NC STATE UNIVERSITY

SUSTAINABLE FLEET TECHNOLOGY

VIRTUAL CONFERENCE 2020

Session #10: Best Practices of the Top Green Fleets 2020

October 14, 2020

NC CLEAN ENERGY TECHNOLOGY CENTER

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

SUSTAINABLE FLEET TECHNOLOGY

VIRTUAL CONFERENCE 2020

https://www.sustainablefleetexpo.com/

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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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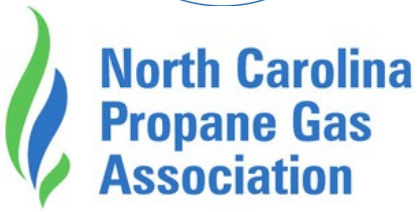

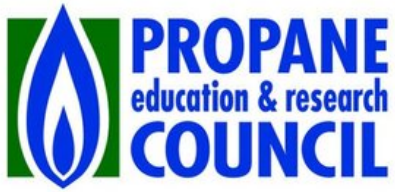

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SUSTAINABLE FLEET TECHNOLOGY
VIRTUAL CONFERENCE 2020

Next Series Dates & Topics:

October 21: Renewable Fuels, Lubricants & Other Bio-Based Products

November 04: Resiliency Considerations With Alternative Fuels & Transportation Technology

November 10: Sustainable Fleet Analytical Tools & Information

November 18: Potential Impacts of Connectivity/Automation Technology

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Format

- Q&A at the end
- Submit questions and comments to “Panelists”
- Scheduled for 2:00p-3:30p
- Handout
- Recording

Rick Sapienza
resapienza@ncsu.edu
Phone: 919-515-2788

- **Clean Transportation Program Director NC Clean Energy Technology Center at NC State University**
- **8 years with NC State**
- **30+ years experience including General Motors, Draper Lab and Great Lakes Pulp & Fibre in both engineering and business management roles**

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Best Practices of the Top Green Fleets 2020
October 07, 2020

2:00-2:05 **Rick Sapienza, NCCETC-**-Welcome & Introduction
2:05-2:10 **Tom Johnson, The 100 Best Fleets**—Green Fleet Awards Contest & 2020 Nuggets
2:10-2:20 **Philip Saunders, City of Seattle WA**—Green Fleet Award Winner 2020
2:20-2:27 **John Andrews, DPF Remedy**—Benefits of DPF Remedy Fuel Additive
2:27-2:37 **John Hyatt, City of Dublin OH**—Green Fleet Award Winner 2020
2:37-2:44 **Chad Bormann, Global Environmental Products**—Green Sweeping
2:44-2:51 **Dan Isaacs, Digital Twin**—AI Modeling for Transportation
2:51-2:58 **Mark Carvalho, Green Alliance International LLC**—Green Fleet Products
2:58-3:08 **Trach Ochsner, City of Fort Collins CO**--#1 Green Fleet Award Winner 2020
3:08-3:30 **Q&A**

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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

The 100 Best Fleets in the Americas

Tom C. Johnson,
author of *Green Fleet Awards*™
and *100 Best Fleets in the Americas*™

5407 Diamond Heights
San Francisco, CA 94131
www.the100best.com
415-285-8391 | tom@the100best.net

City of Seattle

Philip Saunders
philip.saunders@seattle.gov
206-684-0137

- Deputy Division Director Logistics and Emergency Management with oversight of the Green Fleet Program
- Green Ambassador for City of Seattle
- #4 Green Fleet 2019
- Authored 2019 City of Seattle Green Fleet Action Plan
- Received Governor Award for Leadership in Management
- Western Washington Clean Cities Coalition Committee Chair and member National Institute of Governmental Purchasing
- BS in Business Administration, Lean Six Sigma Black Belt Certified
- Retired US Army Warrant Office 20 years as logistician and contract officer

Sustainable Fleet Technology Series

City of Seattle Best Practices of Green Fleet

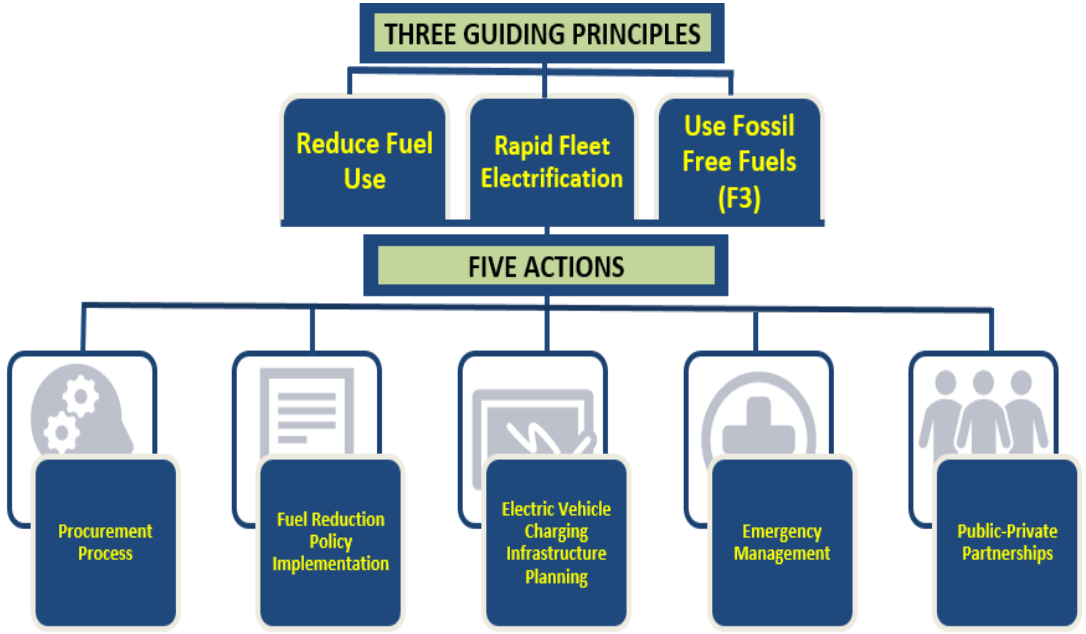
10/14/2020

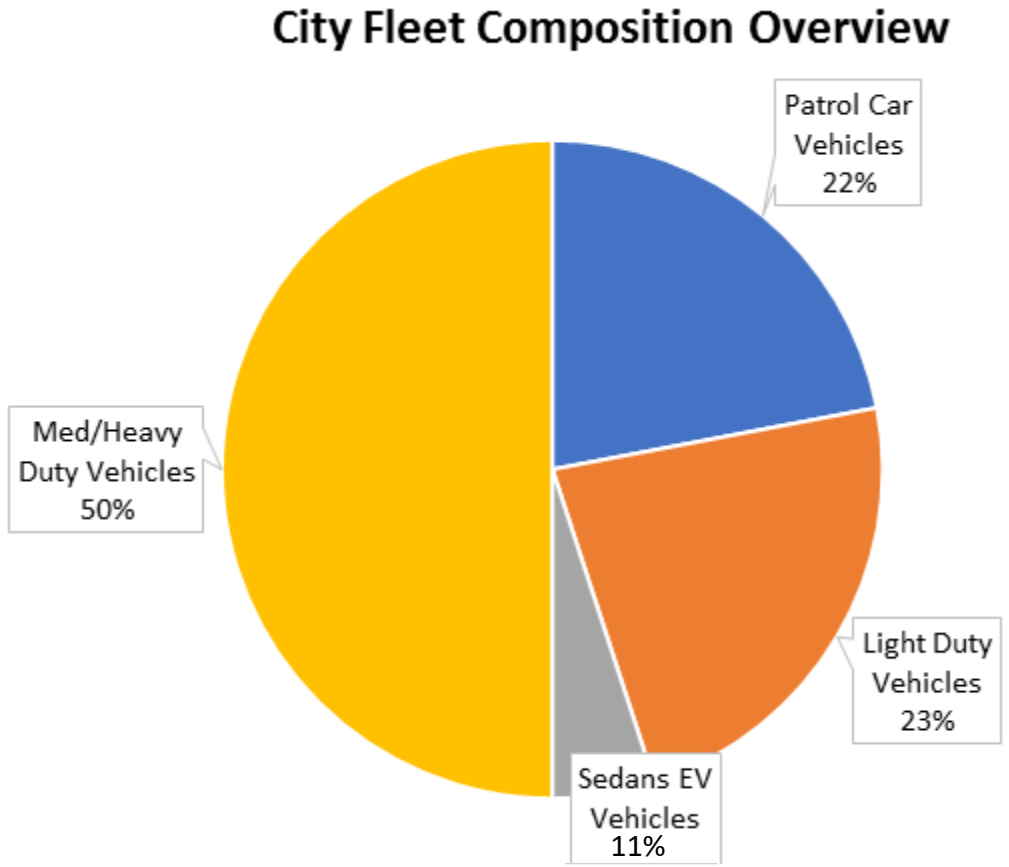
City of Seattle

How Does The City Fleet Reach Its Sustainable Green Fleet Goals?

Green Fleet Strategies

City of Seattle-Green Fleet Action Plan





Based on 4,100 City Fleet Vehicles

Implement the City's Cost to Go Green

- **Mayor Durkan Issues Executive Order 2018-02 (New Green Fleet Action Plan)**
- **Develop Action Plan with Stakeholders (Including Costs for First Time)**
- **Funding:** ~$27M over the next six years
  - Fleet Electrification (increase in EV models costs means increased rates)
    -232 BEV/127 PHEV and More Currently Being Purchased (TCO Tool)
  - Electric Vehicle Supply Equipment (EVSE)/Infrastructure
    -Over 300 Charging Stations Installed (SeaPark/SMT)
    -Master Project Under Way to Determine Charging Stations Citywide for Fleets
  - Renewable Fuels
  - Telematics
- **Bottom Line: All Actions Must Be Combined to Meet the City's Goal**

Implement the City's Cost to Go Green
cont'd

If all electrification options are exhausted, FAS will purchase fossil-fuel-free (F3) liquid fuels that are renewable hydrocarbon biofuels (also called "green" hydrocarbons, biohydrocarbons, drop-in biofuels and sustainable or advanced hydrocarbon biofuels) when a sustainable supply of a preferred fuel is available and recognized by California Air Resource Board (CARB).

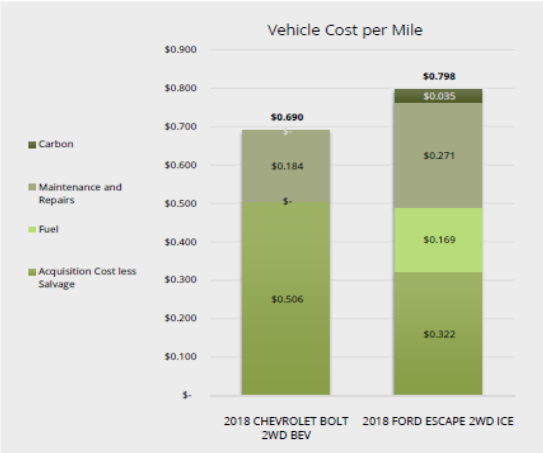
Renewable Fuels

- Renewable Diesel (City Contract-Christensen INC #4900)
  -Currently Using R90 Fleetwide
- Renewable Gasoline (City Contract-Scooter J Logistics LLC #4946)
  -Currently Using (availability)
- Renewable Propane (WA State Contract #02318)
  -Currently Using
- Hydrogen
  -Feasibility Study
- Telematics (Sourcewell Contract #022217)
  -Currently Using

Note: In accordance with EO 2018-02, any construction of new fossil fuel infrastructure for the City's fleet is prohibited.

Implement the City's Cost to Go Green cont'd

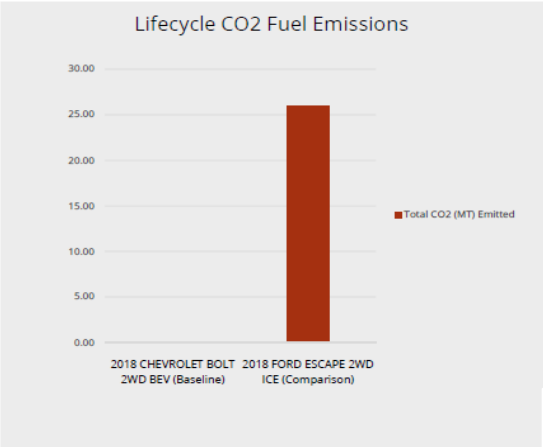
Procurement Summary



	2018 CHEVROLET BOLT 2WD BEV (Baseline)	2018 FORD ESCAPE 2WD ICE (Comparison)
Number of Vehicles Procured	1	1
Years of Use/Ownership	10	10
Miles Procured	55,000	55,000
Acquisition Cost	$ (34,790)	$ (19,699)
Fuel	$ -	$ (9,294)
Maintenance and Repairs	$ (10,102)	$ (14,921)
Carbon	$ -	$ (1,943)
Vehicle Total Cost	**$ (44,892)**	**$ (45,858)**
Charging Infrastructure	$ -	$ -
Estimated Salvage	$ 6,958	$ 1,970
Total Cost of Ownership	**$ (37,934)**	**$ (43,888)**
Total Cost / Mile	$ (0.690)	$ (0.798)

The greenest option (baseline) is 16% less expensive than the alternative (comparison) vehicle

Societal Benefit Summary



2018 CHEVROLET BOLT 2WD BEV (Baseline)	VS	2018 FORD ESCAPE 2WD ICE (Comparison)
0 gallons		2,292 gallons

The greenest option (baseline) fleet uses 2,292 fewer gallons of gasoline than the alternative option (comparison) fleet

Acquisition + Life Maintenance + Life Fuel + Cost of Carbon ($75 per MTCO2e) – Salvage Cost=

Electric Retrofits

- Battery Electric Vehicles (BEV)
- Plug-In Hybrid Electric Vehicle (PHEV)
- Hybrid Electric Vehicle (HEV)
- Fossil Fuel Free (F3) Liquid Fuel (Renewable/Bio Diesel/Gas) Vehicles

50% GHG Reduction by 2025

Questions

DPF REMEDY

John Andrews
john@dpfremedy.com
517-317-4701

- Chief Operating Officer for DPF Remedy
- Long time trucking industry professional
- Committed to improving the environment and reducing transportation emissions

John Andrews
Chief Operating Officer

DPF REMEDY

Product

- DPF Remedy comes in tablet form and is simply dropped into the fuel tank upon refueling. Within a few minutes, it bonds with the fuel at the molecular level causing combustion to occur at much lower temperatures than untreated fuel.

- This combustion efficiency results in not only greater fuel efficiency and less harmful emissions but also bonds with and removes existing carbon deposits in the engine.

- DPF Remedy is manufactured in the USA and is also available in concentrated liquid form for larger applications (1 gallon treats 5000 gallons of fuel)

DPF REMEDY

Benefits

- 40-90% Less Emissions – Especially Particulate Matter / Soot (PM) and NOx
- 10-20% Less Fuel Consumption
- 3-5% More Horsepower
- Dramatic, positive effect on Diesel Particulate Filters (DPFs) – extending regeneration intervals up to 800%
- Removes residual carbon deposits and prevents formation of new deposits – leading to longer engine life.
- Diesel Emission Fluid (DEF) use is reduced 10-20%

DPF REMEDY

Customer Examples

DAYBROOK

AN OCEANA GROUP COMPANY

REPUBLIC SERVICES

OCEANA COUNTY MICHIGAN

HUNTER INC

DPF REMEDY

John Andrews
517.317.4701
john@dpfremedy.com

www.dpfremedy.com

John Hyatt
jhyatt@dublin.oh.us
614-410-4760

- Fleet Manager for the City of Dublin OH
- 16 year with City of Dublin
- Focus on fleet sustainable for more than 10 years
- More than 1/3 fleet alternative fuel vehicles, both CNG and electric

City of Dublin

A Seven Step Plan for a Top 10 Green Sustainable Fleet

John Hyatt

Fleet Manager City of Dublin OH

JHyatt@dublin.oh.us

1. Dublin Ohio City Council implemented the vision for creating a strategic plan for the community that would create a future environment that is more diverse and innovative for those who work and live within the city.

You must have the support from the very top of your organization, Government or Business, you will not succeed without it.

2. As part of the goals of Council, Fleet Management continues to purchase fuel efficient and alternative fueled vehicles and equipment each year to meet fleets goal of 70% of the vehicles and equipment in the City will be alternative fueled and fuel efficient by 2025.

You must set goals that are achievable and measurable.

3. Our Fleet Management Division has an administrative order that addresses the vehicle replacement criteria as well as a replacement policy and schedule. We are to replace all vehicles and equipment with the latest green technology.

You have to have a replacement plan, ours is a five year plan that is reviewed with our City Council, City Manager, and Finance yearly.

4. In 2013 Fleet Management became the approval authority of all capital vehicle and equipment purchases to ensure the City's replacement policy is followed. As part of that, Fleet provides city agencies with safe, reliable, economically and environmentally sound vehicles for all of the city. The plan does not set yearly goals for fuel efficiency & emission standards.

You must have the final say in what type of vehicle or equipment is being ordered.

5. To date the City has purchased 10 Nissan Leafs and has installed 10 Charging stations at various City owned buildings that are free to use for the public and employees. The city owns a total of 67 CNG vehicles including 10 dedicated CNG Freightliner M2 Snow Plows. 10 Nissan EV Leafs, and 3 Ford Hybrid Police Interceptors with an additional 4 on order for 2021.

Any purchased vehicle or equipment that is ordered must be more efficient than what it is replaceing.

6. Fleet meets with all divisions within the city to help them achieve their suitability goals by purchasing CNG efficient vehicles, Tier 4 clean diesel equipment, EV vehicles, and Hybrid Police Interceptors.

You must meet with your customer agencies to find out their true needs before ordering anything.

7. Fleet has also installed keybox's for the ever growing motor pools which helps Fleet replace under- utilized vehicles.

Purchase efficient smaller size vehicles for your motor pool, most of the time its just one person.

City of Dublin

Thank You

Chad Bormann
CBormann@globalsweeper.com
903-713-1600

- Vice President of Sales and Operations for Global Environmental Products
- One of the company's founding partners from 2011

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GLOBAL ENVIRONMENTAL PRODUCTS
ISO9001:2008

5405 Industrial Parkway
San Bernardino, CA 92407 USA
Phone: 909-713-1600
info@globalsweeper.com

GREEN SWEEPING

Clean Fuel,
Clean Streets
Clean Air

We build Purpose Built, Heavy Duty, and simply Tough Street Sweepers.

- *Reliable, Affordable and Innovative Products*
- *Protect our Environment and Reduce our Carbon Footprint*
- *Save our Planet and Clean the Streets*

OUR SPECIALTY…

PURPOSE BUILT CHASSIS PROVIDES FLEXIBILITY TO LEAD INDUSTRY:

ALTERNATIVE FUEL/GREEN TECHNOLOGIES

- **GLOBAL M3 AND M4 CNG MECHANICAL SWEEPERS**
- **GLOBAL M4 HYDROGEN FUEL CELL**
- **GLOBAL M4 HYBRID DIESEL ELECTRIC**
- **GLOBAL M3/M4 ALL ELECTRIC SWEEPERS**

HYBRID VEHICLES (HEVs)

Hybrid Electric Vehicles (**HEVs**)

- Combine the internal combustion engine of a conventional vehicle with the battery and electric motor of an electric vehicle, resulting in twice the fuel economy of conventional vehicles.

Why HEVs?

- Hybrid power systems were conceived as a way to compensate for the shortfall in battery technology. Because batteries could supply only enough energy for short trips, an onboard generator, powered by an internal combustion engine, could be installed and used for longer trips

Our Partner: US Hybrid

- Lead in design, development, and production of advanced electric and hybrid powertrains
- Provide the New York City Department of Sanitation with application-specific hybrid street sweeper
- Lead in supporting NYC's mission to significantly reduce fuel consumption and GHG emissions.

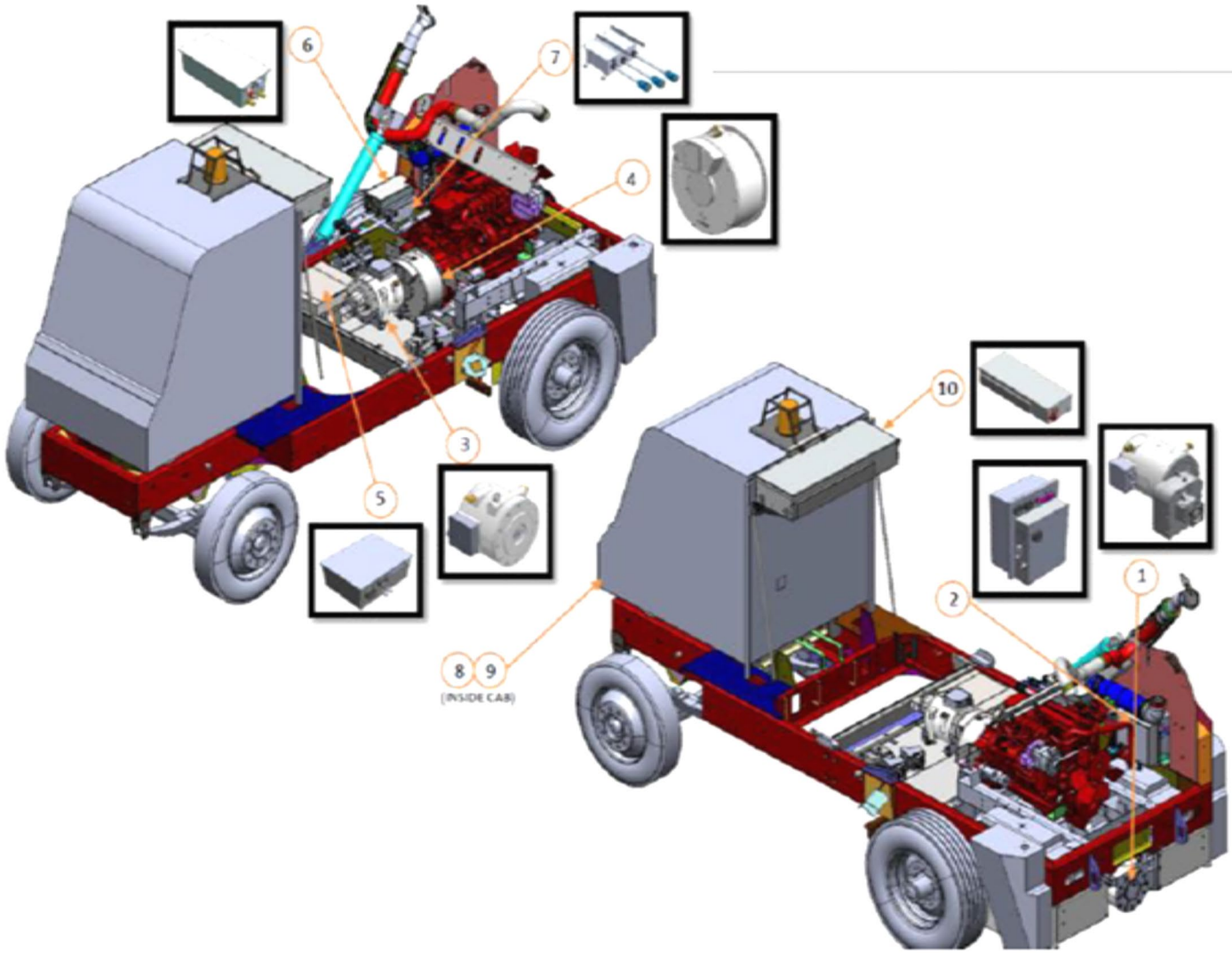
The Global M4H Hybrid Street Sweeper provides up to 50% fuel savings and a 58% reduction in GHGs and regulated emissions.

Hybrid system trade-off study performed.

- Sweeper modeling an operational analysis based on drive cycle of 85% sweeping time and 15% drive time.
- Fuel consumption occurs primarily during sweeping operation making the vehicle an excellent candidate to utilize hybrid powertrain technology.
- RESULTS……

GLOBAL ENVIRONMENTAL PRODUCTS

DSNY Hybrid Sweeper Configuration	
Item	Description
1	120kW Drive Motor
2	120kW Drive Motor Controller Unit with 60kW Hydraulic Controller
3	60kW Hydraulic Motor
4	80kW Generator
5	80kW Generator Controller Unit
6	DC/DC, 200A, 12V
7	High Voltage Disconnect Unit
8	Fuel Econometric Display Unit
9	Wireless Telemetry Unit (iDrive)
10	Battery Pack (110S1P)



GENERATOR SYSTEM/ MOBILE GENERATOR CAPABILITY ON THE M4 HYBRID

M4 HYBRID HAS EXPORT POWER (MOBILE GENERATOR CAPACITY):

10 KW

2 PHASE 240/120 VAC

60 HZ

1st Heavy-Duty Hydrogen Fuel-Cell Powered Street Sweeper in USA!

Protecting our Future with Zero Emissions!

- 33,000 GVWR – 65 MPH TRAVEL SPEED
- Rear Dump and Side Dump Hopper Available.
- Extremely quiet operation.
- Always ZERO EMISSIONS!
- Electric Motor Drives the Sweeper.
- Heavy-Duty Sweeping System Sweeps up to 3-Tons of sand per minute.

GLOBAL ENVIRONMENTAL PRODUCTS

- The fuel cell and hydrogen tank take the place of a battery-electric vehicle's battery pack.
- Diesel engine is no longer required.
- The by-product of electro-chemical reaction is energy and H2O.

At a glance

California Department of Transportation utilizes 170-plus street sweepers daily. Each M4 ZE produces 43 gallons of water per shift so that equals 7,310 gallons of water produced by operating street sweepers.

REGISTERED WITH FEDERAL EPA AND AIR RESEARCH BOARD (ARB)

The Global M4ZE Street Sweeper is North America's first Hydrogen Fuel Cell Street Sweeper whose only by-product is pure H2O!

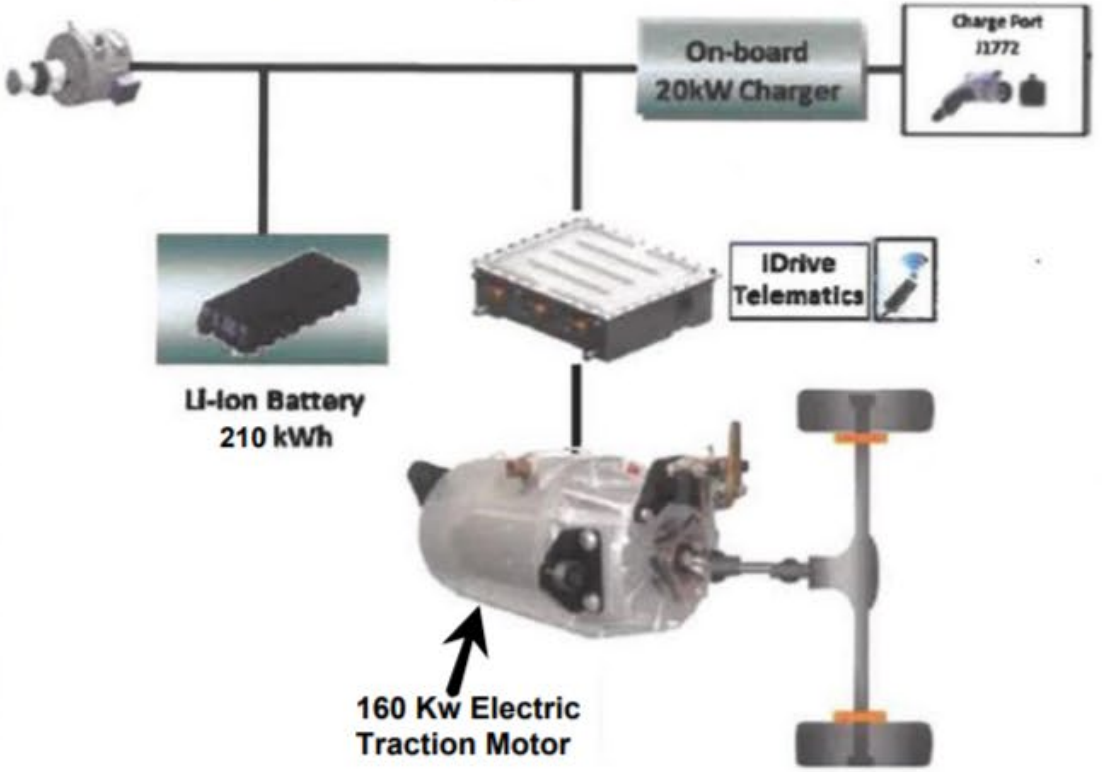
The water produced through this chemical reaction is diverted to the sweeper's water tank system, providing an additional 43 gallons of water per shift to use for dust suppression.

GLOBAL M4 ELECTRIC SWEEPER

THE FIRST 100% ELECTRIC HEAVY DUTY STREET SWEEPER IN THE USA!

CLASS 7 STREET SWEEPER – (26,001–33,000 LBS GVWR)

Battery Electric Zero Emission Sweeper DSNY



8 Year Battery Warranty – A123

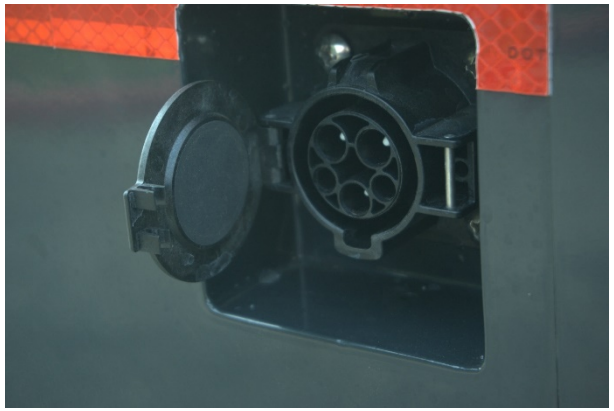
Anticipated Battery efficiency loss of 15%

WORK AUTONOMY:

GLOBAL M3/M4 – 9-11 HOURS OPERATIONAL TIME

SAE 1772 Level II Charging System Standard: 240 Volts with 50 Amp Requirement 9-11 HR Charge Time

- J1772 SAE Level III Supercharging System is available as an option, recharging time of 4 hours.



Control System located above batteries

- Easily accessible for troubleshooting

TRACTION SYSTEM:

CONVENTIONAL REAR AXLE DRIVEN BY ELECTRIC MOTOR

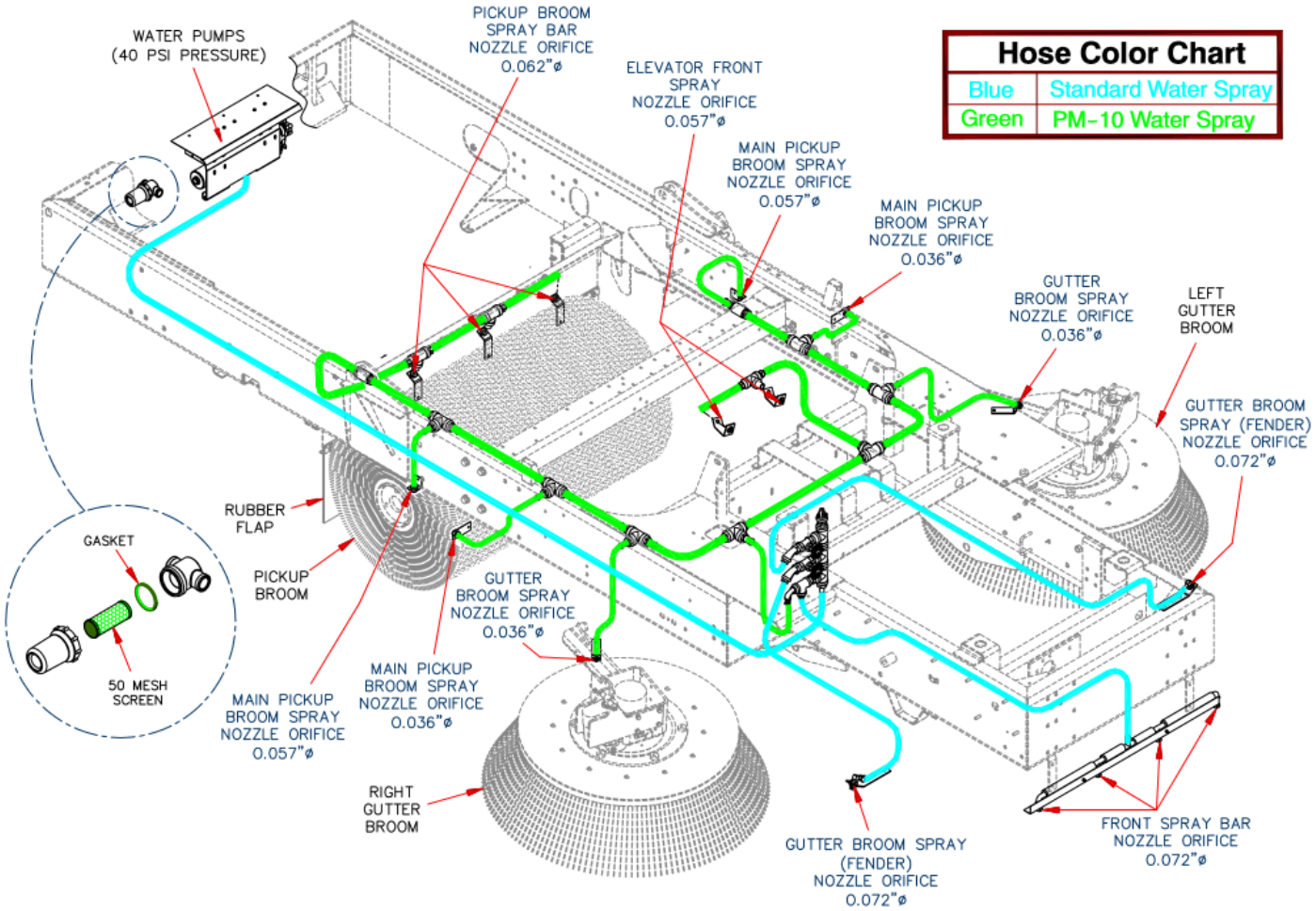
MOTOR TYPE: ASYNCHRONOUS ALTERNATE CURRENT

MOTOR POWER: 160 KW DRIVE POWER ON CONTINUOUS DUTY

ELECTRONIC CONTROL BY INVERTER WITH TORQUE CONTROL

DUST CONTROL SYSTEM:

POLY WATER TANK CAPACITY: 250 GALLONS



GLOBAL ENVIRONMENTAL PRODUCTS

ISO9001:2008

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Phone: 909-713-1600
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THANK YOU!

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Fax: 909.713.1613
www.globalsweeper.com

GLOBAL SWEEPER 55

Dan Isaacs
dan_isaacs@comcast.net
408-410-9000

- Vice President and Technical Director at Digital Twin Consortium
- More than 25 years of experience working in automotive, mil/aero and consumer-based companies
- Involved in emerging technologies including machine learning, Industrial IoT, Automated Driving and ADAS systems
- Degrees in Computer Engineering- EE from Cal State University and B.S. Geophysics from ASU

digital twin™
CONSORTIUM

Digital Twins for Automotive an Alternative Energy

Dan Isaacs: VP Technical Director Digital Twin Consortium

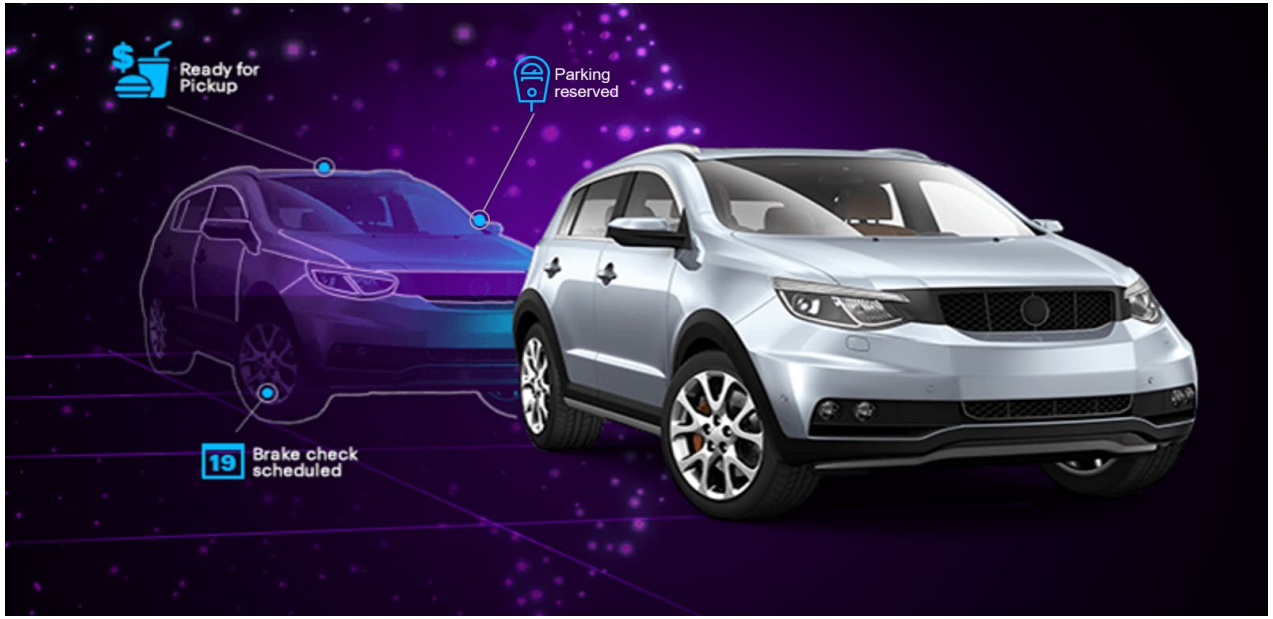
www.digitaltwinconsortium.org

October 14th , 2020

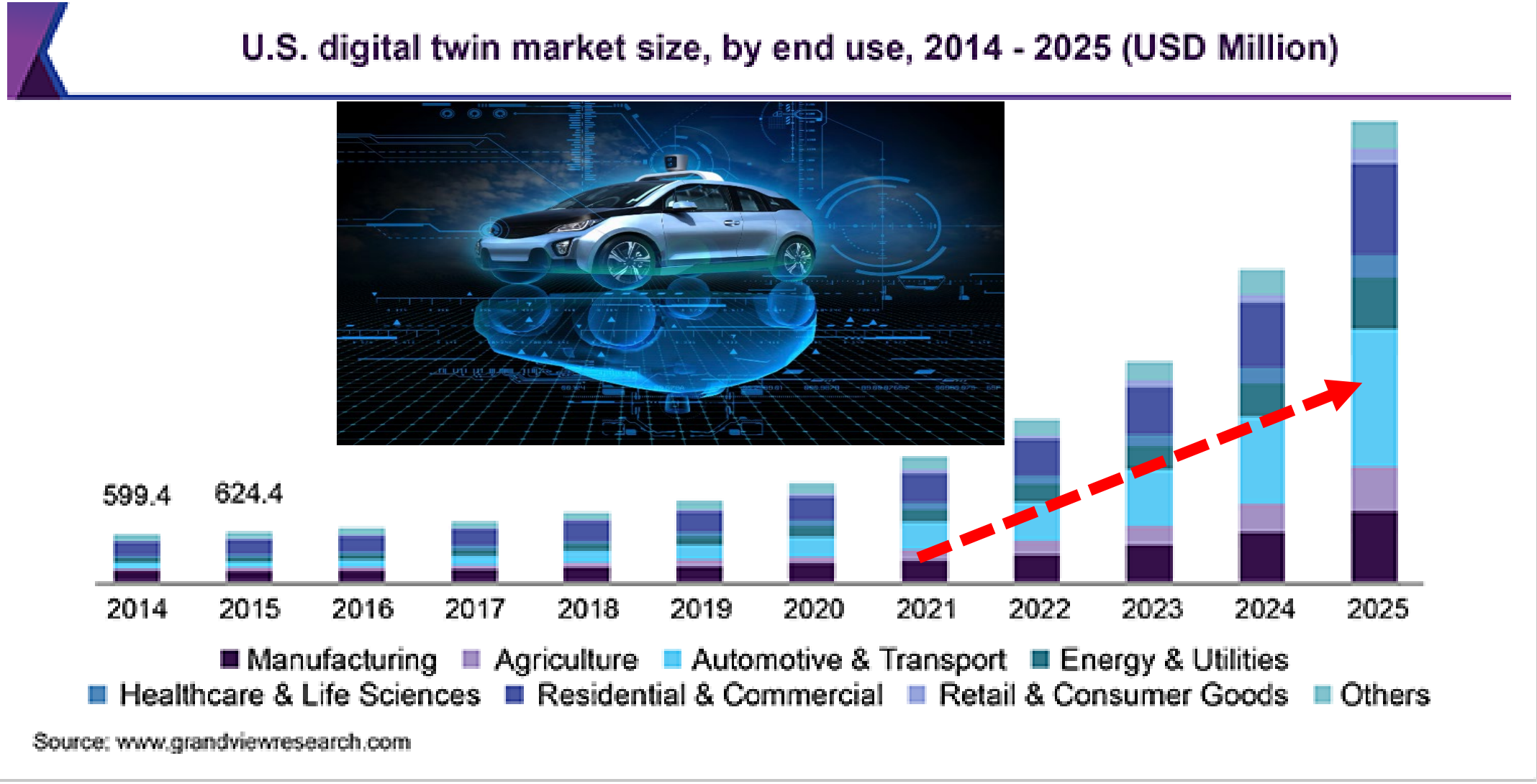
Simplified view of a Digital Twin

- The digital twin is composed of three components i.e. physical entities in the real world, their virtual models and the connected data/view that tie the two worlds.

Instant Identity, Always Connected for Situational Awareness

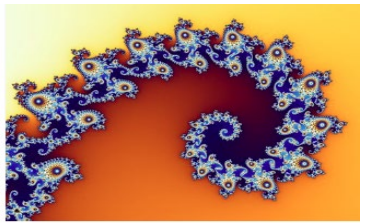


Digital Twins for Automotive – Forecast Growth

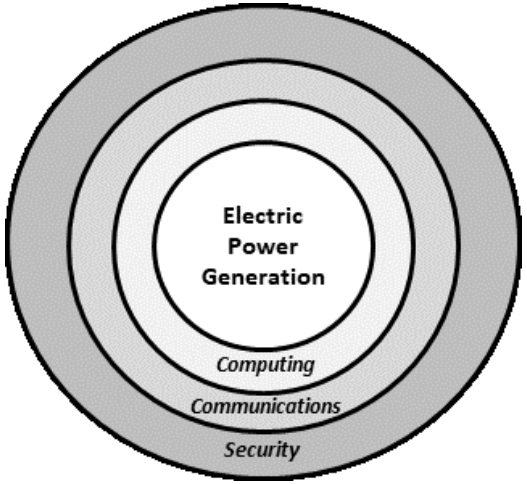


Using a Digital Twin for the Integrated Utility Infrastructure

Empowerment at the Edge with Shared Intelligence and Guidance Above



Mandelbrot Patterns



Tier #4 — National Situational Awareness Centers

"Eyes on, hands off"

Tier #3 — Regional Energy Operations Center — Energy Regional Market

There are 10 ISO Markets in the country.

These become virtual power stations.

Tier #2 — District Microgrid Complex — District #2 — District #N

Microgrids: M — M — M

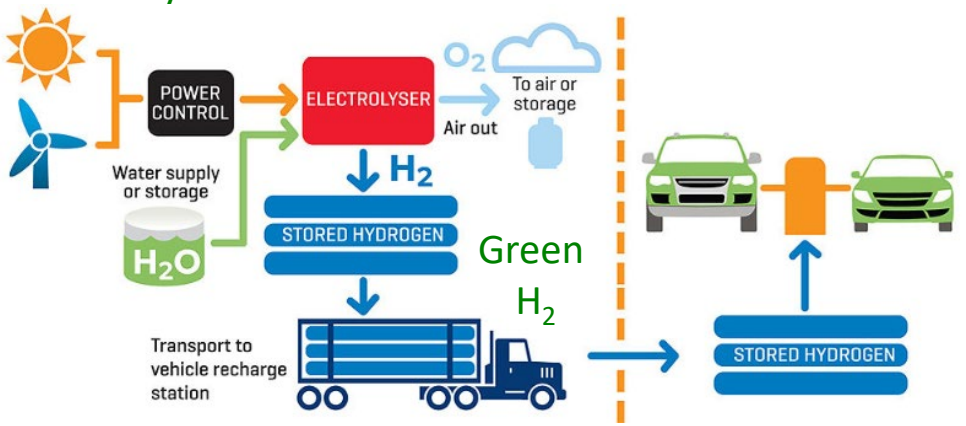
Tier #1

- *Power Generation*
- *Edge Computing*
- *Communications*
- *Cybersecurity Enclave*

Each venue and each microgrid operates autonomously as needed, but operates as a team when connected.

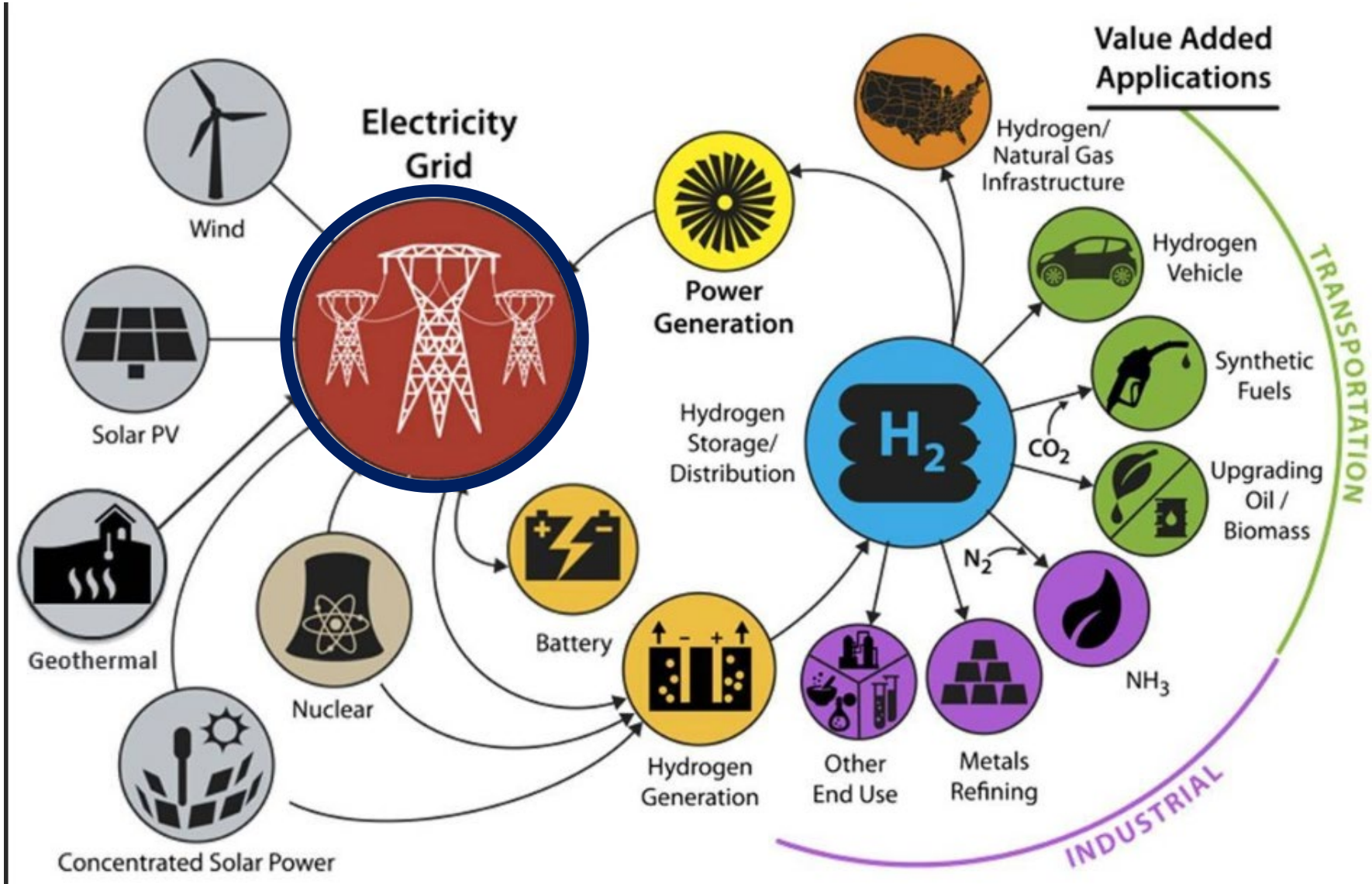
Digital Twin Integration Center

- Solar
- Wind
- Hydro



High Resiliency to Faults

Electric Grid and Green Hydrogen



Smart Grid used to Generate Green Hydrogen

Grey hydrogen	*Blue hydrogen*	*Green hydrogen*
Split natural gas into CO_2 and hydrogen	Split natural gas into CO_2 and hydrogen Residual gasses also in H-vision scope	Split water into hydrogen by electrolysis powered by wind and sun
CO_2 emitted in the atmosphere	*CO_2 stored or re-used*	*No CO_2 emitted*

Towards a Clean Green Hydrogen Economy

- Andy Marsh, CEO of report sponsor Plug Power, noted Monday that the company's **hydrogen fuel cell-powered forklifts and distribution center vehicles used by customers like Amazon, Walmart, Home Depot and Lowe's are using about 27 million tons of hydrogen per day,** supplied by its more than 100 fueling stations across the country. It's expanding into heavy-duty vehicles to serve ports in the U.S. and Europe

- Last week Plug Power signed a deal with Brookfield Renewable Partners to supply 100 percent renewable power for what Marsh described as a "gigafactory" it plans to build in an as-yet-undisclosed location. **The factory will be capable of producing up to 60,000 fuel cells and about 500 megawatts of green hydrogen** electrolyzers per year, he said.

- French industrial gas manufacturing giant Air Liquide is **investing $150 million** into a renewable liquid hydrogen generation plant in **Nevada set to generate 30 tons per day, or enough to supply 40,000 fuel cell vehicles,** when it opens in 2022, said Karine Boissy-Rousseau, president of the company's North American hydrogen energy and mobility business.

- Dutch oil giant Shell, which is planning a gigawatt-scale, wind-power-driven **hydrogen cluster in the Netherlands, is also building hydrogen fueling stations in Los Angeles** to serve these ports' fuel cell vehicle's needs

This is Just the Beginning of a Clean and Green Fleet!

Mark Carvalho
mwcarvalho60@gmail.com
714-317-0369

- COO & Co-Founder of The Green Alliance International LLC
- Long history in green, clean and environmental technologies involved with clean energy, water treatment and sustainable agricultural programs
- Serves on Board of Directors for the Pacific Rim Business Council, American International Chamber and The Green Alliance International LLC
- Previous experience in the automotive world painting and building show cars and hot rods and drag racing
- United States Marine Corps Veteran

GES

GATEWAY ENTRY SYSTEMS

ASSURANCE & TRUSTWORTHINESS

IT'S ESSENTIAL!

GES

SIMPLE AND EFFECTIVE!

- The Green Alliance International created Gateway Entry Systems as the Covid-19 Pandemic continues to ravage the world's economy.

- Utilizing Gateway Entry Systems people entering any facilities will be assured viral symptoms are detected and monitored

- Gateway Entry Systems offer an array of protective technologies for a safe: Return to Schools, Businesses, Hospitality, Manufacturing Industries and Recreation

APPLYING ADVANCED LIFE SCIENCE TECHNOLOGY

GES

HEALTH ASSURANCE

- Through Ambry with Remote Monitoring
- Shurfit Symptom Indicator
- Body Temperature and Security Check
- Advanced Symptomatology Checking
- 24/7 Screening and Continuous Monitoring
- Direct feedback to the Companies, Doctors and Personnel

NEWS PROVIDED BY
Ambry Genetics →
Oct 01, 2020, 08:00 ET

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ALISO VIEJO, Calif., Oct. 1, 2020 /PRNewswire/ -- Ambry Genetics (Ambry), a leading clinical genetic testing lab, is launching its CARE for COVID Program with Western Springs School District 101 and The Green Alliance International. The Ambry Genetics Comprehensive, Assessment, Risk, and Education (CARE) for COVID Program is designed to help identify and test individuals in need of coronavirus testing. The program provides Western Springs School District 101 with the system, tools, and support needed to screen and test their faculty and other employees as they return to their offices and classrooms this fall. The Western Springs School District, located in a suburb of Chicago, Illinois, serves students from kindergarten to eighth grade. The Green Alliance International will be using the CARE for COVID Program's screening and exposure questionnaire as part of their Gateway Entry Systems program. The Gateway Entry Systems program provides school systems, sports venues, and businesses across the U.S. with the tools needed to safely reopen, including disinfecting technology, wristband body temperature screening, and the CARE for COVID program's symptom and exposure digital questionnaire for remote monitoring.

The CARE for COVID program includes viral testing by RT-PCR for individuals who are exhibiting symptoms or have known exposure, with results returned within 24-48 hours of receipt of the sample. Ambry's RT-PCR test uses saliva collection and creates a simpler and more convenient experience than the nasopharyngeal swabs commonly used by other labs.

GES

GATEWAY ENTRY SYSTEMS

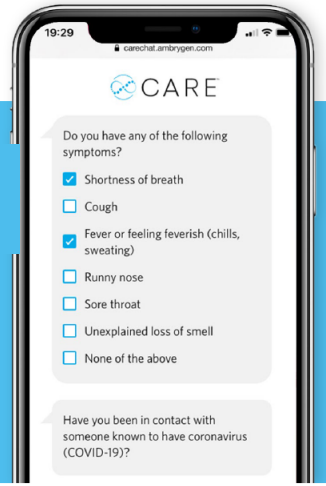
Step 1

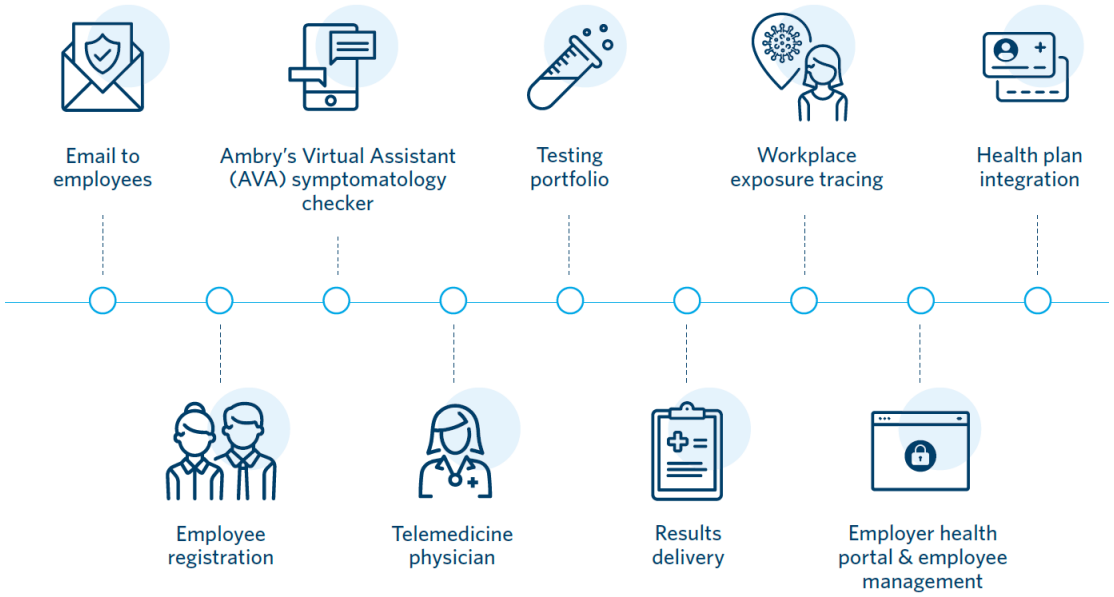
- Secure & HIPAA Compliant
- Guideline Based
- Program Evolves with the Science

Solutions

FOR EMPLOYERS & WORKFORCE

Our end-to-end platform addresses employer challenges of who should be tested, test types, frequency of wellness checks, and can aid in determining who can return to work.





Ambry Genetics®
A Konica Minolta Company

C.A.R.E. Solutions

- Comprehensive, Assessment, Risk & Education
- Population precision medicine platform
- Support employers during COVID -19

At-a-Glance:

- Customizable AI Chatbot
- Comprehensive Testing
- Employer Health Portal
- Employee Management
- Workplace Exposure Tracing

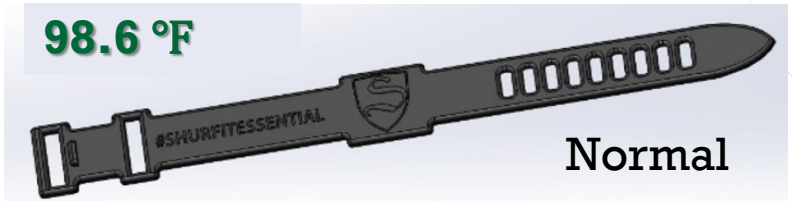
GES

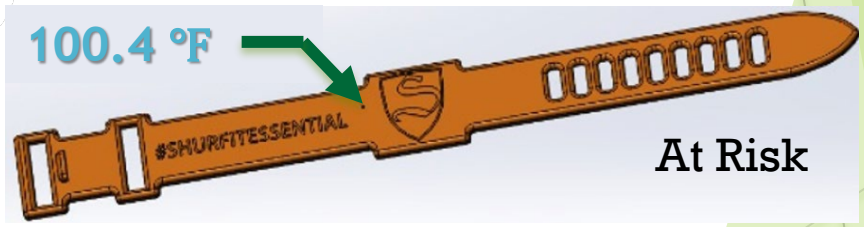
GATEWAY ENTRY SYSTEMS

Step 2

THE ESSENTIAL WRISTBAND

Shurfit Essential Wristband





CDC Centers for Disease Control and Prevention

Indication at inflection point
Orange color 38°C (100.4°F)

CDC Centers for Disease Control and Prevention

GES

GATEWAY ENTRY SYSTEMS

Step 3

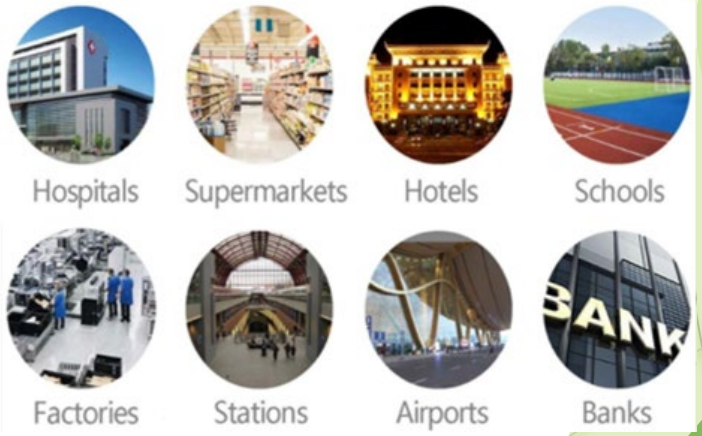
TEMPERATURE AND SECURITY CHECK

- Facial Recognition
- Temperature Check
- Spray Disinfection
- Time Stamping

- Effective up to 24-Hours
- Alcohol-free with Aloe Vera

Contactless Disinfection and Verification

For all Facilities



GES

SECURITY AND SURVEILLANCE

Facial Recognition Cameras

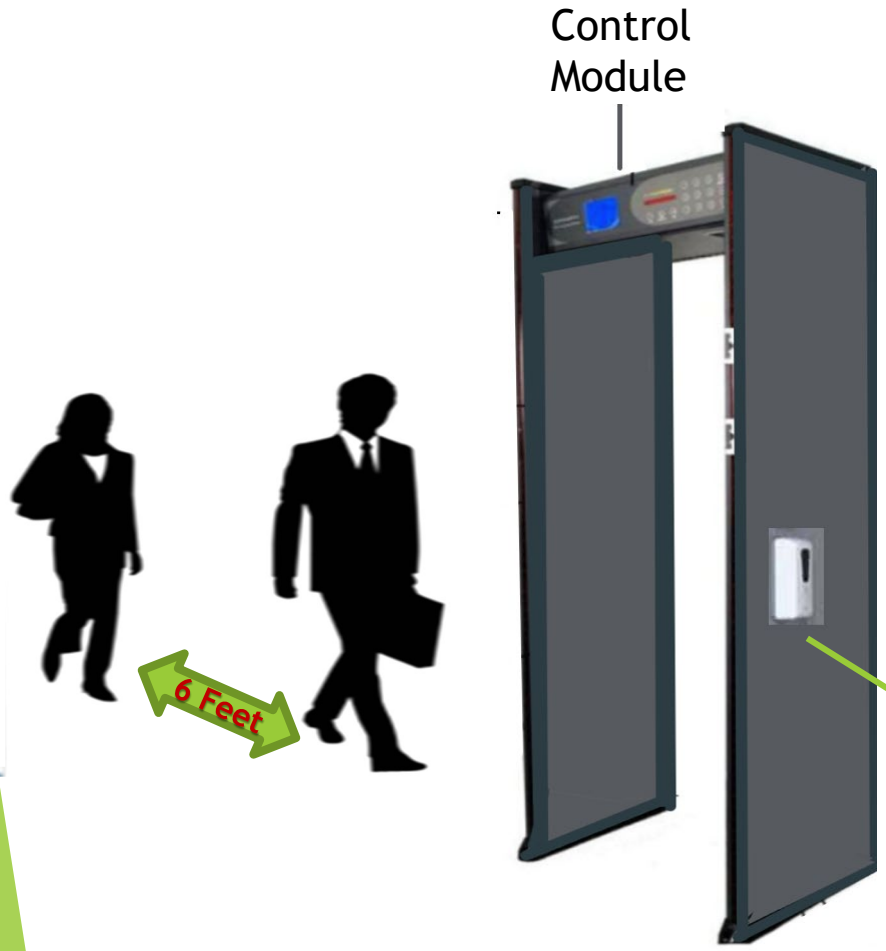
- Verification of personnel

Intelligent Scanning

GATEWAY ENTRY SYSTEMS

Step 5

BODY TEMPERATURE AND SECURITY VERIFICATION



- Body temperature measurement
- Advanced metal detection
- Alarm Trigger for high body temperature
- Alarm Trigger for metal objects
- Entry and Exit contactless time stamp
- Hand Sanitizer

GES

GATEWAY ENTRY SYSTEMS

Step 6

Hospital Grade

Non-Toxic, Chlorine, and Bleach Free

HEALTH ASSURANCE

- Non-toxic formula that Eliminates pathogens
- Eliminates 99.99% of all Germs & Viruses
- Bonds to any surface
- Forms an antimicrobial barrier

Protek complete additive acts as a fabric softener that protects almost all fabrics with a protective shield

PROTECTION UP TO 28 DAYS

SHIELDUS

GES

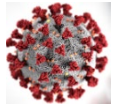
GERMS AND VIRUSES DON'T CARE WHO YOU ARE

ASPERGILLUS NIGER
ATCC 16404
ATCC 1015 (BLACK MOLD)

BACILLUS SUBTILIS
ATCC 6051

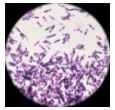
BACTEROIDES FRAGILIS
ATCC 25285

BURKHOLDERIA CEPACIA
ATCC 25416



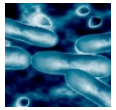
CORONAVIRUS 2019
(COVID-19)*

CARBAPENEM-RESISTANT ENTEROBACTERIACEAE
ATCC BAA-1705



CLOSTRIDIUM DIFFICILE ENDOSPORES
ATCC 43598

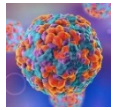
ENTEROBACTER
AEROGENES
ATCC 13048



ENTEROBACTER
GERGOVIAE
ATCC 33028

ENTEROCOCCUS
FAECALIS
ATCC 29212

ENTEROCOCCUS
HIRAE
ATCC 8043

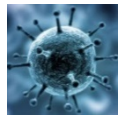


ENTEROVIRUS 71
(HAND, FOOT & MOUTH
DISEASE VIRUS) ATCC-1775

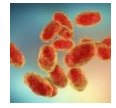
ESCHERICHIA COLI ATCC 8099,
ATCC 8739, K12 NCTC 10538

EUPENICILLIUM LEVITUM
ATCC 10464

FELINE CALICIVIRUS
STRAIN: F-9



FELINE INFECTIOUS PERITONITIS
VIRUS (FIPV)



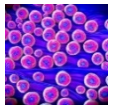
HAEMOPHILUS
INFLUENZAE ATCC
33930

HAND FLORA

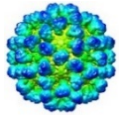
SWINE INFLUENZA VIRUS (H1N1)
A/SWINE/1976/31, ATCC VR-99, ATCC
VR-1741

KEBSIELLA OXYTOCA
ATCC 13182

KLEBSIELLA PNEUMONIAE
ATCC 4352

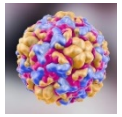


METHICILLIN-RESISTANT
STAPHYLOCOCCUS
ATCC 33592)

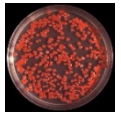


MURINE
NOROVIRUS 1
(MNV-1)

PSEUDOMONAS AERUGINOSA ATCC
15442, ATCC 27853, ATCC 9027

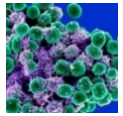


RHINOVIRUS ATCC VR-
482 (COMMON COLD)

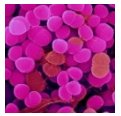


SERRATIA MARCESCENS
ATCC 14756

STAPHYLACOCCUS AUREUS ATCC 6538,
ATC 12600, ATCC 29213, ATCC 6538



STAPHYLOCOCCUS
EPIDERMIDIS ATCC
12228



STAPHYLOCOCCUS
HAEMOLYTICUS ATCC
29970

Eliminated Coronaviruses: **SARS & MERS…**
Results Confirmed for COVID-19 by University of Alabama

GES

INDEPENDENT TESTING

Test Case: Transit Bus

Interior Treatment

Tested for germs per square inch

- Before Treatment: 8,000 germs
- One-hour post treatment:
  - Under 10 germs
- Fifty-four days post treatment
  - Handrails: 18 germs
  - Steering wheel: 65 germs
  - Seat: 46 germs
- Ninety days
  - Under 100 germs

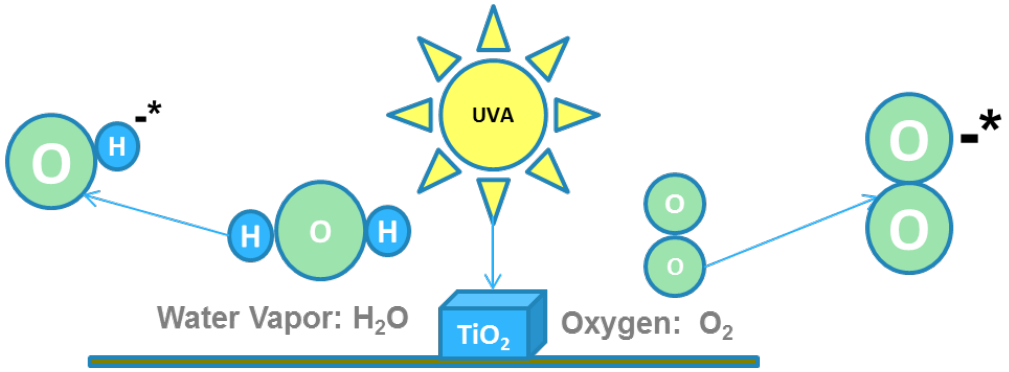
Hospital Grade

Non-Toxic, Chlorine, and Bleach Free

Step 7

pureti™ Use the Power of Light to Clean™

- **Provides Healthy and Clean Air**
- **Intelligent coating**
  Unstructured, titanium dioxide nanoparticle crystals
- **Technology**
  - Natural UV light incite a photo catalytic process
  - 95% Efficiency destroying virtually all viral and air pollutants - Covid-19



The Hydroxyl Radical OH^{-*}

The hydroxyl radical is the most powerful, non-poisonous scrubbing agent in nature - stronger than straight 100% chlorine in oxidative power.

The Super Oxide Anion O_2^{-*}
(Activated Oxygen)

GES

GATEWAY ENTRY SYSTEMS

OVERVIEW

PURETi Clean & Fresh is an environmentally friendly surface treatment that changes the way you think about cleaning glass, windows, and shiny surfaces. Not only is it an excellent, streak free cleaner, but it actually improves indoor air quality. PURETi's technology is energized by sunlight, turning ordinary surfaces into light-activated air purifiers that oxidize harmful organic particles, including VOCs, in the air. Surfaces stay cleaner longer and are easier to clean. PURETi Clean and Fresh also brings out the brilliant, high definition look of your glass. A single application works for up to 3 months, delivering a health-enhancing innovation to your customers and employees.

BENEFITS

pureti CLEAN & FRESH

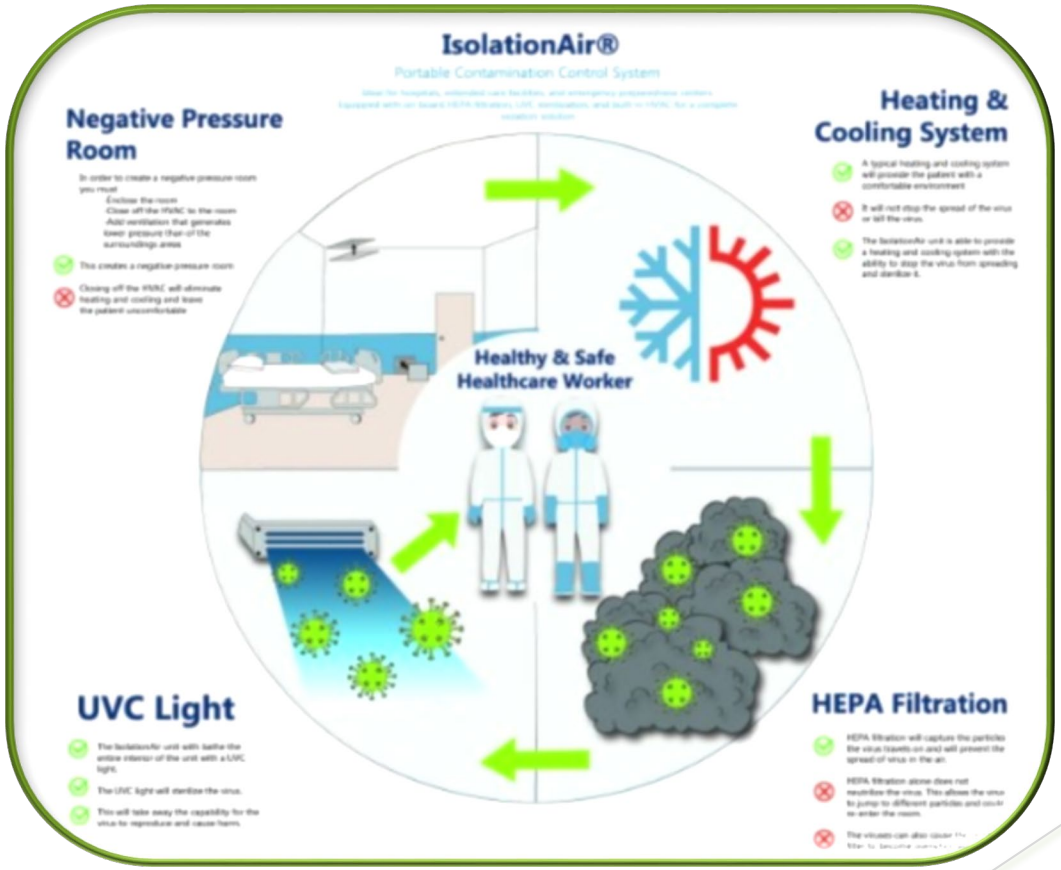
⊕ Improves indoor air quality and reduces VOCs	✓
⊕ Reduces chemical footprint using minerals, not chemicals, to clean	✓
⊕ Delivers a streak-free shine	✓
⊕ Gives glass, mirrors & shiny surfaces the look of a high-definition clean	✓
⊕ Uses the Power of Light to Clean glass, mirrors and shiny surfaces to transform them into light-activated air purifiers	✓

GES

GATEWAY ENTRY SYSTEMS

Step 8

QUARANTINE STATION

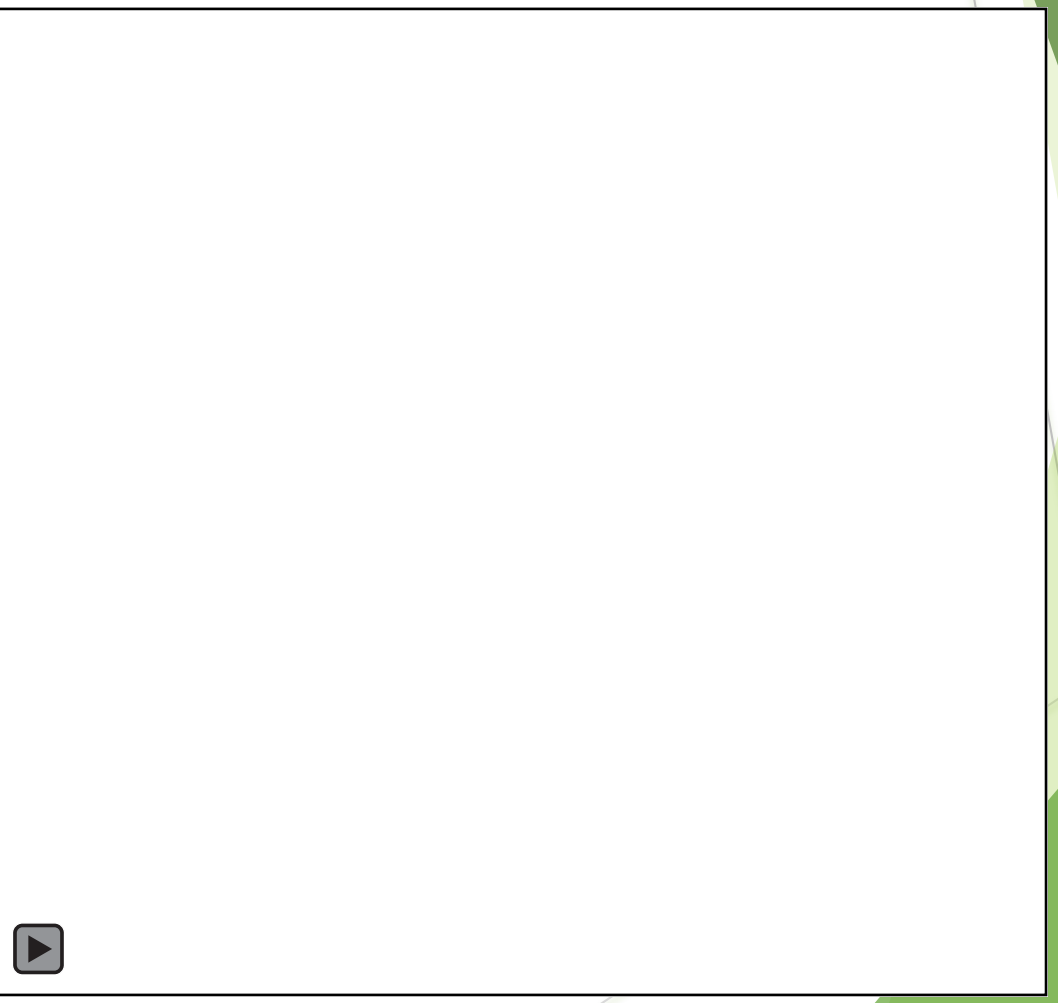


GES

DISINFECTANT ROBOT

- Manufacturing Industries
- Schools and Stadiums
- Hotels and Offices
- Hospitals and Medical Centers

Please click to watch the video



GATEWAY ENTRY SYSTEMS

For Further Information:

www.gatewaysystems007.com

email: thegreenalliance7@gmail.com

ASSURANCE AND TRUSTWORTHINESS

IT'S ESSENTIAL!

GES

Tracy Ochsner
TOCHSNER@fcgov.com

- Assistant Operation Services Director – City of Fort Collins
- 25 years working with alternative fuels
- Certified Equipment Manager
- Founding member of Northern Colorado Clean Cities
- Served on the Rocky Mountain Fleet Managers Association – National Executive Board and Colorado Chapter Chair
- LEED Accreditation from US Green Building Council
- Recognized as a “Sustainability All-Star” by Green Fleet Magazine in 2014

Best Practices of the Top Green Fleets

Sustainable Fleet Technology Virtual Series

It all starts with a Goal

Municipal and Community Greenhouse Gas Goal

- Reduce the City's Greenhouse Gases 20% by 2020
  - Baseline year is 2005
  - Does not account for growth
  - 80% reduction by 2030
  - Carbon Neutral by 2050

Then develop Policy to support that Goal

Vehicle Purchasing Policy

- Will purchase an alternative fueled vehicle if:
  - Fueling infrastructure is in place
  - Job application fits the type of factory-equipped vehicle available
  - Economics are beneficial to the City
  - Vehicle meets the operational needs of the dept.

Find some supporters in other Departments

Objective 5.1. City transportation systems and equipment are carbon neutral, resilient, and efficient.

5.1.1. Increase electric vehicles in the City fleet by making 100% of light duty* vehicle purchases plug-in electric by 2025.

- May include assessing how fleet passenger cars and light duty truck purchases can be electric

5.1.2. Invest in the charging infrastructure needed to support electric vehicles in the City fleet and provide adequate workplace charging for employees.

- May include identifying funds for charging stations

5.1.3 Convert municipal small engines, such as lawn and garden equipment, to be fossil fuel free.

- May include work with consultants (American Green Zone Alliance) and Regional Air Quality Council (RAQC) to help define goals, funds and timelines for complete conversion of commercial-grade electric lawn and garden equipment

5.1.4. Support City employees to lead by example in sustainable vehicle use and commuting.

- May include creating internal policy for Travel Demand Management (TDM)

5.1.5. Operate City transportation systems with increasing efficiency.

- May include integrating smart cities concepts such as implementation of connected and autonomous vehicle technology

*"light-duty" refers to passenger cars and trucks intended for on-road use.

And don’t forget about your executive leaders

Diversify, Diversify, Diversify

And don’t let your failures stop you

Promote what you do!

100 BEST FLEETS

- 2012 - 29th
- 2013 – 55th
- 2014 - 72nd
- 2015 - 47th
- 2016 - 33rd
- 2017 – 14th
- 2018 – 12th
- 2019 – 14th
- 2020 – 7th

greenfleet awards|forum

- 2012 - 22nd
- 2015 – 16th
- 2016 - 16th
- 2017 – 7th
- 2018 – 3rd
- 2019 – 8th
- 2020– #1

GOVERNMENT FLEET leadingfleets APWA

2016 – top 50
2017 – 13th
2018 – 10th
2019 – top 50
2020 – #1

GOVERNMENT FLEET MANAGEMENT ALLIANCE GFMA

Malcolm Baldrige National Quality Award
2017 Award Recipient

Thank-you

NC STATE UNIVERSITY

SUSTAINABLE FLEET TECHNOLOGY

VIRTUAL CONFERENCE 2020

Session #10: Best Practices of the Top Green Fleets 2020

October 14, 2020

NC CLEAN ENERGY TECHNOLOGY CENTER

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION