NC STATE UNIVERSITY

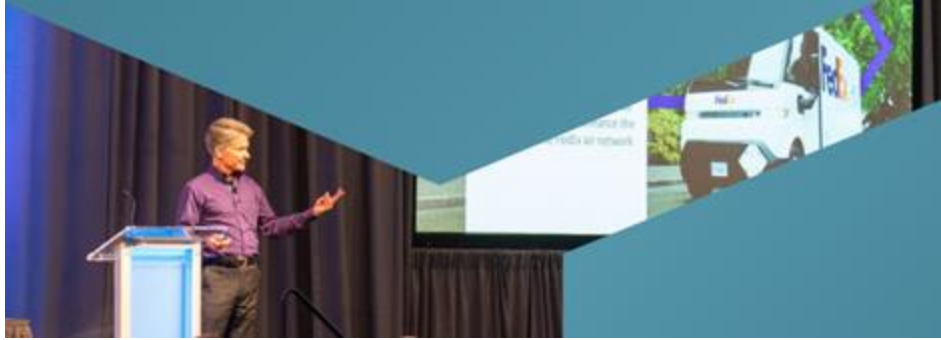
SUSTAINABLE FLEET TECHNOLOGY WEBINAR SERIES 2026

Preparing for Natural Disasters

July 16, 2026

NC CLEAN ENERGY TECHNOLOGY CENTER

NAFA FLEET MANAGEMENT ASSOCIATION



SUSTAINABLE FLEET TECHNOLOGY

CONFERENCE & EXPO 2026

August 25-27, 2026

Durham Convention Center

Durham, North Carolina

NAFA Sustainable Fleet Manager Workshop
August 25, 2026

Join us!

www.sustainablefleetexpo.com

Shelly Parker
sft_conference@ncsu.edu
919-513-3136

SUSTAINABLE FLEET TECHNOLOGY WEBINAR SERIES 2026

Lower Cost Charging Options, Sept. 17

Upfitting Your Garage for Electric and Alternative Fuel Vehicles, Dec 10

Register at nafa.org/events/sustainable-fleet-technology-webinar-series/

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Transportation Fuel Resilience – The Role of Alternative Fuels

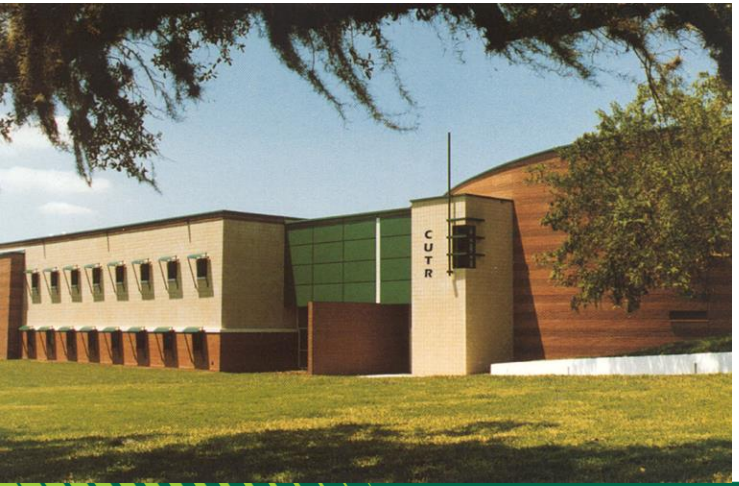
Preparing for Natural Disasters – 2026 Webinar

Alexander Kolpakov
Senior Research Associate

July 16, 2026

CUTR Center for Urban Transportation Research

UNIVERSITY of SOUTH FLORIDA



CUTR – Who We Are

- Created by the Florida Legislature in 1988
- Housed within USF's College of Engineering
- USDOT designated University Transportation Center
- Multi-disciplinary
- Over 200 active research projects
- $38M current contracts and grants
- Over 120 employees

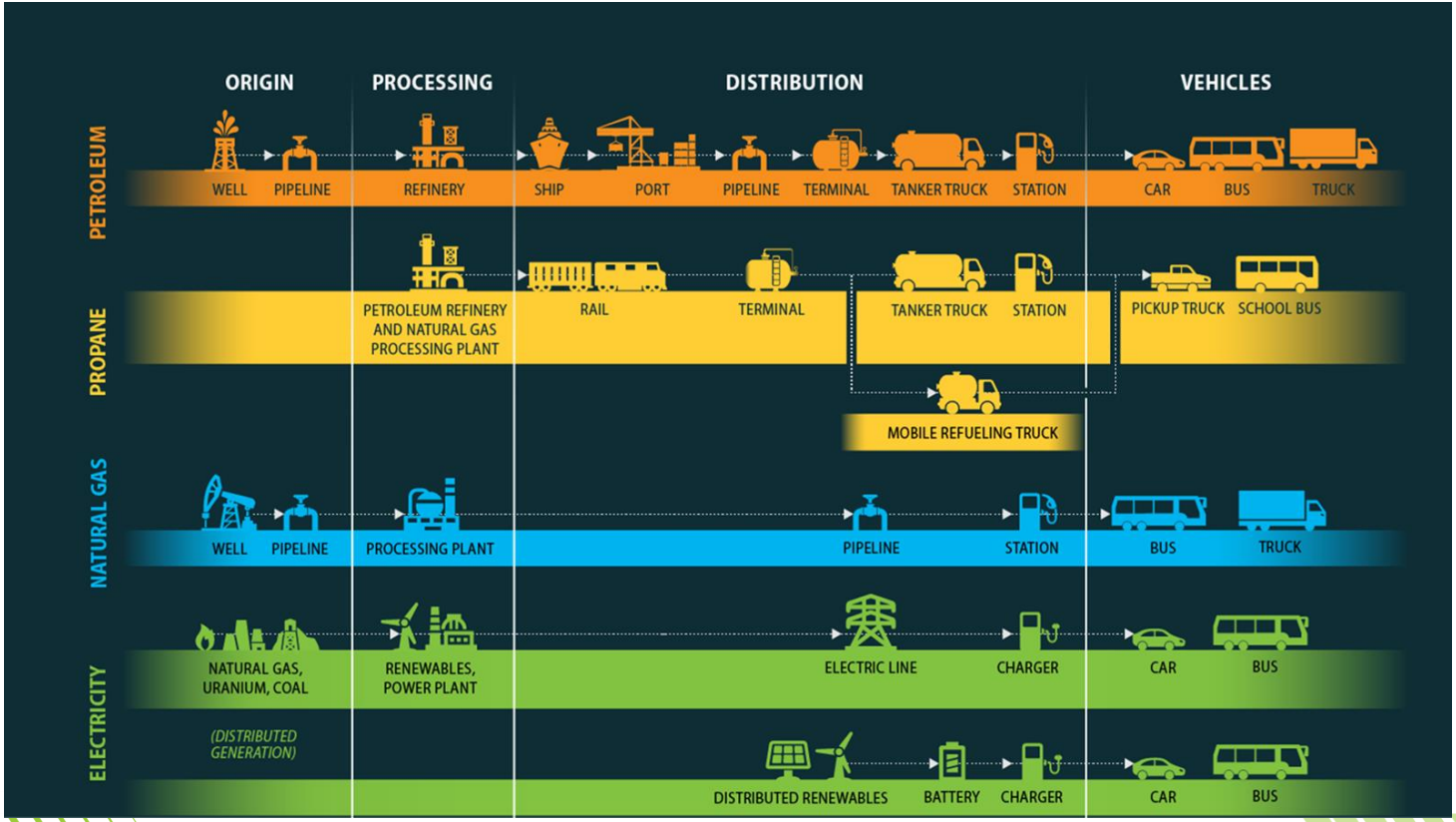
Tampa Bay Clean Cities Coalition (TBCCC)

- Designated by U.S. DOE in 2014
- Redesignated in 2021
- Housed at CUTR/USF
- Covers 6 counties in west-central Florida
- Guided by 7-person Steering Committee
- Public and private stakeholders

Five-Pronged Approach to Resilience

1. Redundancy
   - Multiple fuels, sources, modes, and routes, multi-purpose vehicles
2. Storage
   - Have fuel stored nearby when source gets cut off
3. Access
   - Make sure access to stored fuel is maintained during disaster
   - Location of storage
   - Communication is key
4. Resupply
   - Ensure that local storage facilities are resupplied ASAP after a disaster
   - Renewable energy to resupply EVs
5. Efficiency
   - Maximize passengers/cargo/jobs per vehicle
   - Maximize miles per gallon

Transportation Fuel Supply Chain



Fuel Supply Facts

- Gasoline & Diesel – Delivered through ports or pipeline
  - Ports can be chokepoints during hurricanes
- Natural Gas – Delivered through pipeline
  - Not affected by hurricanes; large amount of redundancy
  - Mobile fueling is available
- Propane – Delivered by rail or truck
  - Can be stored indefinitely
  - Mobile fueling is available
- Biofuels – Delivered to by rail or truck
- Electricity – Produced mainly from natural gas, coal, nuclear, and renewable sources
  - Production and distribution are vulnerable to hurricanes

Resilience Studies

- Tampa Resilience Study - 2020
  - In partnership with NREL
  - Goals:
    - Collect & report data on fuel management and resilience activities related to disaster planning
    - Investigate best practices and case studies of using AF
    - Evaluate vulnerabilities of critical facilities
- Florida State Resilience Plan - 2022
  - In partnership with FL Energy Office, NREL, UCF
  - Goals:
    - Review existing resilience practices
    - Maximize alternative fuel assets
    - Integrate alternative fuels into resilience planning practices to improve state's preparedness to hurricanes.

Florida Alternative Transportation Fuel Resilience Plan

Caley Johnson,[1] Jeff Cappellucci,[1] Lauren Spath Luhring,[1] Maria St. Louis-Sanchez,[1] Fan Yang,[1] Abby Brown,[1] Austin Sipiora,[2] Alexander Kolpakov,[2] Xiaopeng Li,[2] Qianwen Li,[2] Sean White,[3] John Gonzales,[1] Erin Nobler,[1] and Eric Wood[1]

1 National Renewable Energy Laboratory
2 University of South Florida, Center for Urban Transportation Research
3 Florida Department of Agriculture & Consumer Services

NREL is a national laboratory of the U.S. Department of Energy
Office of Energy Efficiency & Renewable Energy
Operated by the Alliance for Sustainable Energy, LLC

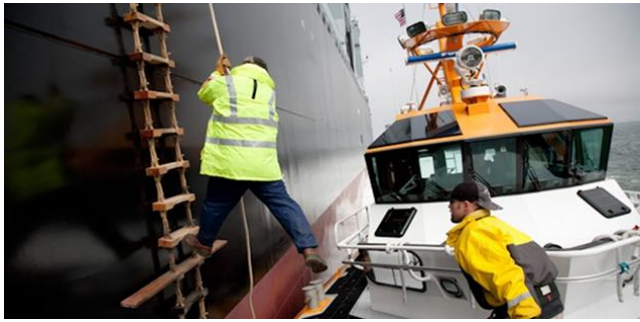
This report is available at no cost from the National Renewable Energy Laboratory (NREL) at www.nrel.gov/publications.

Contract No. DE-AC36-08GO28308

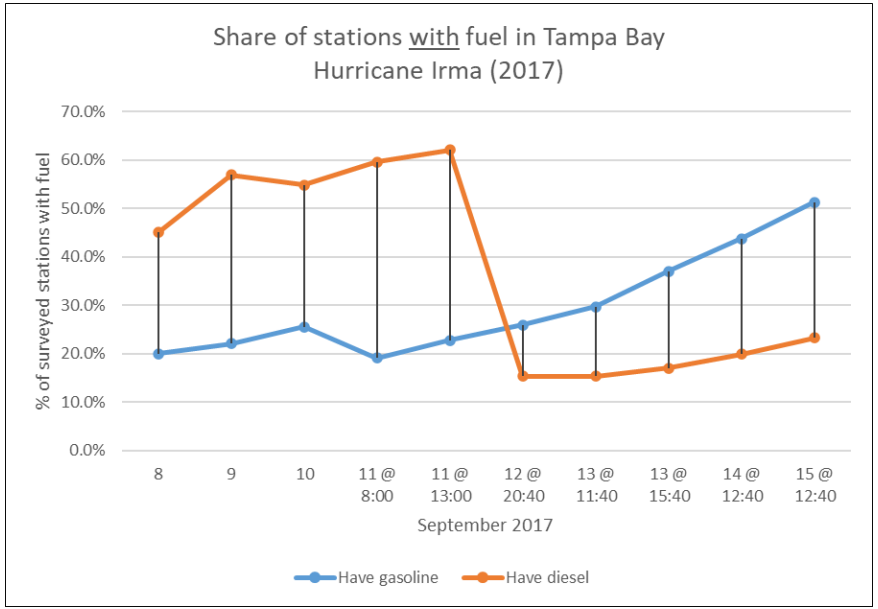
Technical Report
NREL/TP-5400-83795
December 2022

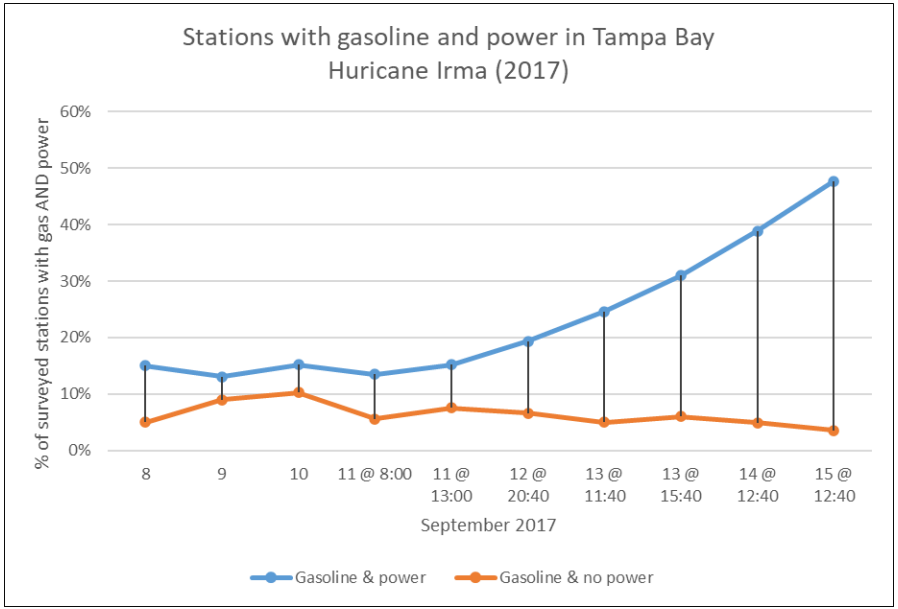
Findings from Florida Fleets - Best Practices

- Ports vulnerability – complicated configuration of Port of Tampa and waterways leading to it
- Critical timing
- Asset staging
- High-water-capable vehicles
- Variety of fuel strategies
  - Adequate storage
  - Supply contingency
  - Prioritization
  - Diversification
  - Communication & resource sharing
- Back-up power/emergency generators
- Fuel burn rate under emergency operations



Hurricane Irma (2017) Fuel Shortages





Resilience for Battery Electric Buses

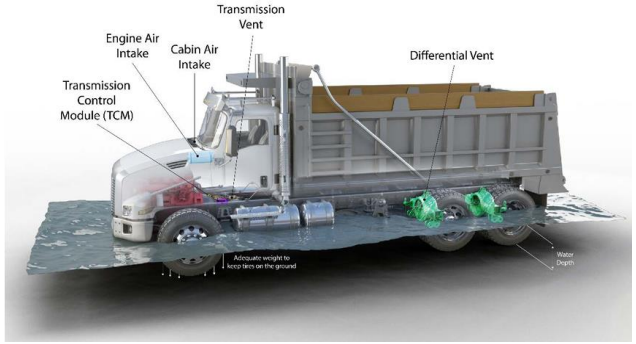
- Power outages create significant challenges for transit agencies with large BEB fleets
- Backup generators are not capable of supporting practical BEB charging
- Solar power (PV) – large footprint and is often not independent of the grid
- Potential solutions:
  - Fuel diversification: Electric, Diesel, CNG, Hybrid buses
  - Multiple connections to the grid (on different circuits)
  - Battery storage (expensive)
  - Hardening of electrical infrastructure by utility (e.g. underground electrical cables)
  - Faster restoration of service by utility company
- Utility companies play a vital role

Lessons Learned from Past Hurricanes

- Supplies of Propane and CNG were not interrupted during past hurricanes (unlike gasoline and diesel)
- The need to educate first responders
- Fuel sharing among fleets can help with recovery
- Redundancy in fueling infrastructure is key
- Alternative fuel generator can be very useful
- Priority service for wireless communication

Standing Water Operations

- Standing water (especially saltwater) presents challenges for vehicles
- Both conventional vehicles and AFVs are vulnerable
- The ability of vehicle to go through standing water depends on the height of air intake and vents
- Garbage trucks are typically well-suited
- BEVs do not need air to operate
- Regular BEVs are as vulnerable to standing water as conventional vehicles
- Some EVs are specifically designed to be used in standing water

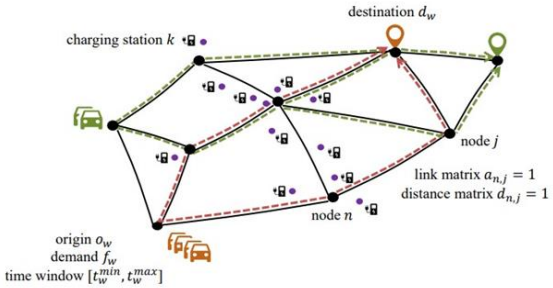


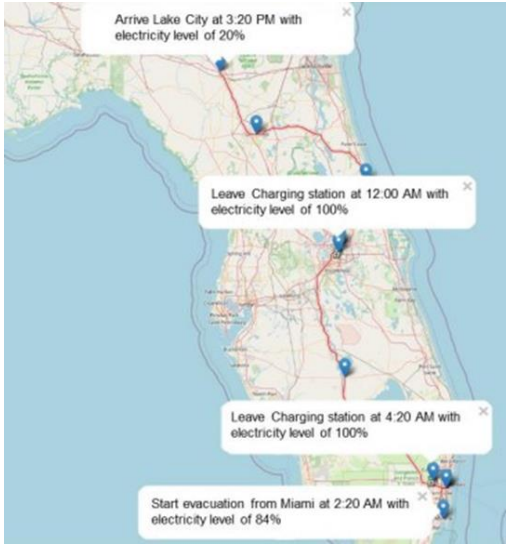
Source: Josh Bauer, NREL

Source: Dannar, Inc

Web-Based EV Evacuation Tool

- USF developed and tested EV evacuation planning web tool
- Goal: Assist with developing an optimal evacuation plan for EVs to avoid EVSE congestion
- User Inputs:
  - Initial Range/State of Charge
  - Origin/Destination
  - Departure Window
- Back-end algorithm determines:
  - When to start
  - What route to take
  - Where to charge
- Balance EV charging demand and supply by reservation and EVSE capacity





Hurricane Ian (2022) and Milton (2024)

- NG service was not interrupted
- Significant reduction in NG demand
  - 42% decrease in NG generation
- Flooding (saltwater)
- EV battery fires
- Success of Solar – Babcock Ranch
- Delayed Inland Flooding (Milton)

Thank you!

Alexander Kolpakov
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813-974-4038

UNIVERSITY of
SOUTH FLORIDA

Planning for Natural Disasters: Lessons Learned from Superstorm Sandy

Eric Richardson

Owner and Principal
EBR Safety Solutions

Strategic Mobility Advisor
Windels Marx LLP

Board Member
24/7 Clean Power

New York City Deputy Chief Fleet Officer
(Retired)

Size and Strength of Superstorm Sandy (72 Hours Before Landfall)

Internal City Government Pre-Storm Actions

01

Notified agencies to fuel or charge vehicles with general and global email and telephone discussions

02

Asked agencies to move vehicles out of flood zones

03

For agencies with in house fueling operations requested that they ensure fuel levels were maximized

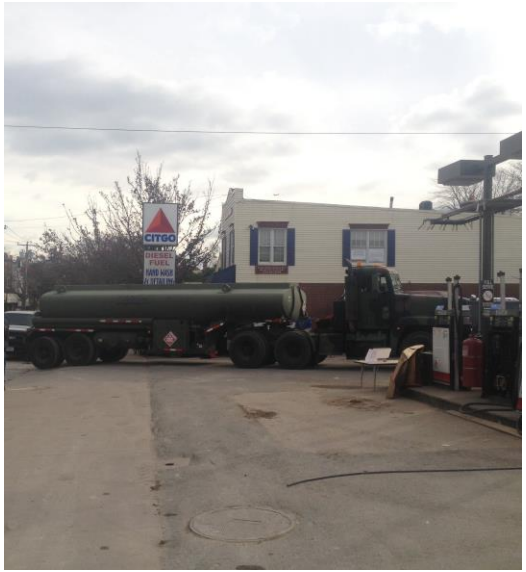
Storm Impacts

- Bridge and Tunnel Closures
- Mass Power Outages
- Major Flooding
- Fuel Contamination
- Damage to Refineries and Terminals

Additional Stressors on Fuel Supply

- Panic Buying
- Hoarding
- Emergency Generators
- Road Closings
- Pricing Instability
- Spike in usage of vehicles for recovery

Defense Logistics Agency, the National Guard, and NYC Fleet



To support emergency responders ….

To reopen schools....

Even in the snow...

Hurricane Sandy After Action Plan

Citywide Telematics System

In House Fuel Management System Upgrade and Enhanced Tank Reporting

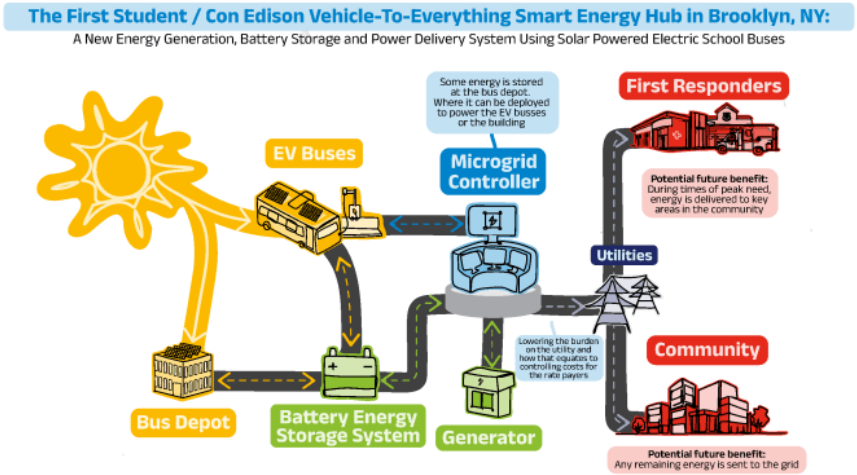
Investments in City Owned Fuel Trucks, Generators, Forklifts, and Water Pumps

Accelerating the Transition to Electric Vehicles

Post Sandy Resiliency: Building a Robust EV Charging Network

Post Sandy Resiliency: Solar Electric Vehicle Chargers and Elevated Battery Storage

Post Sandy Resiliency: Mobile Vehicle Chargers



The Future: Using Assets to Support the Grid and Emergency Centers

Contact Information

Eric Richardson

Email: Eric@EBRSafetySolutions.com

Sustainable Fleet Technology & Preparing for Natural Disasters

Background

Emergencies in Fleet

Understanding Risks

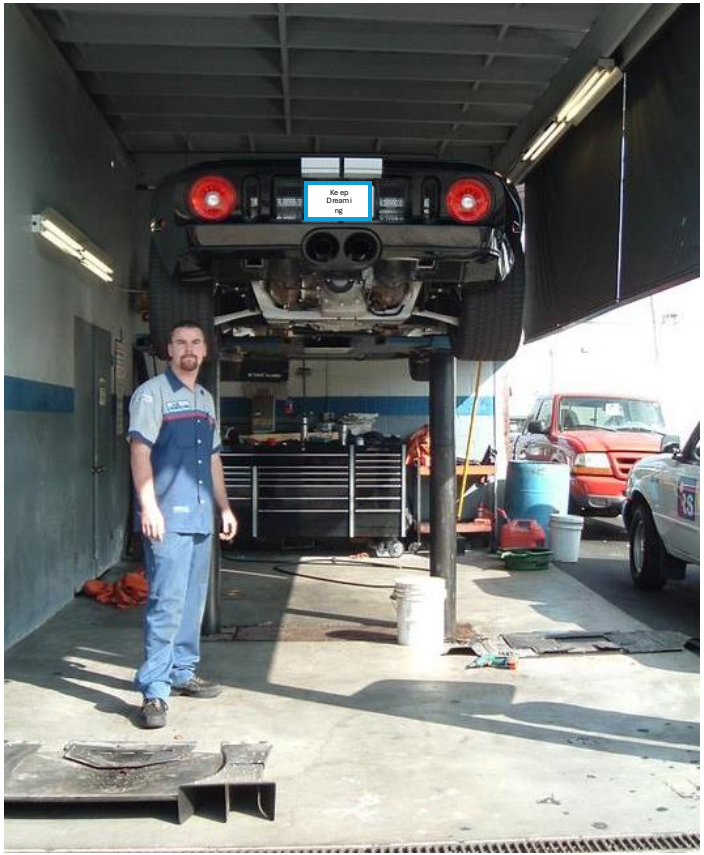
Know Your City

Demonstrations of New Tech

Table-Top Exercises

Bradley Northup, CAFM

NAFA FLEET MANAGEMENT ASSOCIATION



Background & Experience

Encinitas Ford *(2002-2009)*

Technician, Senior Master

County of San Diego *(2009-2020)*

Master Fleet Technician

- Sheriff & Light Duty Fleet

Fleet Team Leader – BA Business (SDSU)

- PW Division 1 & County Operations Center
- Medium/Heavy Trucks & Equipment
- Work Management
- Productivity & Safety Programs, Shop Re-Model

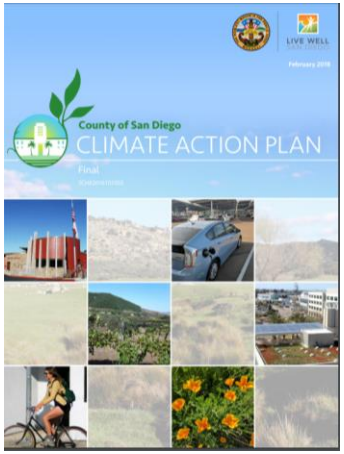
Fleet Coordinator – CAFM (NAFA)

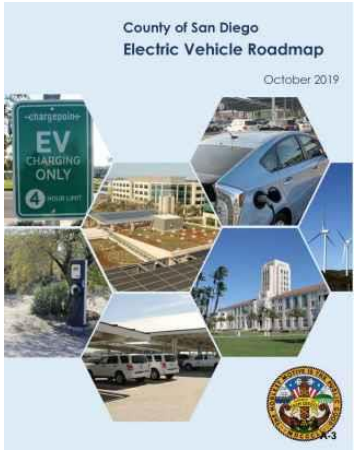
- Acquisition & Asset Management ~ 4,200 vehicles
- Contract, Policy & Specification Development
- Fund Management, Rate Development
- Climate Action, Green Fleet, New Facility Construction

Encinitas Ford *(2020 - Present)*

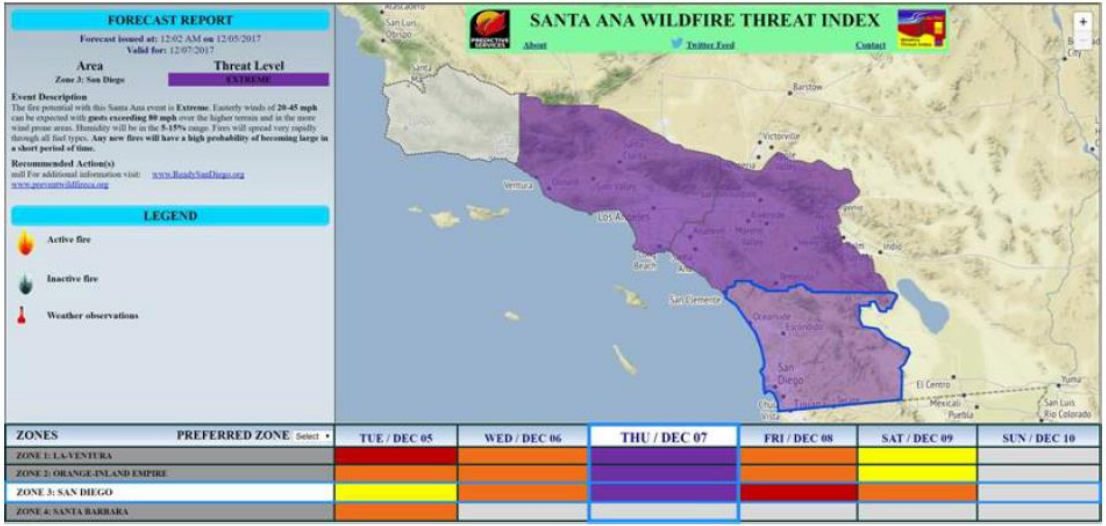
- Fleet Management Policy Update (circa 1994)
- FMIS Integrated CMS & GPS Telematics
- Fuel Depot Refurbishment
- DC Charging Infrastructure
- Fleet Facility Re-Model

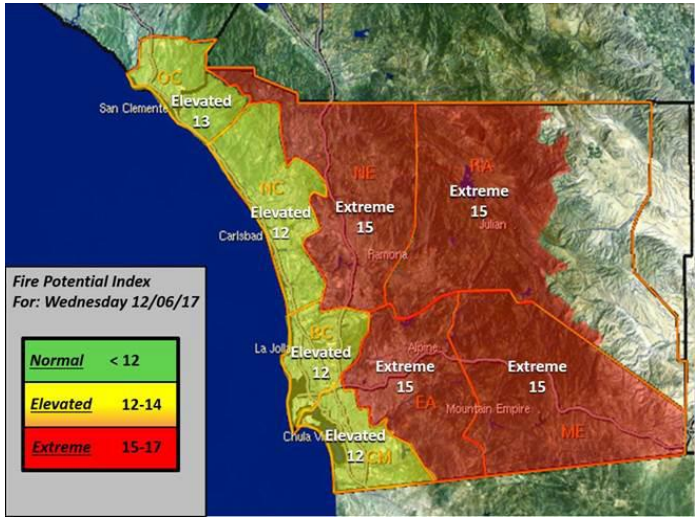
Bradley Northup, CAFM





@ County of San Diego





PREDICTIVE SERVICES

Santa Ana Wildfire Threat Index for San Diego County:

Tue 12/05	Wed 12/06	Thu 12/07	Fri 12/08	Sat 12/09	Sun 12/10
Marginal	Moderate	Extreme	High	Moderate	No Rating

No-Rating	Marginal	Moderate	High	Extreme
Santa Ana winds are not expected or will not contribute to significant fire activity.	Upon ignition, fires *may* grow rapidly.	Upon ignition, fires *will* grow rapidly and *will* be difficult to control.	Upon ignition, fires will grow *very* rapidly and will be *very* difficult to control.	Upon ignition, fires will have extreme growth and will be uncontrollable.

Being Prepared Means Staying Informed

Know When Risks are Highest

Know What Assets/Vehicles - MUST BE READY

Lilac Fire – December 7th, 2017

Extreme Red Flag Conditions

11:15am – Fire Reported North San Diego County (I-15 Freeway & West Lilac Rd)

11:30am – Extreme rate of spread (photo)

11:45am – Reverse 911 + Home & School evacuations

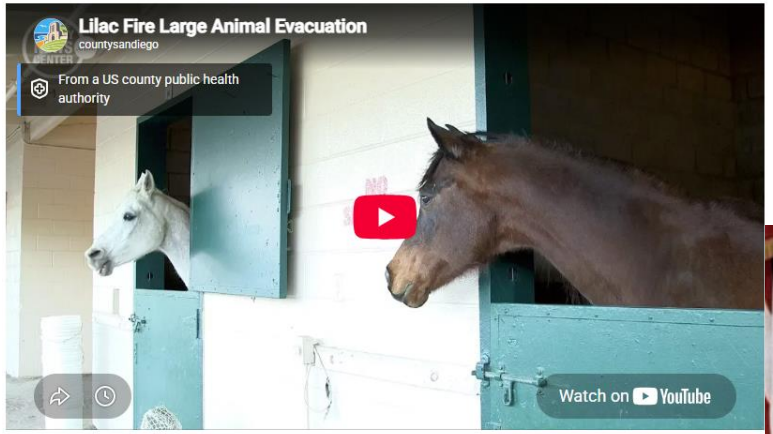
12:15pm – EOC Activated (County OES & Evac Assistance)

1:26pm – State of Emergency Declared

2:35pm – 1,000 acres spreading at 1,000 acres/hr

3:37pm – 2,000 acres spreading at 1,000 acres/hr

County Animal Services Response to Lilac Fire



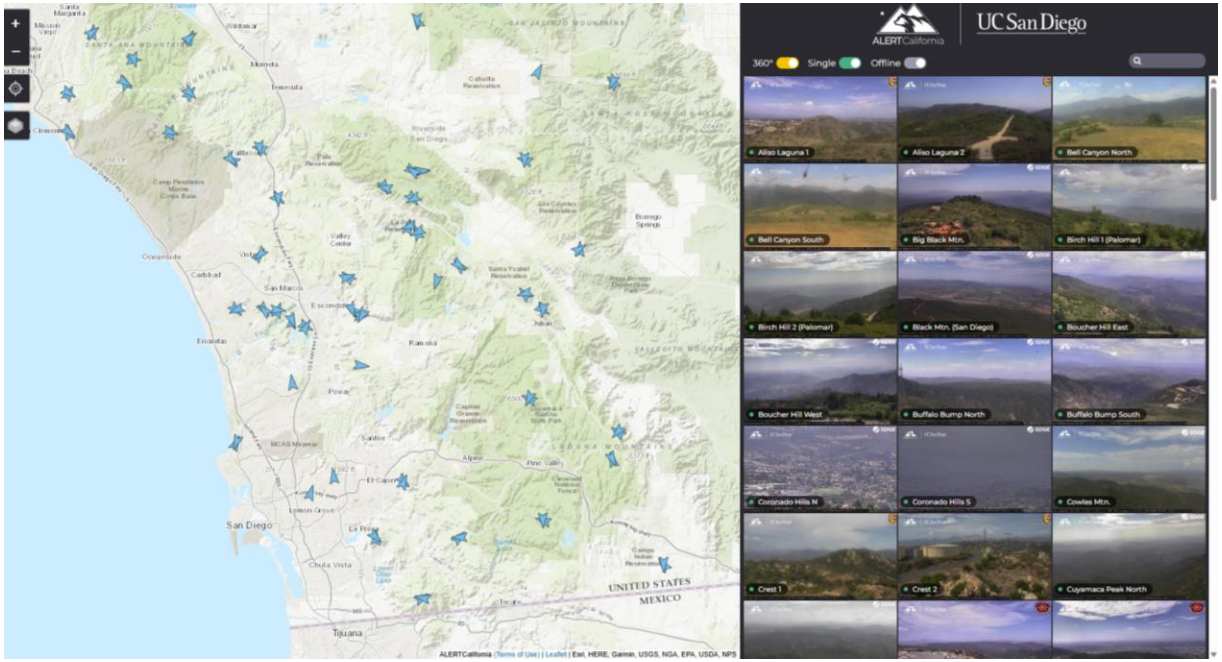
At the request of County Animal Services, the Del Mar Fairgrounds opened up for large animals during the evacuation period for the Lilac Fire in December of 2017.

By County News Center, County of San Diego Communications Office
Dec. 12, 2017 | 1:21 PM

Reading Time: 3 minutes

As the Lilac Fire burns out and recovery begins, County Animal Services is taking stock of its response to the incident. In addition to keeping its three shelters running, the department sent out teams of animal control officers and volunteers from the County Animal Response Team and Valley Center Disaster Animal Response Team.

@ County of San Diego



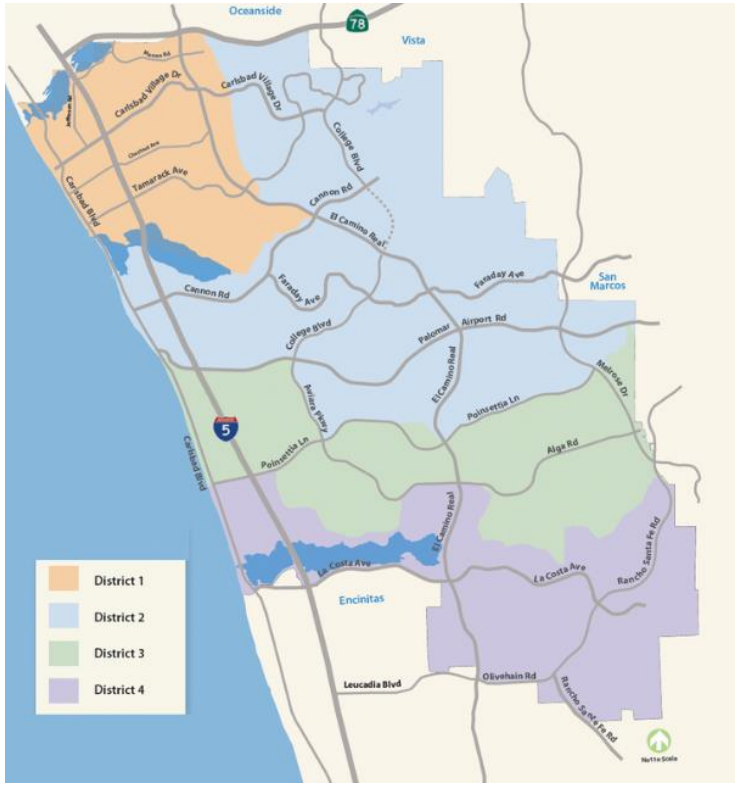
ALERTCalifornia

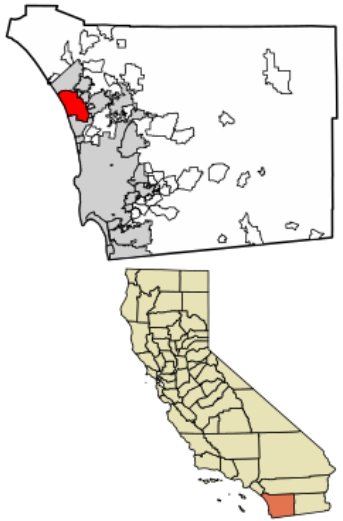
ALERTCalifornia is a UC San Diego Program

Lessons Learned

Technological Innovations

Prepared with New Resources





City of Carlsbad

Carlsbad

EXHIBIT 1

RESOLUTION NO. 2021-215

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF CARLSBAD, CALIFORNIA APPROVING THE DECLARATION OF A CLIMATE EMERGENCY[1]

WHEREAS, climate change poses an immediate and long-term threat to the City of Carlsbad in the form of increased drought, air pollution, extreme heat, species stress, negative health effects, sea level rise and increasing wildfires; and

WHEREAS, the Carlsbad City Council acknowledges that these conditions constitute an emergency affecting Carlsbad's residents, businesses, and natural resources; and

WHEREAS, efforts to control climate change will have many benefits, including cleaner air and water, improved community health, local employment opportunities, and cost savings to households, businesses and the city government; and

WHEREAS, the intensity of duration of record-breaking temperatures and severe drought conditions continue across California and the West; and

City of Carlsbad

Some Escondido schools closed, evacuations ordered as fire burns at SDG&E battery bank storage

Photo by: KGTV


By: Ashley Na

Posted 3:34 PM, Sep 05, 2024 and last updated 11:54 AM, Sep 06, 2024

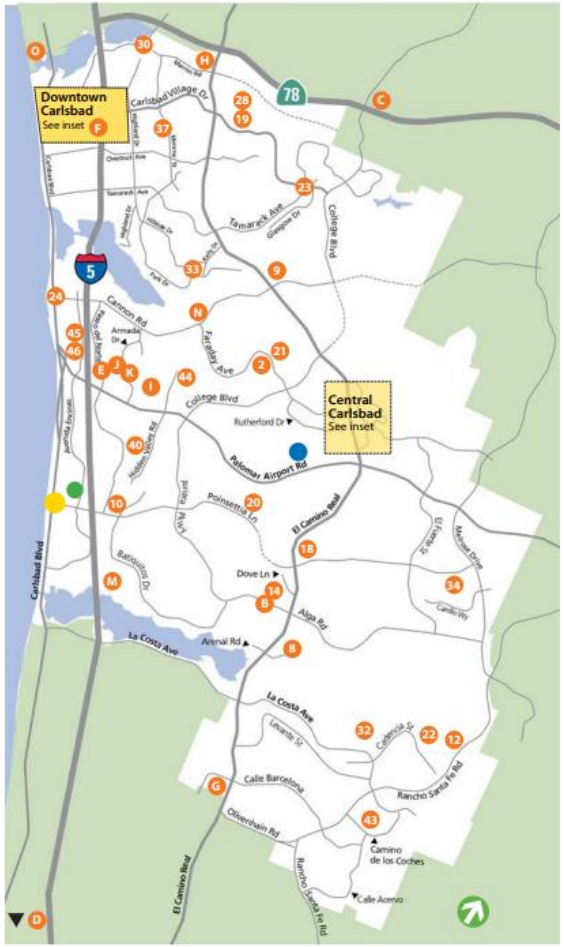
ESCONDIDO, Calif. (KGTV) — A fire that erupted at a San Diego Gas & Electric battery storage facility in Escondido Thursday afternoon prompted evacuations of nearby businesses and the Friday closure of some area schools.

Tesla Semi fire closes I-80 for hours, releases toxic fumes in Placer County

Freeway shut down for hours as firefighters scramble to contain intense heat and flames from batteries

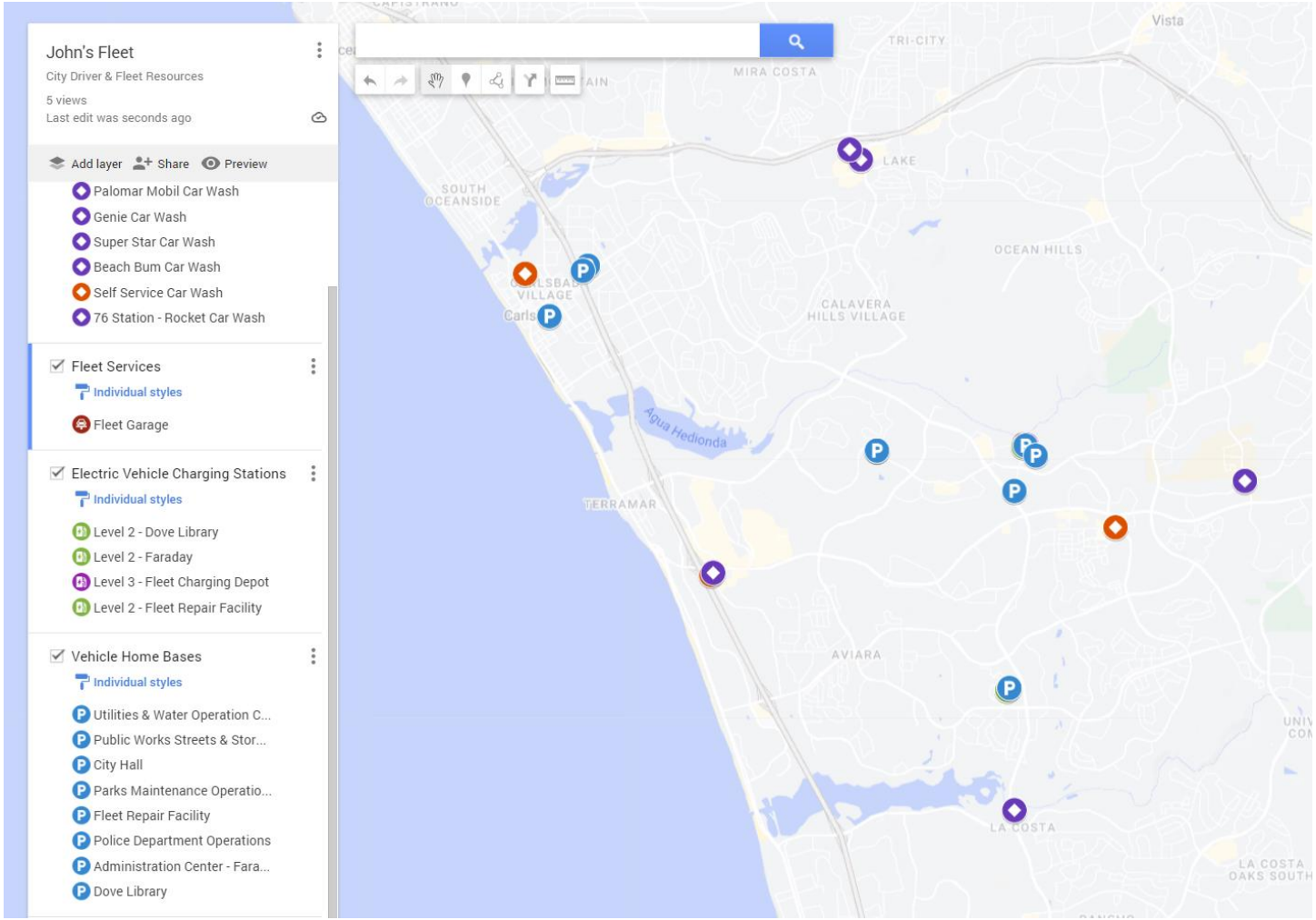
Where Do I Start?

Know Your Site(s) & Your City



Downtown Carlsbad

Central Carlsbad



[Create your own custom maps!]

Testing New Technologies

Testing New Technologies

Table-Top Exercises

FEMA

QUESTIONS?