



Resilience Project Ideas

Cares Act Funding

Presented by: John L. Hendrickson



Public Transportation

Bus, Bicycle, Pedestrian, Light Rail





RESILIENCE

Is defined as our capacity to:

recover quickly from difficulties; or our toughness

As rural public transportation providers throughout the state of Texas, we should strategically evaluate our programs and services to create an environment of resilience for our passengers, employees, and the communities we serve.

Let's get started!



Choose from a range of facial coverings, gloves, disinfectant wipes, and similar products to prevent viral transmission within transit systems:

Maintain a reasonable supply

Develop agreements with suppliers

Cleaning crews may have additional needs

Understand shelf life and product expiration dates



Providers are encouraged to include PPE as part of their safety and security plans in future updates and other local emergency management procedures

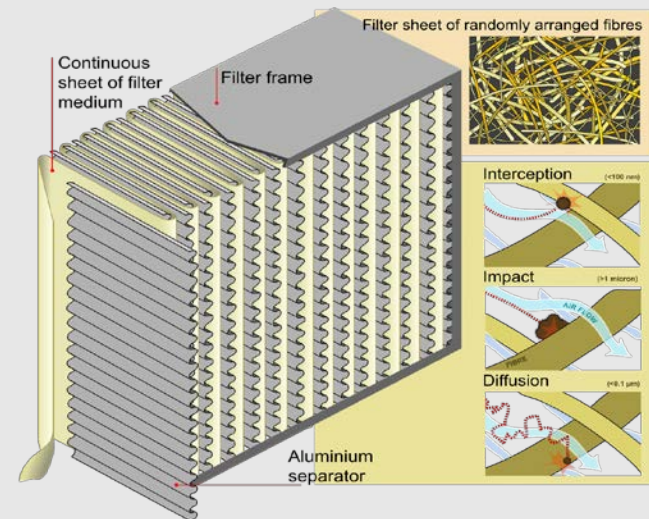
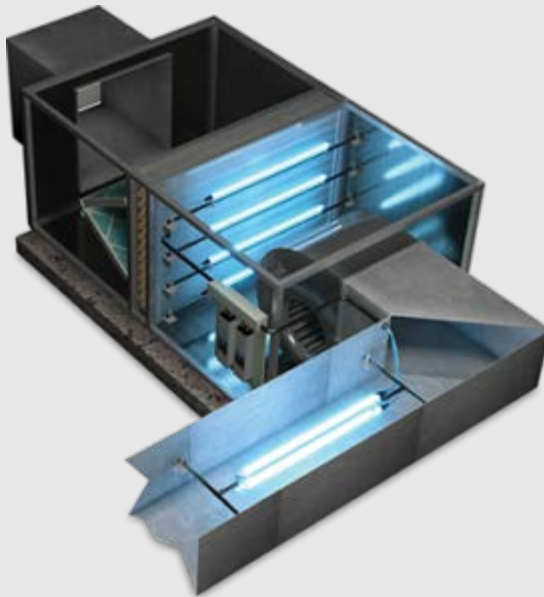


Choose from a range of HVAC Improvements including:

UVC lights at evaporator coils

HEPA Filtration

Other fixed disinfecting treatments for recirculated air





The following recommendations provide detailed guidance issued by ASHRAE Epidemic Task Force.

- 1.) Provide and maintain required minimum outdoor airflow rates
- 2.) Use combination of filters and air cleaners that achieve MERV 13 or better
- 3.) Only use devices that demonstrate positive effectiveness and safety
- 4.) Select control options that minimize energy usage and provide for stand-alone filters and air cleaning technology
- 5.) Air filtration and UVC equipment including bulbs must be maintained



Choose from a range of treatments to include:

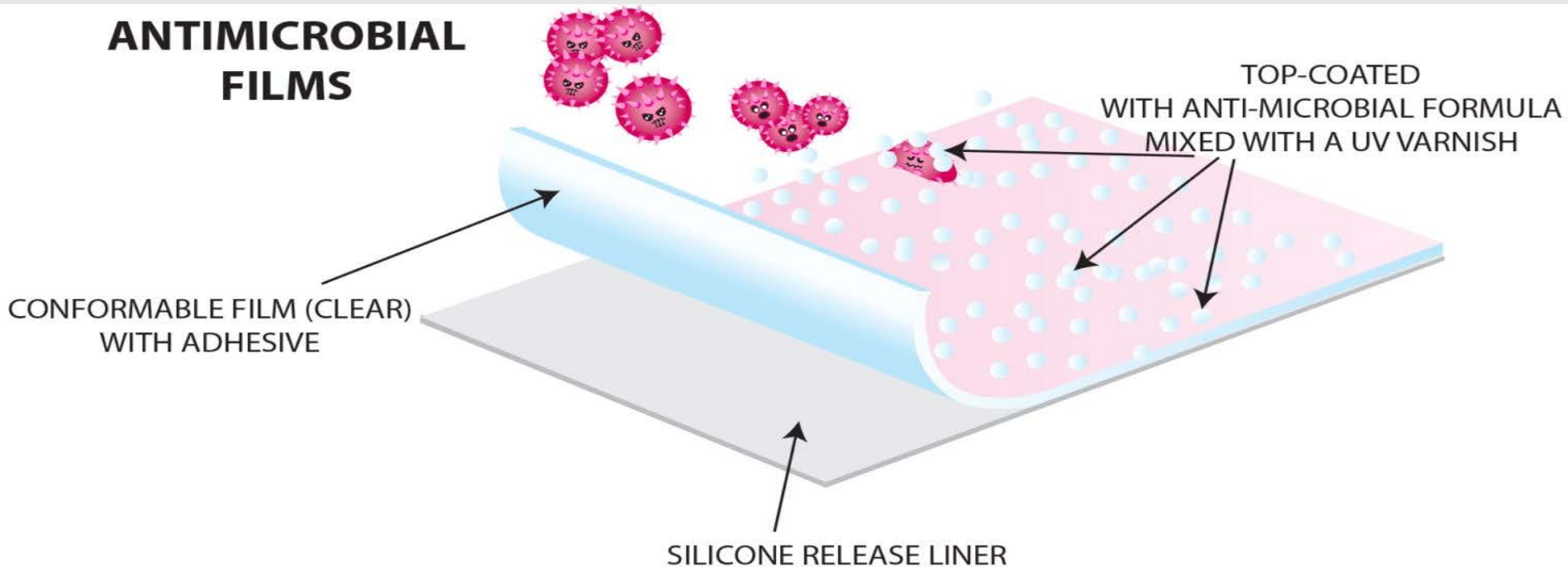
Antimicrobial surface installations

UVC irradiation

Related Interior Cleaning treatment



ANTIMICROBIAL FILMS

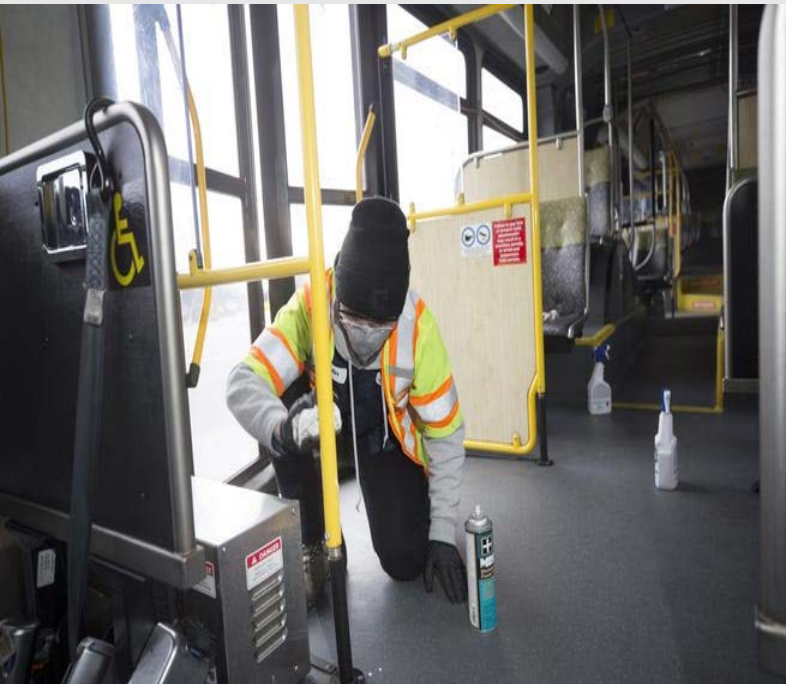




Key Components:

Interior treatment and cleaning procedures will be to utilize surfaces that help minimize the spread of bacteria and viruses.

- 1.) High touch surfaces
- 2.) Textile surfaces



Interior Cleaning Procedures and more frequent cleaning intervals.

- 1.) Detailed vehicle cleaning has a new sense of urgency while out-of-service
- 2.) UVC must be applied while vehicle is empty
- 3.) Major detailing on regular basis
- 4.) End-of-line or Midday cleaning



Various types of operator barriers are now being produced for specific vehicle types and aid in the protection of operators to reduce exposure to contact, droplet, and airborne exposure.

Available as a retrofit for existing fleets

Barriers installations may require HVAC considerations

Different types: rotating hinge, sliding hinge, and textile designs

Minimal vehicle modifications required





Selection of contactless fare validators and related equipment

Contactless micropayments is an evolving market, and due to the current pandemic has become a major opportunity.

Single ride transactions the value is minimal, but collectively electronic contactless fare collection provides a number of benefits

Common forms: plastic credit card-sized smart cards, key FOBs, smartphones, and smartwatches

Operational improvements and reduced physical contact

Improve customer convenience and fare security

but;

May create learning curve for passengers and fare validation challenges



Software companies are developing new and innovative solutions for low-value payment programs including minimizing capital outlays for farebox equipment and maintenance.

Download the App

GoPass®





Older vehicles within a fleet that have reached useful life criteria should be replaced under a responsible fleet replacement program rather upgrading or retrofitting equipment or technology.

Funding accounts for approximately 200 units statewide

Procured with new units and factory installed equipment:



Operator Barriers

Appropriately size HVAC equipment

UVC and HEPA filtration

Antimicrobial Films

Wet or Dry fogging systems





Selection of portable automated disinfecting vapor machines vehicles and facilities.

Misters, foggers, and electrostatic diffusion systems are being used to improve cleaning and disinfecting practices throughout transit system operations.

- Various types are available in the market today

- May be incorporated onboard vehicles

- Manual operations allowing employees to control disinfecting process

- Vital Oxide is a wet fog – requires vehicle empty

- Hypochlorous Acid is a dry fog – currently under testing





Development of barrier installations throughout existing facilities to prevent viral transmission by strategic placement of polycarbonate barriers.

Polycarbonate barriers may be used to assist in social distancing

Barriers can be modular in design allowing for installation or removal as necessary





Barrier design and installation should be reviewed by safety committee

Any barrier placement should take into account air flow and air quality

Scratch resistant materials should be used

Design standards should be established for semi-fixed installations





Transit Systems may choose to outfit current facilities with alternate means of electrical power generation.

Alternate or renewable energy generation is becoming more affordable such as wind or solar power generation

Texas has high levels of sunshine and wind to produce renewable energy at levels adequate to provide for desired consumption

Off-grid or grid-tie in are offered for both types of renewable energy sources

Off-grid is more expensive and requires battery storage banks

Solar or Wind?



Solar Power:

- 1.) Solar panels are available in various wattage levels and sizes, but require large areas of roof space depending on energy production needs.
- 2.) Daily and hourly energy calculations are needed to determine overall system design requirements.
- 3.) Solar panel construction is important in considering life cycle costs
- 4.) Monocrystalline are more efficient providing 15% to 20% efficiency
- 5.) Polycrystalline are less efficient and require more space
- 6.) Thin film are crystalline-based but degrade faster
- 7.) Concentrated photovoltaic cells are most efficient, but expensive
- 8.) Dependent on direct sunlight
- 9.) Minimal preventive maintenance costs



Wind Power:

- 1.) Typical wind turbine is approximately 80 feet tall and requires wind speeds of 12 MPH
- 2.) Wind Turbines have mechanical moving part that require preventive maintenance
- 3.) May require substantial permitting to install
- 4.) Require less land area to install
- 5.) Best installed in an isolated area
- 6.) Must have appropriate wind speed levels
- 7.) Not dependent on sunlight



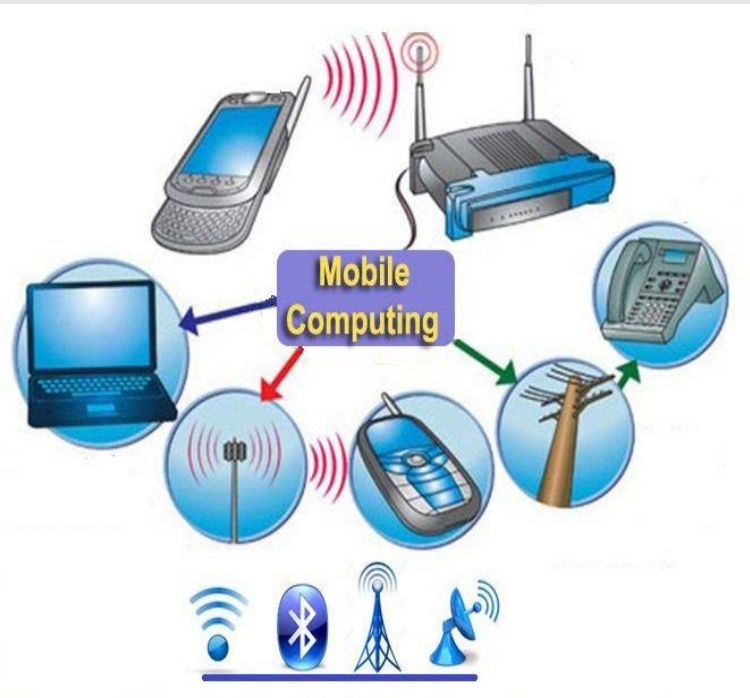
Solar Panels
Designed into facility

Wind Turbine
Strategically located





Upgrade technology such as hardware and software to facilitate remote working capabilities



- 1.) Internet bandwidth upgrades
- 2.) Software license agreements and relates software upgrades
- 3.) Upgrading servers, routers, and switches
- 4.) Creating Virtual Private Network (VPN) capabilities
- 5.) Upgrading desktop computing stations to more mobile devices



- 1.) PPE and Related Equipment
- 2.) Improvements to Vehicle and Facility HVAC Systems
- 3.) Improvements to Vehicle Interior Treatments
- 4.) Improvements for Operator Barriers
- 5.) Contactless Fare Collection Systems
- 6.) Fleet Replacements
- 7.) Disinfecting Equipment
- 8.) Facility Barrier Upgrades
- 9.) Alternate Power Generation
- 10.) Technology Upgrades



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