON SURFACES	YES	NO	NO	NO	SOME	YES	TBD
DEGRADES MATERIALS	NO	NO	NO	NO	YES	YES	NO
VOC & ODOR REMOVAL IN AIR	YES	NO	SOME	SOME	NO	YES	TBD
LARGE SURFACES/AREAS	YES	YES	NO	YES	NO	NO	YES
PRICE per FT^2 TREATED	$$	$	$$	$$	$$	$$	$$$$
MAINTENANCE FREQUENCY	annual	quarterly	Semi annual	Semi annual	Semi annual	annual	seldom
ONGOING OPERATING COSTS	$	$	$$$	$	$$$	$$$	$

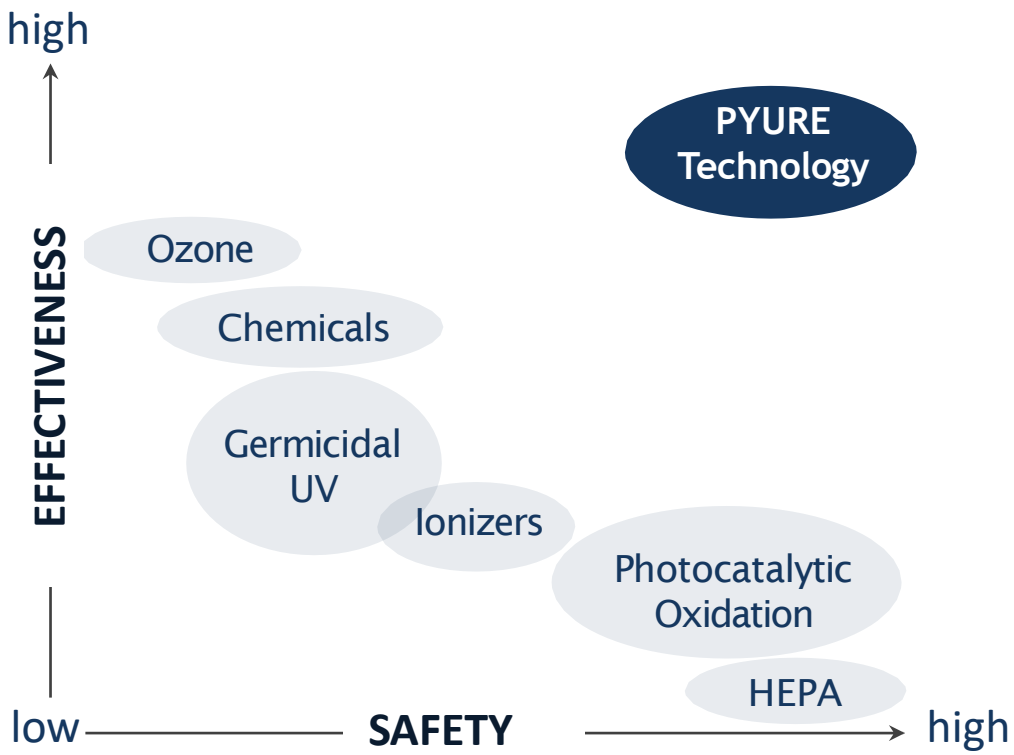
* Do not kill pathogens but trap some that pass through the filter

PYURE Competitive Positioning

AIR PURIFICATION



SURFACE SANITIZATION



PYURE Commercializes Four Distinct Product Lines

Portable Devices

- Plug into power socket
- Meant for small areas: 100 to 2,000 ft^2
- Portable & transportable
- Have minimum/maximum volume guidelines for optimal performance

In-Duct & Wall Mounted Units

- Inserted in duct or on wall
- Meant for medium sized areas: 1,000 to 5,000 ft^2
- Permanent installation
- Have minimum/maximum volume guidelines for optimal performance

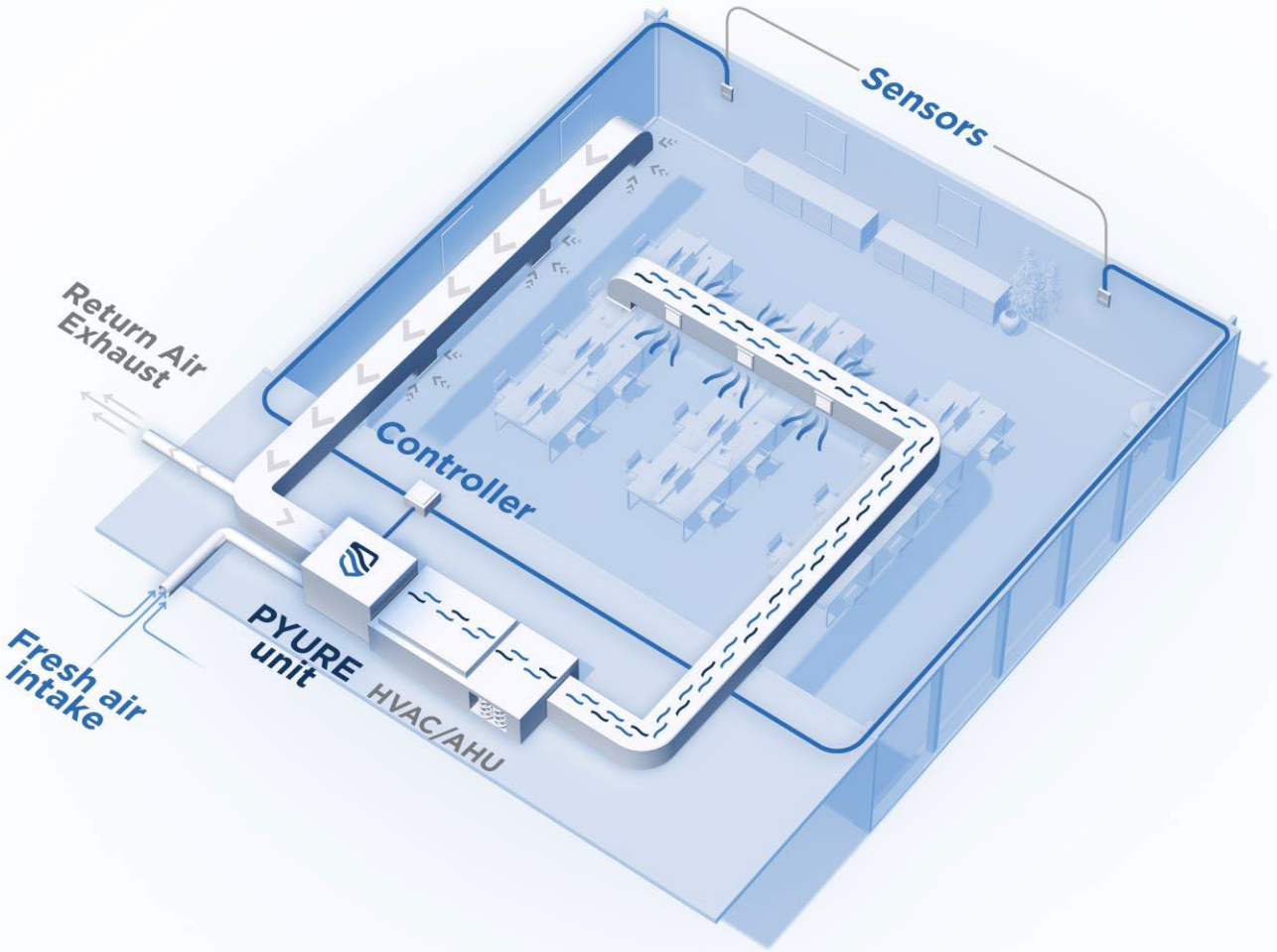
Custom Solutions

- Integrated in HVAC system
- Meant for large areas or entire buildings: no limit
- Permanent installation
- Control system monitors and adjusts continuously for optimal performance

Replacement Optics

- Annual replacement needed for optimal performance
- Not complicated but ideally part of after-sales service
- Can be shipped direct
- Connectors are proprietary to PYURE, cannot substitute

PYURE Custom Solutions



The custom solutions can be scaled to treat millions of cubic feet

Interactive, Sensor Driven Process Controls

- Enables user to set total oxidant limits :
  - OSHA safe limits: 100 parts-per-billion
  - PYURE levels set at 30 - 50 parts-per-billion
- Measures oxidant levels continuously
- Reduces or shuts down production if total oxidant levels exceed set point in any zone
- Ensures safety with fail-safe sensors
- Enables remote monitoring and control
- Archives data to document performance

Intellectual Property

Patent protection covering:

- UV photolytic hydroxyl generation
- Organic oxidant cascade generated outside of the PYURE device
- Monitoring unit performance
- Design patents on desktop units

Trade secret know-how for:

- Energy spectrum
- Air velocity retention times
- Optic design and placement
- Materials of construction

Patents issued: US, EU, Canada, Australia, China, Hong Kong, Taiwan (expire in 2029)

Registered Trademarks for the HGI® logo, Odorox® and OHAir® brands in multiple jurisdictions

Trademarks pending for Pyure Dynamic Protection™, Powered by PYURE Technology™, shield icon