

Vancouver, BC  
Bellevue, WA  
Seattle, WA  
Bremerton, WA  
Tacoma, WA  
Portland, OR  
Eugene, OR

Steamboat Springs, CO

Petaluma, CA  
Santa Rosa, CA  
San Francisco, CA  
San Jose, CA  
Livermore, CA

Palm Springs, CA

Eau Claire, WI

Minneapolis, MN

Des Moines, IA

Champaign-Urbana, IL

Louisville, KY

Houston, TX

St. Petersburg, FL

Rockford, IL

Chicago, IL

Manus, IN

Columbus, OH

Washington, DC

Atlanta, GA

Galveston, TX

Ottawa, ON

Windsor, ON

Westchester County, NY

Baltimore, MD

Level, QC

Montreal, QC

Springfield, MA

Richburg, MA

Boston, MA

Annapolis, MD

Kingston, NY

Roswell, GA

Queens, NY

Flushing, NY

New York City, NY

Newark, NJ

Seabrook, NJ

Reading, PA

Philadelphia, PA

Saginaw, MI

Quebec City, QC

Leeds, QC

Trillium, QC

Longueuil, QC

Shelburne, QC

Westchester County, NY

Kingston, NY

Roswell, GA

Queens, NY

Flushing, NY



# Sierra Club Susquehanna Group Presentation by BAE Systems

June 21, 2022

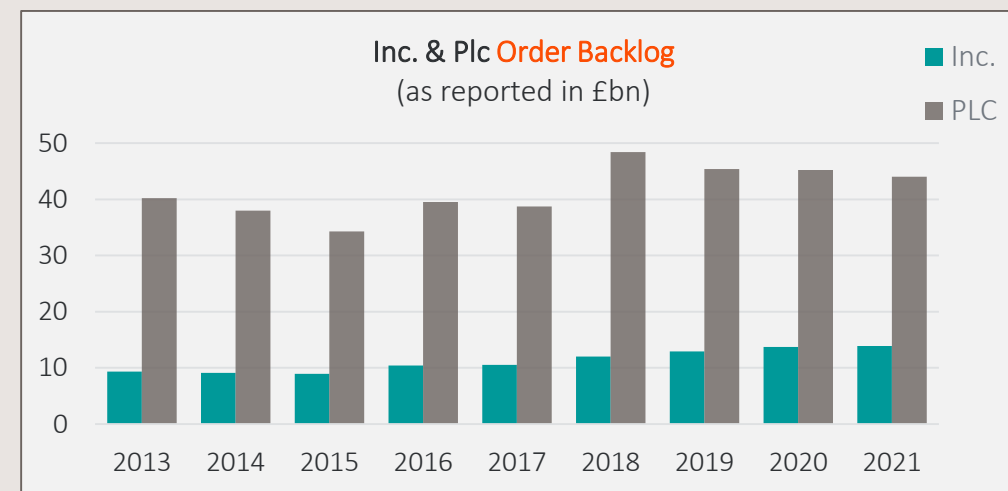
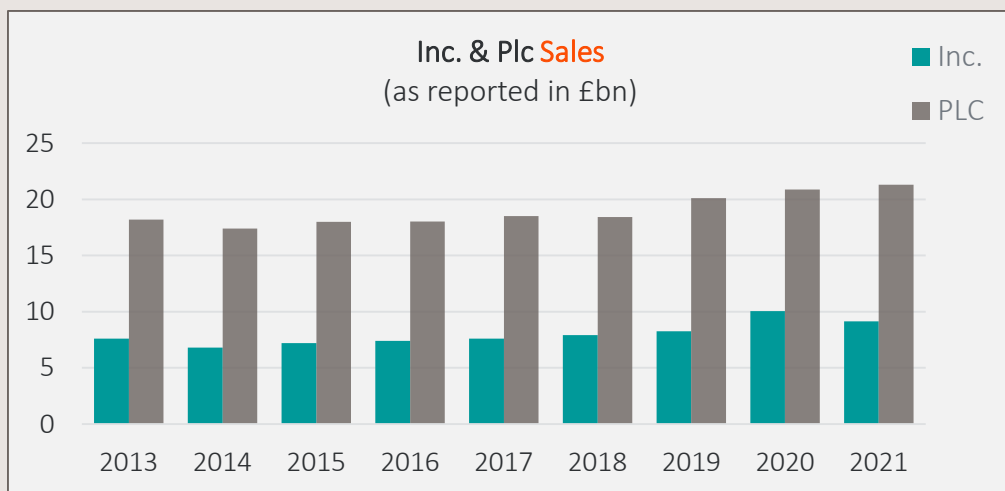
## Discussion topics

- Introductions
- Overview of BAE Systems
- What we do
- What we are seeing (in the marketplace)
- How BAE Systems fits in
- What is going on in NY?
- Working together



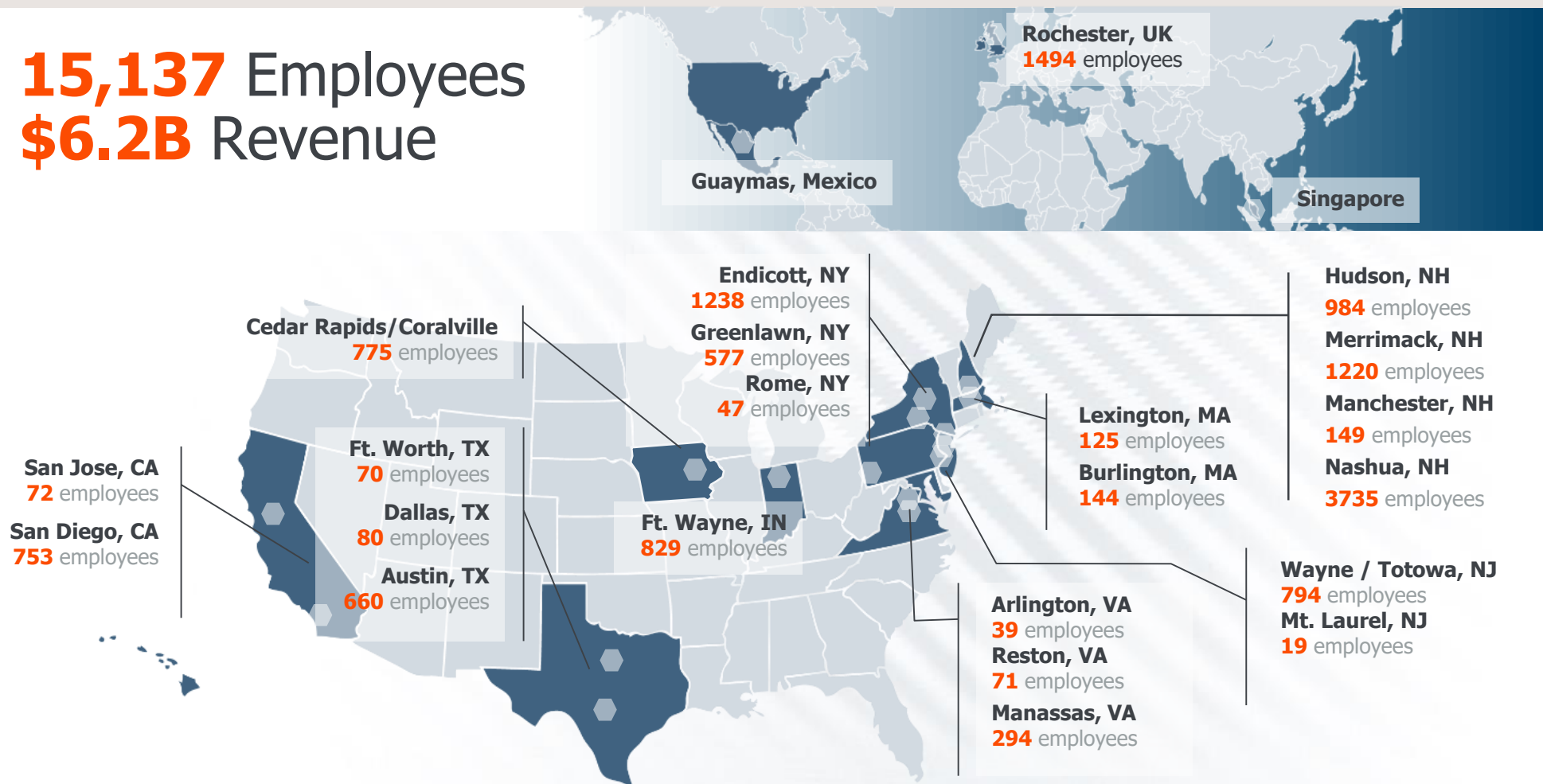
## BAE Systems Inc – part of BAE Systems plc (aka the Group)

- Our global business remains a top 10 U.S. prime contractor, with strong, enduring presence in international markets
- BAE Systems, Inc. employs a diverse international workforce of approximately 34,400 employees (c.31,200 in the U.S.)
- Major operations in 30 U.S. states, the UK, and Sweden
- 2021 Inc. sales of \$12.5bn, representing approximately **43% of the Group**
- 2021 Inc. order backlog of \$18.8bn, representing approximately **32% of the Group**



# Electronic Systems

**15,137** Employees  
**\$6.2B** Revenue



\*500 people work at other sites with less than 50 employees

# Electronic Systems Business Areas



\* Headquartered in Endicott NY

# Controls & Avionics Solutions

- Flight Controls: Fly-by-wire systems, Active Inceptor Systems
- Engine Controls: Full Authority Digital Engine Controls (FADEC), Power Management Systems
- Flight deck systems: instrument control panels, detection and alerting
- Cabin management systems enabling the ultimate flying experience
- Aftermarket Solutions: maintenance, repair and overhaul, technical service capabilities
- Advanced flight controls and mission avionics
- Advanced displays and inceptors
- Through-life support
- **Aircraft electrification solutions enabling hybrid and all-electric aircraft**



# Power & Propulsion Solutions

- Delivers propulsion and power management performance with innovative electric products and solutions
- Serves a diversified market footprint: Advancing vehicle mobility, efficiency, and capability in markets such as; transit, marine, military and truck
- Holds a significant IP portfolio; 200+ patents world-wide; using technology evolved from over 25 years of investment in aircraft controls and power systems
- More than 15,000 electric drive systems deployed worldwide have logged over 4 billion revenue service miles while preventing 3 million tons of harmful emissions
- Systems development and integration is a core competency – makes the difference between average performance and class-leading

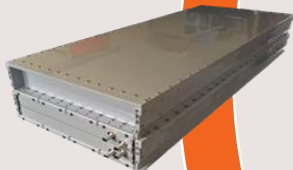


# What we do

Main Power Electronics



Energy Storage Systems



Motors



NOVA BUS



GILLIG

Energy Storage Systems



IVECO





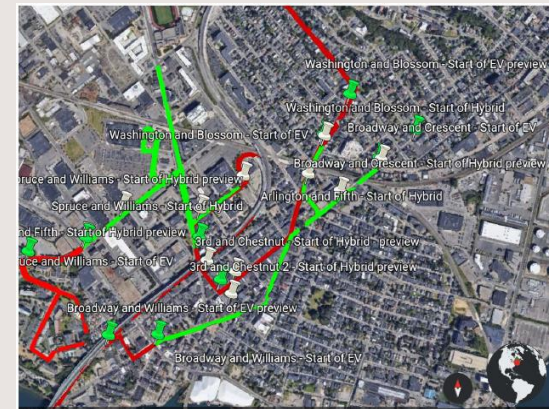
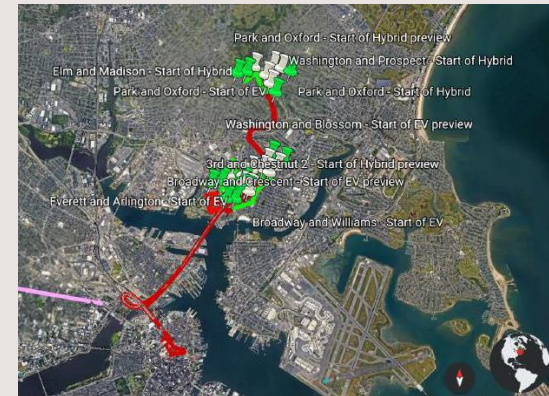
# What are we seeing - geofencing



## San Francisco, CA (MUNI)

- In service – 2019
- 68 buses across 11 Green Zones
- Prioritized zones based on equity and poor air quality
- Estimated 7 million zero emission miles over lifetime

## MBTA Boston - planned



Source: MBTA Board presentation 3/24/2022

## Others



We Go Where You Go!



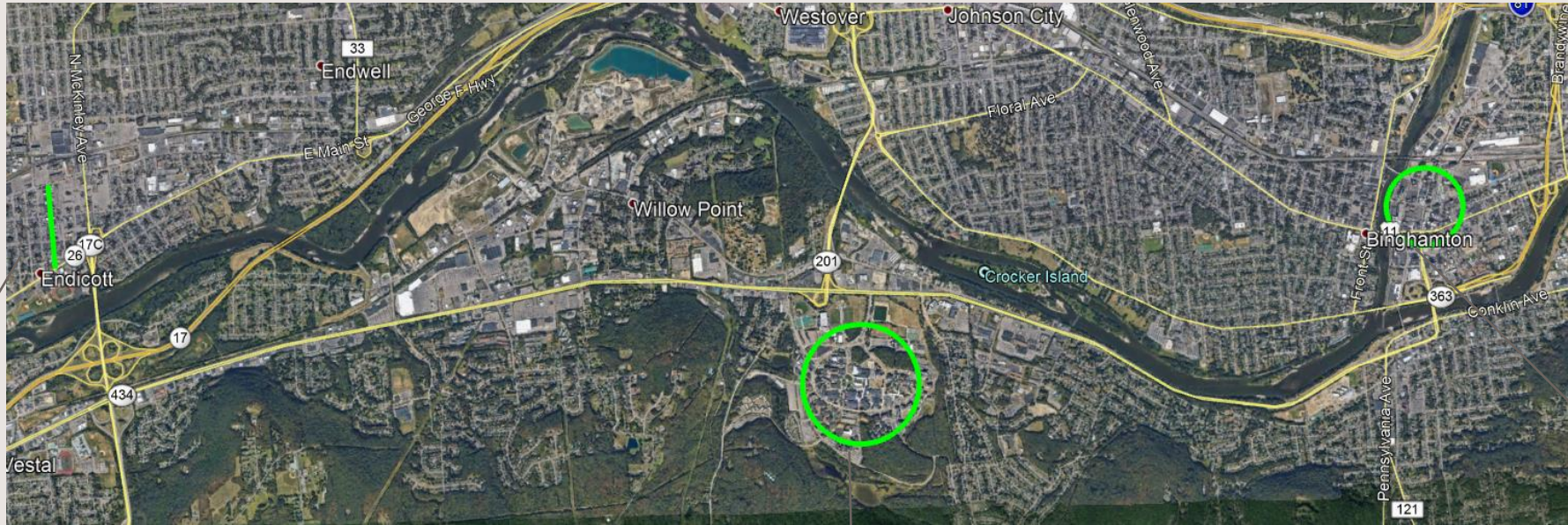
## Rockford, IL (MTD)

- In service – 2019
- 15 buses across 10 Green Zones
- Only procuring hybrids to add to Green Zone operations



700 buses running through 93 Green Zones have delivered over 900,000 miles of zero emissions service

# What are we seeing - geofencing



Washington Ave  
Endicott

Binghamton University

Downtown BC Transit  
transfer center



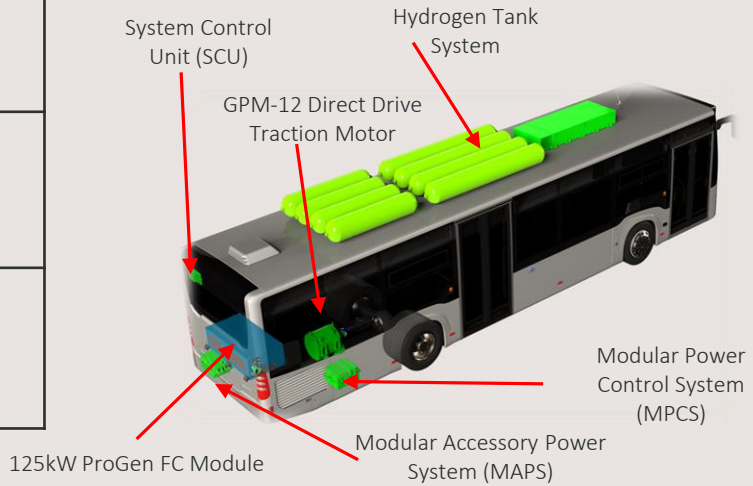
We Go Where  
You Go!

Broome County Transit is running zero emissions capable hybrids in geofenced zones across Broome County

# What are we seeing – hydrogen fuel cell electric buses



Generation & supply of hydrogen	<input checked="" type="checkbox"/>
Provide infrastructure consultation	<input checked="" type="checkbox"/>
Supply scalable, complete infrastructure systems & components	<input checked="" type="checkbox"/>
Deliver fully integrated fuel cell drivetrains	<input checked="" type="checkbox"/>
Be a single point of contact for all hydrogen fleet services & support	<input checked="" type="checkbox"/>



## What are we seeing – battery electric buses



**LFSe<sup>+</sup>**

Powered by BAE Systems

### Nova Bus LFSe+ coming to Broome County Transit



First look at fully-electric buses for Broome County Transit (6/6/2022)

Broome County Transit moves towards an electric fleet (6/6/2022)

Made in Plattsburgh NY with electric powertrain and power management systems from BAE Systems in Endicott NY

# How BAE Systems fits in

## Near zero

## Full zero

### REAL

Electric  
Accessories

### Series-E

Electric Hybrid

### Series-ER

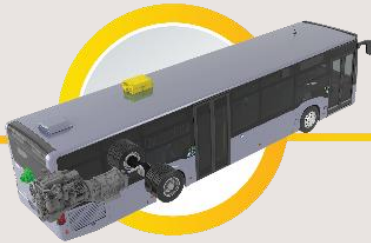
Electric Range Hybrid

### Series-H

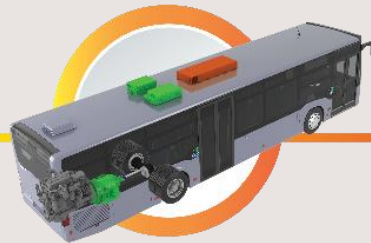
Fuel Cell Electric

### Series-EV

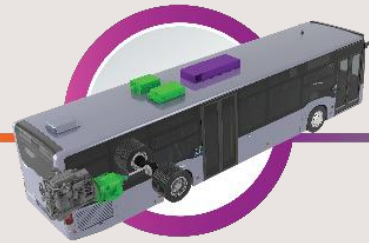
Battery Electric



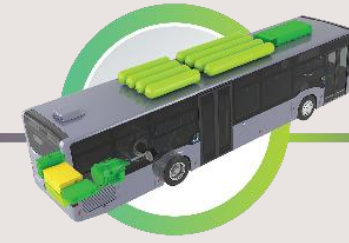
- First step towards zero emissions
- Proven hardware
- Significant maintenance savings



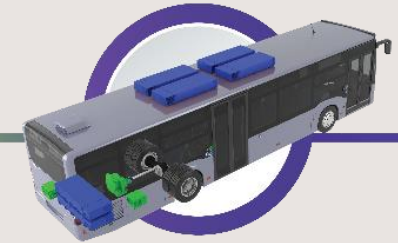
- Optimized thru-life costs
- Significant fuel savings and emissions reductions
- Arrive-and-go capability



- Significant zero emission capability
- Geofencing-enabled operation
- On-board charger
- Plug-in option available



- Full zero emission
- Hydrogen fueled
- Produces only pure water as exhaust
- 300+ mile range



- Full zero emission
- Proven with 500 systems in service & 20 million zero emission miles
- Opportunity and depot charging

# How BAE Systems fits in – working with key partners in NY State



# What's going on in NY State

## Climate Action Plan

- We provided commentary during Syracuse public hearing session supporting zero emission hybrid buses instead of buying more diesel transit buses

## NYSERDA, NY-BEST, NYLCV, NYPTA, NY Clean Fuels coalition

- We are actively engaged with key industry advocacy and support associations

## Hydrogen Hub

- BAE Systems is a key member of NY-led regional hydrogen hub pursuit of federal funding

## Active legislation (Kennedy and Harkham bills)

- Senate Bill S3535C
  - Relates to the purchase of zero-emission buses and the procurement of electric-powered buses, vehicles or other related equipment
- Senate Bill S8917
  - Relates to the purchase of zero-emission capable hybrid and zero-emission buses; and the procurement of electric-powered buses, vehicles or other related equipment

**NY fleets and operations** – NYC, Westchester, BC Transit, Rochester, Syracuse (transit); Mamaroneck NY (maritime)

**Aircraft electrification lab investment** in Endicott NY

# Working together

- Where do our goals and objectives align?
- Advocacy support
- Legislative support
- Continuing our dialogue
  - Come visit our Endicott facility
  - Meet with other Sierra Club chapters





Thank you

