COMMAND CONSULTING, L.L.C

SOLUTIONS THAT WORK

Response to the

Cuyahoga County Department of Sustainability's

Utility and Microgrid Request for Information

June, 2022

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COMMAND CONSULTING, LLC

Finding Solutions That Work

Who we are:

Command Consulting LLC are consultants to local governments with a focus on Electrification, Emergency Services and Shared Services. We define those as follows:

- Electrification - adding electric vehicles (EV), developing charging infrastructure using microgrids and saving taxpayers money three ways
- Emergency Services - professional development programs, response system improvements, grant assistance
- Shared Services - finding savings through cooperation, collaboration, or consolidation between municipalities

Our co-owners have more than 65 years of experience innovating and improving service delivery systems for local governments, including realizing $20 million in savings through alternative funding and improved service system designs. Our work has received a Taxpayer Hero Award from the Ohio Auditor of State and our electrification analyses identified more than $32 million in savings for Ohio municipalities in 2021 alone.

Michael Benson, MPA is a retired Fire Chief, EV owner and advocate. He focuses on consulting with municipalities to electrify their fleets, develop microgrids with EV charging infrastructure, and improve the resiliency of their community's infrastructure. This combination of EV's and microgrids will improve service, increase resiliency and lower costs. Retired Chief Benson is a member of the Board of Directors for Green Energy Ohio, a contributor to Police1 and FireRescue 1 magazines, a member of the Critical Services Microgrid Group in Asheville, NC, a volunteer member of Drive Electric Ohio, and he continues to train and mentor chief fire officers.

Robert Pursley, PhD is a retired Fire Chief and expert in public policy. His research on microgrids for local governments confirmed municipalities need assistance in developing renewable energy, storage and EV charging infrastructure. The resiliency of a community in the face of power outages, storms and other disasters is critical, and mission-critical microgrids (patent pending) provide this resiliency. Chief Pursley is also an expert in emergency service systems, professional development and training programs. He is a past member of Ohio Task Force 1, a FEMA search and rescue team with experience in search, rescue and planning.

What we do:

Under the RFI's Initiative, we fit into the Developer and Designer categories.

Our development work is based in electrification analyses: a combination of fleet analyses and microgrid feasibility studies. The results identify the savings to be realized as electric vehicles are implemented by the community and microgrids with built-in EV charging are brought online. The report defining this value opportunity may be used by a community to write an RFQ/RFP, and/or be used to obtain financing to accomplish the full electrification process over the next 20-30 years.

One component of the savings calculation is the use of private financing for microgrids. We recommend using an Energy-as-a-Service financing model through Power Purchasing Agreements. Montgomery County, MD pioneered this model and has used it successfully to develop microgrids since 2017 without

burdening itself with high capital costs. Cuyahoga County should facilitate the same kind of public-private partnerships which result in public-private win-wins for property owners, businesses and residents alike.

As far as our design work, mission-critical microgrids (patent pending) are unique, because they are intended to support mission-critical fleets and facilities. Their capacity and capability are far beyond a typical microgrid, because they are designed to operate during extended outages and in response to worst-case scenarios. This provides benefits to a community a normal microgrid would not: the energy storage capacity is high enough to become a grid-level asset to be used for demand response, voltage regulation, load management and more; the EV charging system is capable of megawatt+ power, and a grid-tied microgrid of this size improves a whole neighborhood's resiliency.

As experienced emergency, disaster and municipal service system planners, leaders and managers we understand the unique needs a disaster and emergency response system has. Whether a microgrid is designed to support police vehicles, fire stations, wastewater facilities, service departments with snow plows, water treatment plants or any other mission-critical purpose, our expertise will ensure mission-critical microgrids (patent pending) will work 24/7/365, especially in the face of worsening climate events.

Our firm would be an integral part of the microgrid development process as follows, using the RACI model:

Cuyahoga County Microgrid Development RACI Matrix Command Consulting LLC (CC LLC)	R = Responsible A = Accountable C = Consulted I - Informed
Project Step	**CC LLC Role**
Feasibility Assessment	R
Initial System Design	R
Financial Planning	C
Engineering – Utility Interconnection	A
Procurement – Construction	I
System Commissioning	I
Operations and Optimization	C

What we see – our vision for the Initiative:

A "***Cuyahoga County Municipal Microgrid Program***" designed to support the adoption of electric vehicles through the development of microgrids with integrated EV charging infrastructure. The County could also facilitate an EV procurement process through cooperative purchasing or leasing programs, but that is for another RFI.

The growth and proliferation of electric vehicles presents an opportunity for local governments at all levels (county, city, township, village) to improve their communities through electrification. Adding electric vehicles to a municipal fleet saves taxpayers money by requiring less maintenance than internal combustion-engine (ICE) vehicles. It also eliminates a major source of greenhouse gasses from within a

community. Municipal vehicle fleets, however, have exigent demands and mission-critical responsibilities. This means commercially available EV charging infrastructure is inadequate to ensure mission-critical fleets are able to respond to every emergency, especially during a disaster.

To support these special fleets, we need to develop mission-critical microgrids (patent pending) with integrated EV charging at levels which meet emergency service leaders' expectations. Police cars need to "fill up" and be ready to respond in minutes. Fire engines need to refill their batteries as quickly as they refill their water tanks and reload their hose after a fire. Snow plows must be ready for their next route without delay during a snow event. Charging battery electric vehicles with grid power is unreliable and inefficient; we need mission-critical microgrids (patent pending) to support these EV's. Mission-critical microgrids (patent pending) designed for northeast Ohio use solar panels for power, store energy in high-capacity batteries and use sophisticated power control systems with high level DC charging capacities (up to a megawatt+).

This combination of EV's and microgrids match the goals expressed by Cuyahoga County, and provide additional benefits:

- It will make our grid cleaner through the use of solar power and energy storage.
- Our energy system and electric vehicle fleets will be more resilient in the face of climate events.
- Because microgrids are able to operate independently from the grid, they are less vulnerable to cyber-attacks.
- Microgrids are an investment, not a cost, making them cost neutral at worst and revenue providers at best.
- The timing of EV proliferation along with low cost for renewable energy technology is a one-in-a-lifetime opportunity.
- We will modernize our electric grid by using smart power control systems on these microgrids and at the point of interconnection with the distribution grid.
- Energy-as-a-service financing models make all of this possible with little capital expense for communities as they develop microgrids.
- Private investors want to put their money into clean energy projects, and communities want clean energy which makes mission-critical microgrids (patent pending) mutually beneficial, and true public-private win-wins.
- Because public facilities are geographically dispersed throughout a community, mission-critical microgrids (patent pending) built on those facilities are naturally distributed energy resources.
- Their benefits are also equitable as they affect a whole community, but especially because marginalized or under-resourced neighborhoods also contain police, service, fire or emergency medical service facilities on which mission-critical microgrids (patent pending) are based.
- Private partner entities, whether they are for-profit, non-government, or non-profit will all benefit from a municipal microgrid program as their systems interact and interlace with municipal systems.
- Municipal microgrid EV charging systems should include public access whenever possible, especially street-level charging in areas where multi-unit dwellings and houses without garages are located and residents use on-street parking.

Through this program Cuyahoga County will support the development of mission-critical microgrids (patent pending) on their facilities and for any participating municipality in the County. Command Consulting LLC will conduct electrification analyses with a fee based on the size and scope of the analysis. The results of the analysis will be used by our finance and engineering partners to form the basis for an Energy-as-a-Service contract to engineer, procure and construct these microgrids with no capital expense for the communities. A services contract with the County will be used with terms every interested municipality may sign onto. Command Consulting LLC's fees may become part of the Energy-as-a-Service financing model if the scope and volume of these microgrid projects is high enough to support them.

Challenges to this vision:

Many communities and community leaders are not ready to adopt EV's, are distrustful of other governments, and/or are misinformed about clean energy technology like microgrids. Command Consulting LLC has been providing educational presentations on electrification to municipal leaders, fraternal organizations and professional conferences for several years. We will use this same model to help inform local government decision-makers throughout Cuyahoga County of the benefits of the Cuyahoga County Municipal Microgrid Program.

Additional information

Included on the following pages are:

- Fire Department-based Mission-Critical Microgrid Flier from Command Consulting LLC
- Example community electrification presentation slide deck

Available on the internet are the following articles on electric vehicles and microgrids:

- Police1 article – "Fleet Management: Know your electric options" https://www.police1.com/fleet-management/articles/fleet-management-know-your-electric-options-6O4EKpTJZNDJveUS/
- Police1 article – "Debunking the top 10 electric vehicle myths in law enforcement" https://www.police1.com/patrol-cars/articles/debunking-the-top-10-electric-vehicle-myths-in-law-enforcement-ZS6aznRjxfRNTHZp/
- Police1 article – "The economic advantages of electric vehicles" https://www.police1.com/patrol-cars/articles/the-economic-advantages-of-electric-vehicles-iWZ0viYZbIgis5fT/
- FireRescue1 article – "Your top electric vehicles questions, answered" https://www.firerescue1.com/fire-products/fire-apparatus/articles/your-top-electric-vehicles-questions-answered-symyZmoregxW0tFn/

We look forward to working with Cuyahoga County by simply having a meeting to talk about this concept, or by contracting with us to help implement the Cuyahoga County Municipal Microgrid Program.

If you have any questions on this RFI response, please contact Michael Benson at 330-620-248 or michael@commandconsultingllc.com.

COMMAND CONSULTING, LLC

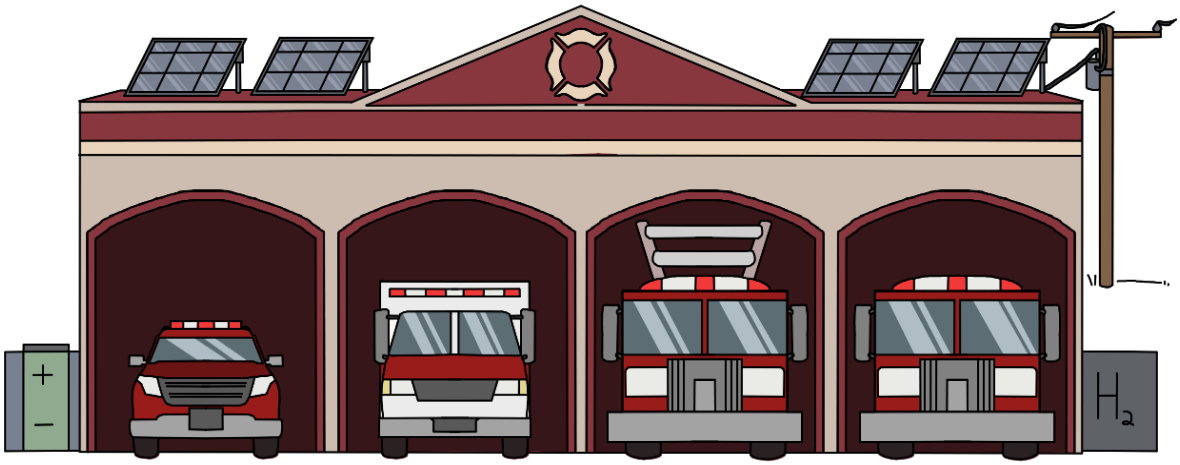
Finding Solutions That Work

Combining electric vehicles with a mission-critical microgrid (patent pending) is the fire station you need today.

Produce your own power (typically solar)

An asset for the grid

High-capacity energy storage for disaster resilience



Electrolyzer creates Hydrogen

EV charging system is capable of daily use (kilowatts) and fast turn-around time during peak use (megawatts)

Long-range electric vehicles with hydrogen fuel cells have extended operating times and are emissions free

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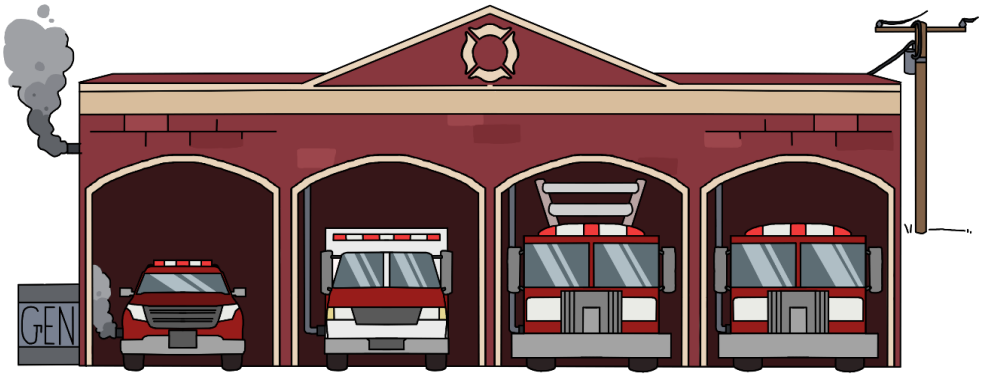
Current fire stations use fossil fuels and the electric grid for power. This is unreliable, inefficient and unhealthy.

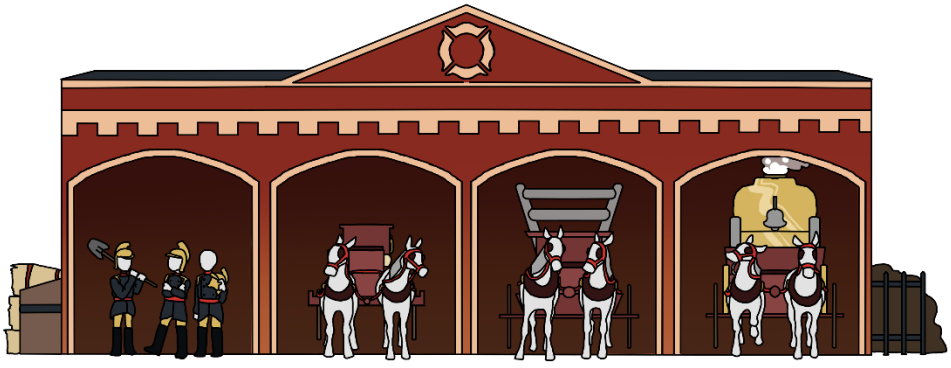
Exhaust

Grid Power



Generator

This is a major change for the fire service, but they have been through this before.



More than 100 years ago our fire stations used horses, coal and steam for power. We transitioned from all horses to no horses in only 20 years. We are making this kind of move today.

For more information look on the back,

or contact us at:

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Finding Solutions That Work

Stacking the Values from Electric Vehicles and Mission-Critical Microgrids (patent pending)

Savings from Electrification	• Electric vehicles (EV) cost less to own and operate today • Driving an EV on solar power eliminates high gasoline/diesel prices • Mission-Critical Microgrids (MCM) offset facility energy costs, saving money • MCM pay for themselves; they are an investment, not a cost
Public-Private Partnerships	• MCM may be developed using Power Purchasing Agreements and Energy as a Service financing models • A true Public-Private win-win, investors will pay to build municipal microgrids • Municipalities will improve their electrical and EV charging infrastructure without capital expense
Fleet Resiliency	• Supports 24/7/365 operations, especially during a disaster • Capable of adjusting from daily use EV charging from 20kW up to a megawatt+ for quick turn-arounds after major events or when back-to-back-to-back calls come in • MCM have greater capacity and capability than a typical microgrid • Excess energy from a MCM may be used to produce green hydrogen from water • Eliminates the need or diesel range extenders
Fleet Emissions and Efficiency	• Electrification reduces greenhouse gasses from vehicles and infrastructure • Gas/diesel vehicles pollute throughout their whole life • EV's have zero emissions after manufacture • Fuel cell EV's only emit water
Facility Resiliency	• Mission-Critical Microgrids (MCM) operate as an island of power when the grid is down • Municipal infrastructure is strengthened • Local governments succeed even when the electric grid has failed

Grid Resiliency	• MCM integrated into the electric distribution grid provides multiple benefits
	  ○ Demand response, voltage regulation, load management and more
	  ○ Provide modern electric architecture with new power control systems
	  ○ Energy storage sizes are worthwhile as a distribution grid-level asset

Community Resiliency and Equity	• Municipal microgrids are geographically dispersed benefitting multiple neighborhoods ○ They are more equitable, because they are based on municipal facilities, many of which are located in marginalized areas of a community
Not just for Fire Stations	• Other municipal facilities and fleets will also benefit from adding MCM to their facility: police stations, water treatment plants, wastewater facilities, public works, service garages, parks and pools, and administrative buildings

The opportunity to realize all of these benefits starts with the adoption of EV's.

Contact us to help you get started.

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Why Electric Cars Won't Work

… Without a Plan

MICHAEL BENSON, MPA

MARCH, 2022

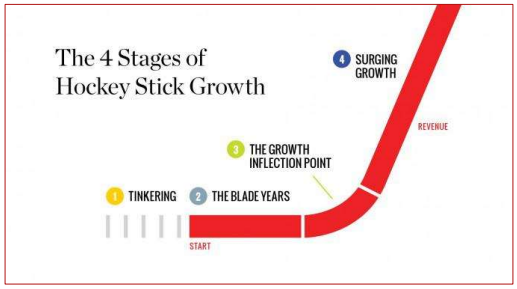
How I got here

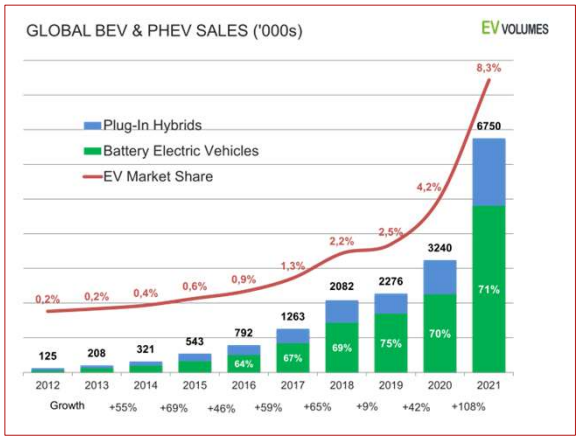
- 30 years in the fire service
  - Innovating all the way
  - Better service – lower cost
- Chief car goes away – what to buy?
  - Tesla Model 3
  - 25 months of waiting
  - Fast, fun
  - Smart, Efficient
  - Cheap? Cheaper …
- This would be a great public safety vehicle

EV advantages

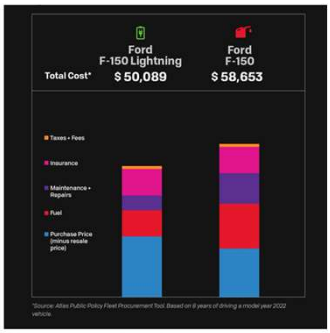
- Skateboard design = any type of vehicle
- Torque
- Braking
- Cheaper maintenance
- Safety
  - Auxiliary braking
  - Crumple zones
  - Low COG
  - Polar Moment of Inertia

EV Growth



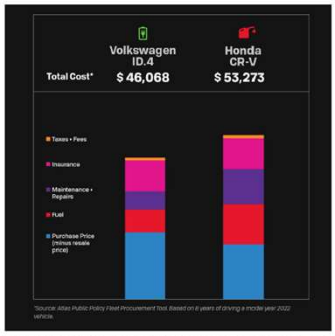


EV Economics



This analysis found that the Ford F-150 Lightning is 17.1 percent less expensive than the Ford F-150.

- Lower TCO
- Cheaper Fuel
- Less Maintenance
  - Brakes
  - Oil changes
  - Transmission
- Pickup – 17% cheaper
- SUV – 15.6% cheaper



This analysis found that the Volkswagen ID.4 is 15.6 percent less expensive than the Honda CR-V.

EV's are going to get cheaper

- The major cost of an electric car is the battery pack
- Battery pricing is dropping annually
- 89% drop since 2010 ($1,100 to $137 per kWh)
- Battery technology improves exponentially
- Car battery technology = cheaper/better storage technology

Figure 1: Volume-weighted average pack and cell price split

Source: BloombergNEF.

Revolution is Real

Demers Ambulance

Logan, OH PD Prototype

Madison, WI E8

Bargersville, IN PD

Bargersville Police example

Dodge Charger

Date	19-Aug	19-Sep	19-Oct	19-Nov	19-Dec	20-Jan	20-Feb	20-Mar	20-Apr	20-May	20-Jun	20-Jul	20-Aug
Gas	$ 450	$ 320	$ 489	$ 530	$ 706	$ 514	$ 423	$ 425	$ 222	$ 118	$ 200	$ 201	$ 447
Oil	-	$ 37	-	$ 38	$ 38	-	$ 37	-	$ 37	-	$ 37	-	$ 37
Maintenenace	$ 6	-	$ 122	-	$ 88	-	$ 72	-	$ 1,935	-	$ 33	-	$ 17
Rolling Cost	$ 456	$ 813	$ 1,424	$ 1,992	$ 2,824	$ 3,339	$ 3,871	$ 4,295	$ 6,489	$ 6,607	$ 6,877	$ 7,079	$ 7,580

Tesla Model 3

Date	19-Aug	19-Sep	19-Oct	19-Nov	19-Dec	20-Jan	20-Feb	20-Mar	20-Apr	20-May	20-Jun	20-Jul	20-Aug
Electricity	$ 57	$ 61	$ 50	$ 51	$ 125	$ 66	$ 55	$ 74	$ 52	$ 53	$ 44	$ 70	$ 66
Maintenenace	-	-	-	-	-	-	-	-	-	-	-	-	-
Rolling Cost	$ 57	$ 118	$ 169	$ 220	$ 344	$ 411	$ 465	$ 540	$ 592	$ 645	$ 689	$ 759	$ 825
Rolling Savings	$ 398	$ 694	$ 1,255	$ 1,772	$ 2,480	$ 2,928	$ 3,405	$ 3,756	$ 5,898	$ 5,963	$ 6,189	$ 6,320	$ 6,755

What we need to do

Develop the Infrastructure

An Opportunity – Not a Threat

Mission Critical DCFC = Microgrid

- Solar/Wind/Water
- Plus storage
- Plus DC fast charging
- Sized beyond demand
- Resiliency
- Redundancy

Three kinds of charging:

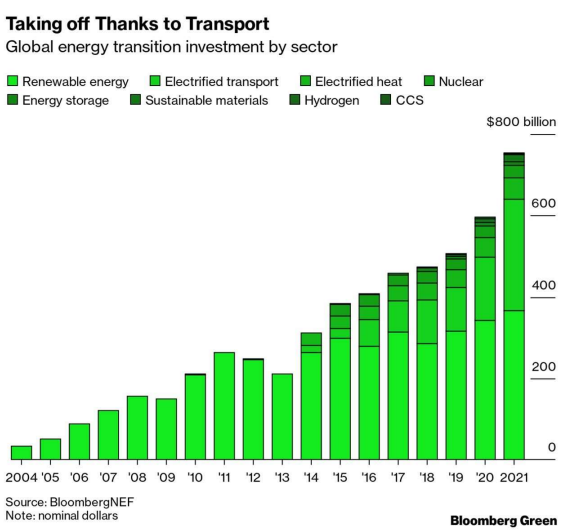
- Level 1 – 120V at home
- Level 2 – 240V at home or destination
- DC fast charging
- Mission-Critical Charging – DCFC at megawatt+

Microgrids do more than charge EVs

- Microgrids are distributed energy
- Work with AEP Ohio as a partner
  - Fewer neighborhoods lose power in a storm – when integrated into the distribution grid
  - Disaster Mitigation – infrastructure is strengthened
  - Smart grid improvements to accommodate renewable energy strengthen the grid
  - Green Mountain Power example
- Multiple or large projects affect whole community – Cincinnati and Athens are already doing this
- Makes communities safer and happier – Baltimore Resiliency Hubs

How we pay for all of this

- Fleet
  - Pilot program
  - Lease-Purchase
  - Savings
- Microgrids
  - Power Purchasing Agreement
    - Public-Private Win-Win
    - Zero capital expense
  - Grants - competitive
  - Traditional Finance – capital



Command Consulting LLC

- Electrification Analysis
  - $32 million in savings identified in 2021
- Emergency preparedness and response focus
- Creating and managing projects for communities

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