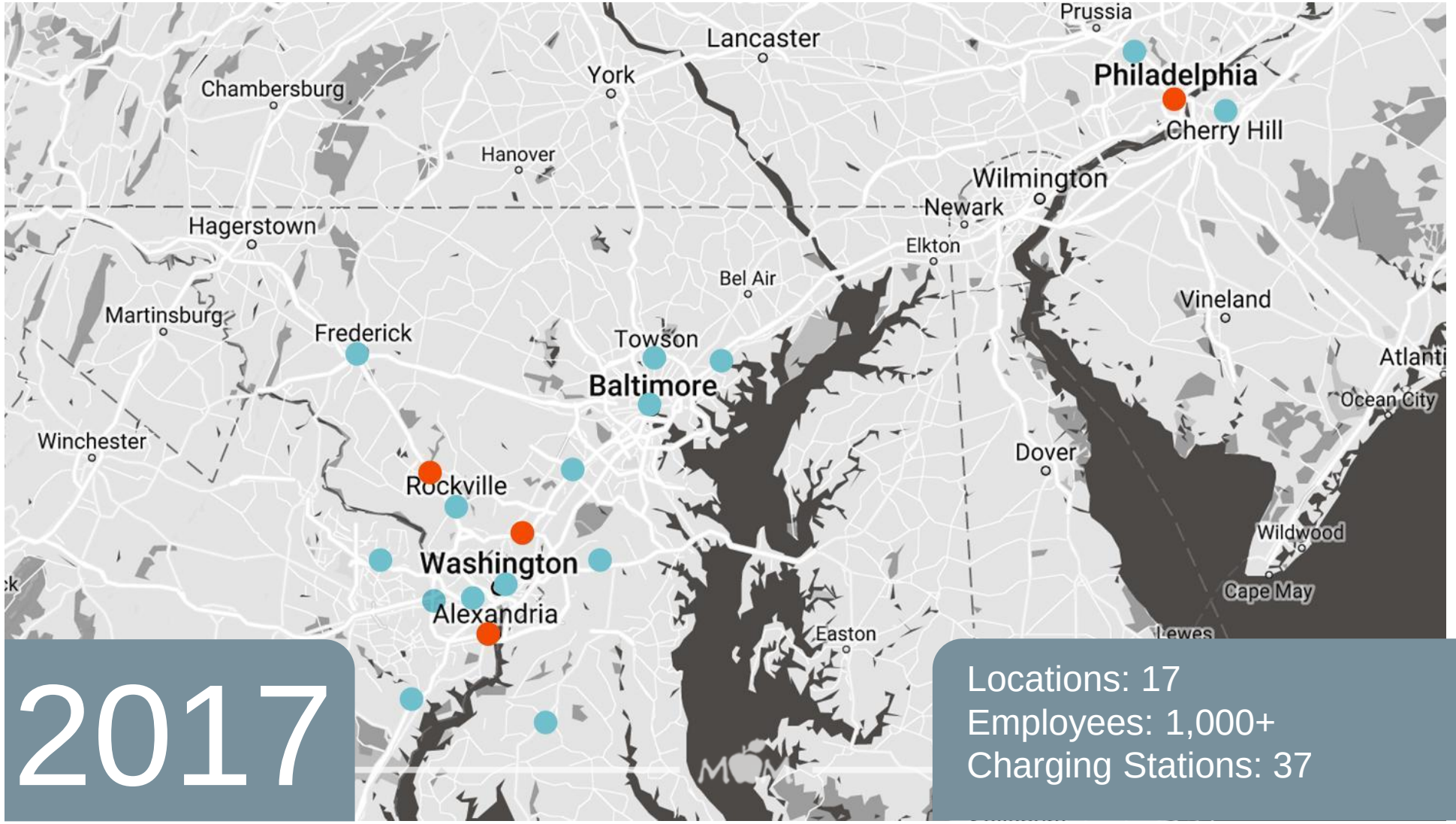
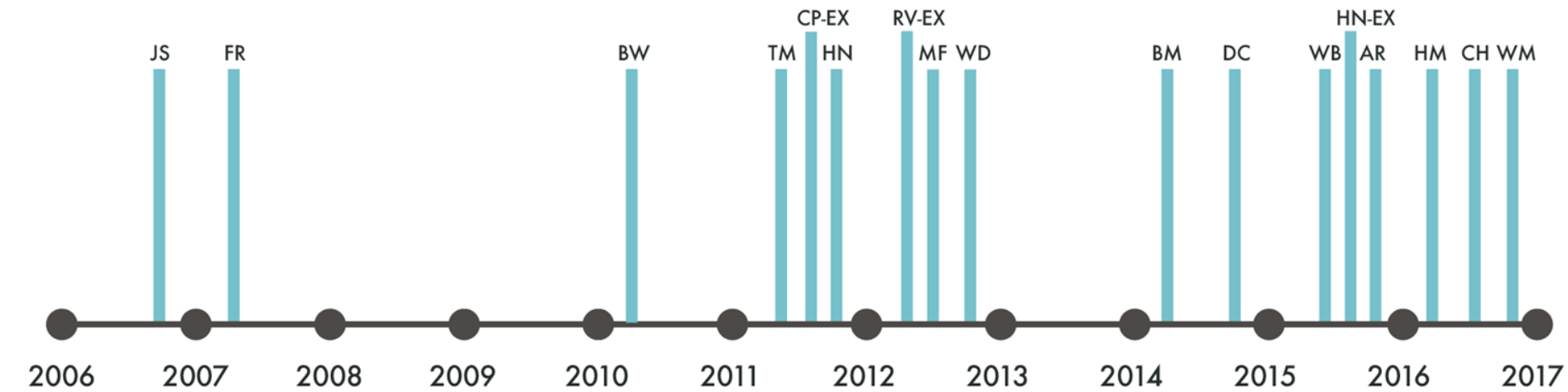
WORKPLACE CHARGING EXPERIENCE

David Mackey, MOM's Organic Market
Celso Guitian, University of Maryland, Baltimore County
Mike Wall, Clinton Electric


Prussia
Lancaster
York
Philadelphia
Chambersburg
Cherry Hill
Hanover
Wilmington
Newark
Hagerstown
Elkton
Martinsburg
Vineland
Atlanti
Ocean City
Winchester
Dover
Rockville
Wildwood
Cape May
Lewes
Rehoboth Beach
Culpeper
MOM
MOM's Organic Market


Prussia
Lancaster
York
Chambersburg
Philadelphia
Cherry Hill
Hanover
Wilmington
Newark
Hagerstown
Elkton
Bel Air
Martinsburg
Frederick
Towson
Vineland
Baltimore
Ocean City
Winchester
Dover
Rockville
Wildwood
Washington
Cape May
Alexandria
Easton
Lewes
2017
Locations: 17
Employees: 1,000+
Charging Stations: 37


JS
FR
BW
CP-EX
TM
HN
RV-EX
MF
WD
BM
DC
HN-EX
WB
AR
HM
CH
WM
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017

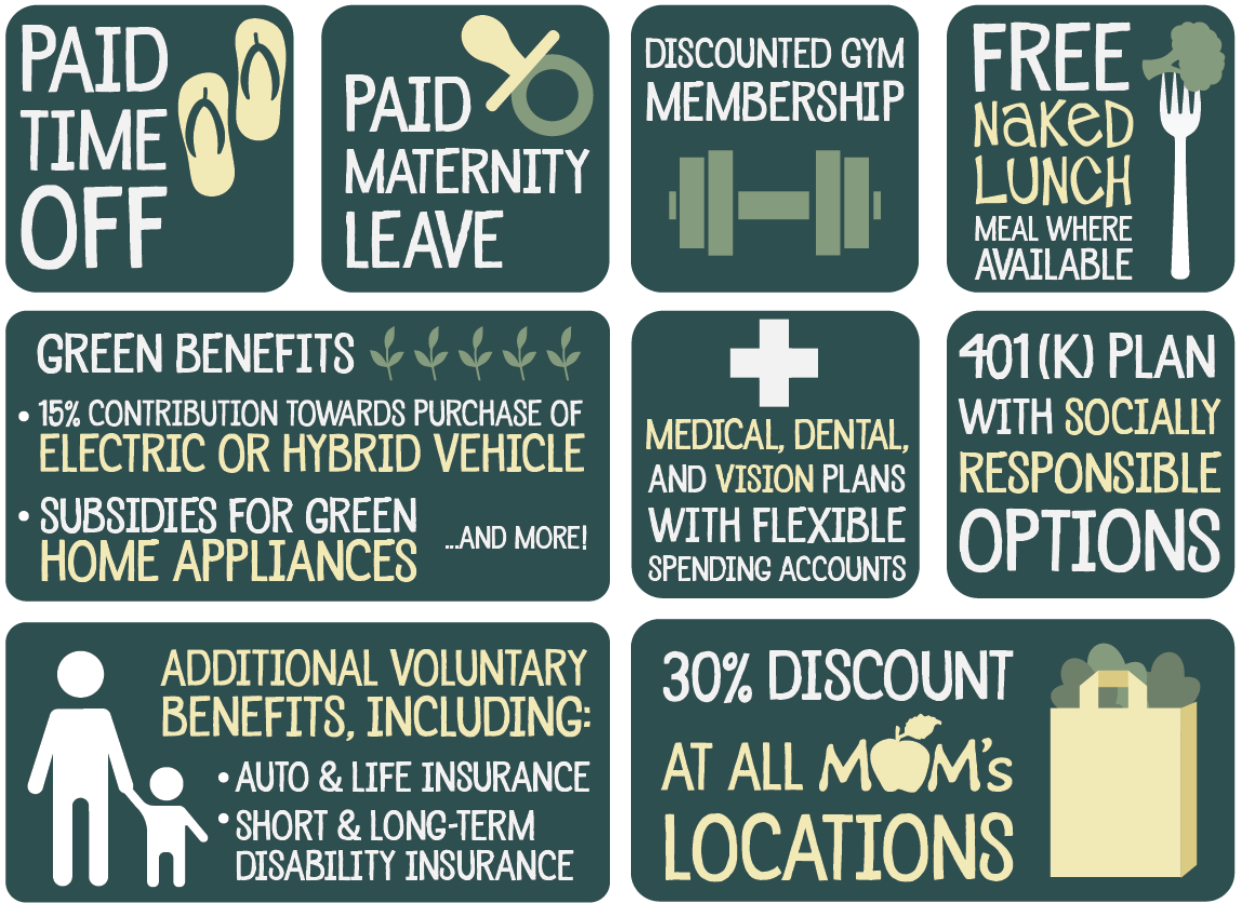

MOM


MOM's Purpose
to protect and restore
the environment


MOM
MOM's Organic Market
Reserved
for Electric Car
Charging
MOM
MOM's Organic Market


MOM
MOM's Organic Market
CAR CHARGING
BRYN MAWR
CBS


MOM
MOM's Organic Market
This spot reserved for electric car charging
MOM
MOM's Organic Market
RESERVED
ELECTRIC CAR
CHARGING


PAID TIME OFF
PAID MATERNITY LEAVE
DISCOUNTED GYM MEMBERSHIP
FREE NAKED LUNCH
MEAL WHERE AVAILABLE
GREEN BENEFITS
• 15% CONTRIBUTION TOWARDS PURCHASE OF ELECTRIC OR HYBRID VEHICLE
• SUBSIDIES FOR GREEN HOME APPLIANCES
...AND MORE!
MEDICAL, DENTAL, AND VISION PLANS WITH FLEXIBLE SPENDING ACCOUNTS
401(K) PLAN WITH SOCIALLY RESPONSIBLE OPTIONS
ADDITIONAL VOLUNTARY BENEFITS, INCLUDING:
• AUTO & LIFE INSURANCE
• SHORT & LONG-TERM DISABILITY INSURANCE
30% DISCOUNT AT ALL MOM's LOCATIONS


RESERVED
ELECTRIC CAR
CHARGING
VOLT
HOV


MOM
MOM's Organic Market
RESERVED
ELECTRIC CAR
CHARGING
NISSAN


TurboCord
PORTABLE EV CHARGER
TurboCord
PORTABLE EV CHARGER


MOM
MOM's Organic Market
MOM
MOM's Organic Market


MOM


MOM
MOM's Organic Market
RESERVED
ELECTRIC CAR
CHARGING
MOM
MOM's Organic Market
RESERVED
ELECTRIC CAR
CHARGING
MOM
MOM's Organic Market
RESERVED
ELECTRIC CAR
CHARGING


G Street FABRICS
TEPPANYAKI GRILL & BUFFET
MOM
Reserved for Electric Car Charging
MOM
Reserved for Electric Car Charging
MOM


MOM
MOM's Organic Market
RESERVED
ELECTRIC CAR
CHARGING
GRAND OPENING
MOM
RESERVED
ELECTRIC CAR
CHARGING
XJY-8298
MOM


EXIT
MOM


ELECTRIC
VEHICLE
CHARGING
STATION
MOM
PARKING
MOM
PARKING
MOM


E·T·N
E·T·N
SemaConnect


MOM
MOM's Organic Market
RESERVED
ELECTRIC CAR
CHARGING


PROFESSIONAL
GROUNDS, INC.
LANDSCAPE DESIGN/BUILD
(703)339-0600
"Exceeding Your Expectations . . . Since 1974.
SUPREME
JAMESTOWN,PA
BARBER SHOP

THANK YOU

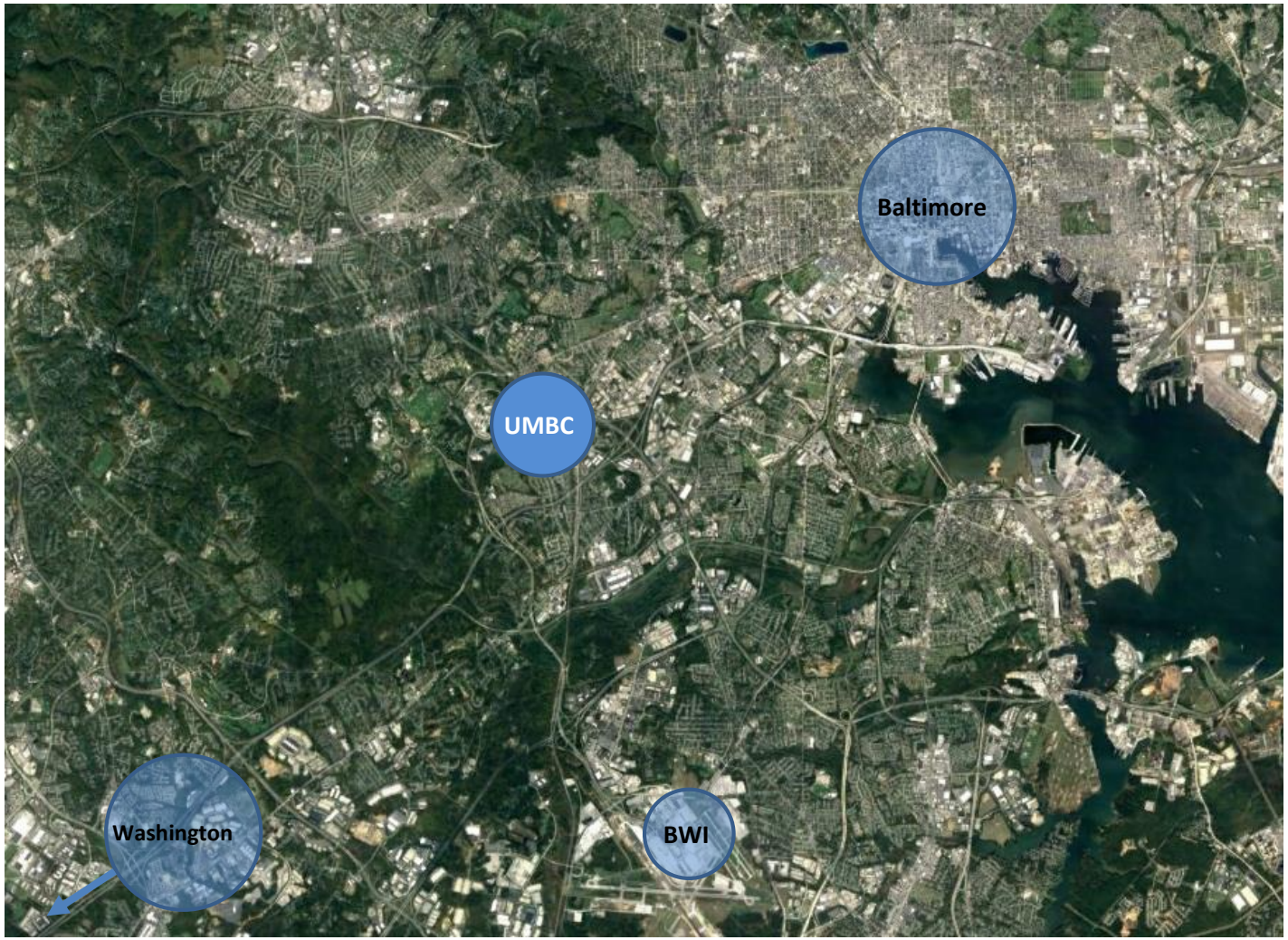
David Mackey
Director of Construction & Facilities
david.mackey@momsorganicmarket.com

Workplace EV Charging and Management

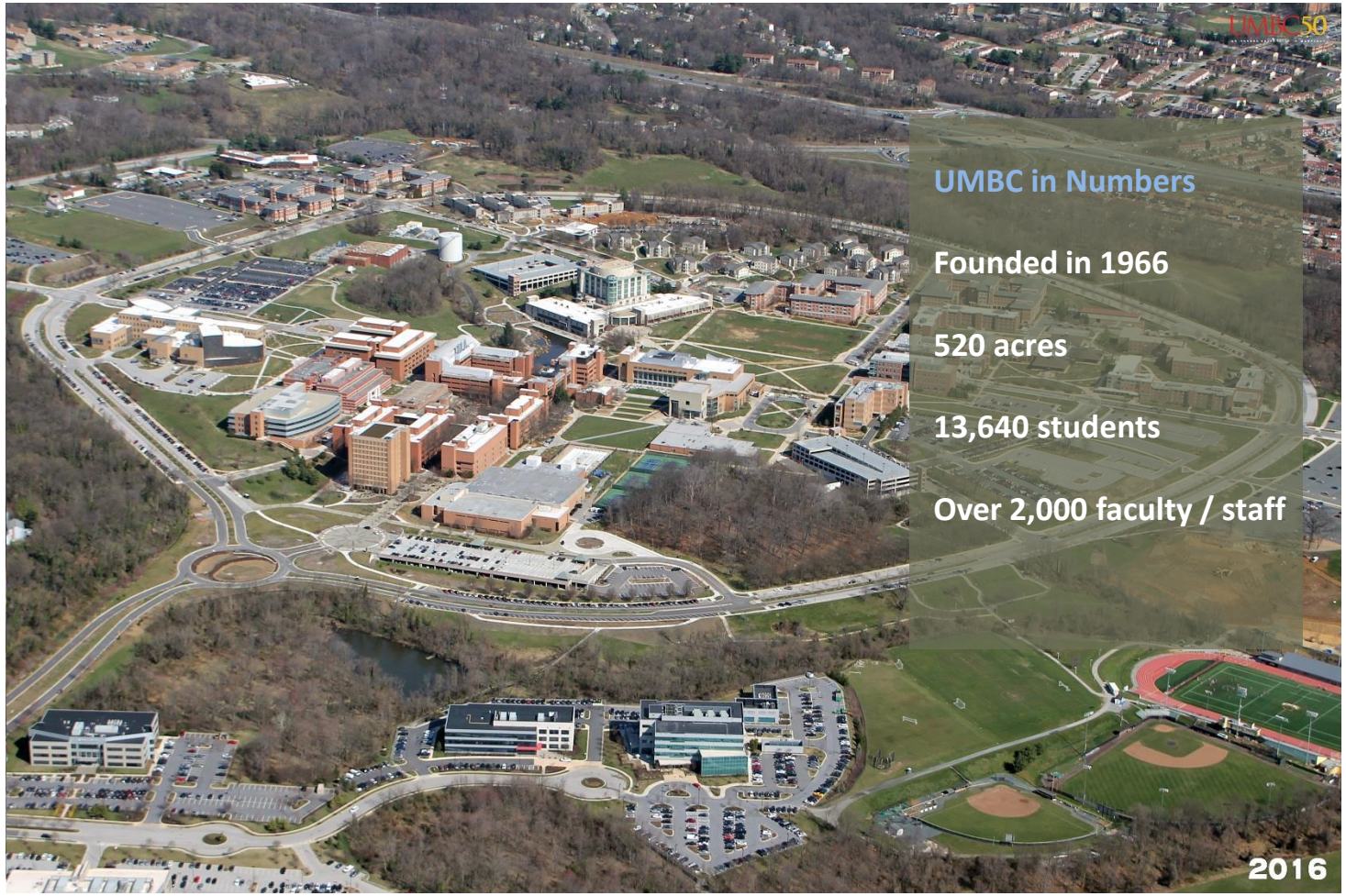
Expanding the Network

UMBC Charging Stations for Electric Vehicles

UMBC Workplace EV Charging and Management



UMBC Workplace EV Charging and Management



Modest Beginnings

In 2011, the university installed two charging stations in the Stadium Lot with the assistance of the Baltimore-Washington Electric Vehicle Initiative (BEVI).

The availability of the charging stations helped respond to the growth in electric and plug-in hybrid car use on campus.

Encouraging EV use lowers the overall carbon footprint of the university and illustrates our commitment to sustainability.

Current Management

The stations are free to use at any time
- during weekdays before 5pm they are dedicated for university parking permit holders only.

The stations are repaired and managed by Facilities Management, but parking regulations are enforced by Parking Services.

Responding to high demand, four spaces serve the two charging units.

EV drivers currently self-manage the two stations and swap out the cables with the cars in the two adjoining spaces, where the cables currently reach.

Over the last five years, the university has logged very few complaints about inappropriate use of the stations.

Growth in Plug-in Vehicle Use

On most days the two charging stations are occupied from 7am to 5pm.

While many of the EV drivers are staff or faculty, it is quite often to see commuting student hang tags on the vehicles.

Four Nissan Leaf electric vehicles at the two campus charging stations in April 2015

Location on Campus

Many of the users of the charging stations are staff or faculty members employed in the central academic core of the campus.

The location of the two existing stations in the Stadium Lot is inconvenient to those who teach in the core of the campus.

For many years these faculty and staff members have been voicing a need for not just additional stations, but ones located on the west side of the campus.

Location on Campus

UMBC is lagging far behind other sister institutions

UMBC, with two, is falling behind many of its sister institutions in the availability of charging stations.

- University of Maryland, Baltimore has 16 stations at seven garage locations.
- University of Maryland, College Park has 16 stations, also at seven locations around campus.
- Towson University has 18 charging stations at five locations.
- Salisbury University has a parking garage with 6 charging stations
- Johns Hopkins, with less than half of our student body, has 5 stations.

Clear Benefits

Increasing the network of charging stations on campus has many benefits for UMBC.

Advantages include:

- Encouraging the use of zero emission vehicles, lowering the carbon footprint of the university.
- Creating convenience for staff, faculty and students that drive plug-in electric vehicles.
- Displaying vividly to students and visitors UMBC's commitment to address climate change.
- Contributing to the goal of enhancing the regional network of charging stations.
- Contributing to reducing our reliance on fossil fuels.

Incentives to Installing More Charging Stations

The US Green Building Council LEED program provides incentives for the construction of electric vehicle charging stations in their LEED new construction ratings.

The State of Maryland also provides incentives for the installation of charging stations. Currently there is a 50% rebate for the purchase and installation of each Level 2 (240V) charging stations by June 30, 2017 for **up to $5,000**. This applies to state institutions and non-taxpaying businesses.

So what has kept the university from expanding its current network?

Belief that converting existing spaces will reduce student commuter parking, which is at a premium.

The previous LEED program gave as much of an incentive to provide Low Emitting Vehicle (LEV) spaces as EV spaces.

The university has not constructed a new parking garage in more than ten years – many charging stations on university campuses have been located in new parking facilities.

While students are very vocal about parking issues, faculty and staff (the biggest users) have been less demanding for new charging facilities.

The EV charging stations themselves do not fall under any established campus management departments. No unit wants to manage use and charge users.

Expansion Plans

UMBC is committed to expanding our network. Before proceeding with a plan we had to ask these **questions**.

- What level of charging should we be investing in? Level 2 or DC fast charging?
- What equipment and power connections are necessary to provide electric charging?
- The university is not in the business of managing fuel services. How will these stations be managed? Should we charge for the electricity used? Should we contract with an outside vendor to manage the network?
- Can we afford to dedicate additional parking spaces to EV users?
- Where should the charging stations be located on campus? Should they target faculty/staff, students, or visitors to the campus?

Work Place EV Charging

An Electrician's perspective.

Work Place EV Charging

Michael Wall, President

Clinton Electric Co., Inc.

1850 York Road, Suite L.

Timonium, MD 21093
Mike@ClintonElectric.com

(410) 453-9800

Over 400 EV stations sold and/or installed in the past 5+ years, with 27 DC Fast charger locations installed in MD, DE, PA and Aruba. ChargePoint O&M partner for MD, DE. VA and DC. Tritium and Efacec repair partner for the East Coast.

My Experience at a recent Trade show at the Baltimore Convention Center:
Some Real Questions Asked:

- **Are they already selling electric car?**
- **Really, some people don't know they exist.**
- **So, you need to actually plug them in?**
- **Yes, it's some what like putting in gas.**
- **Do you think electric cars will really be viable business someday?**
- **Have you heard of Tesla?**

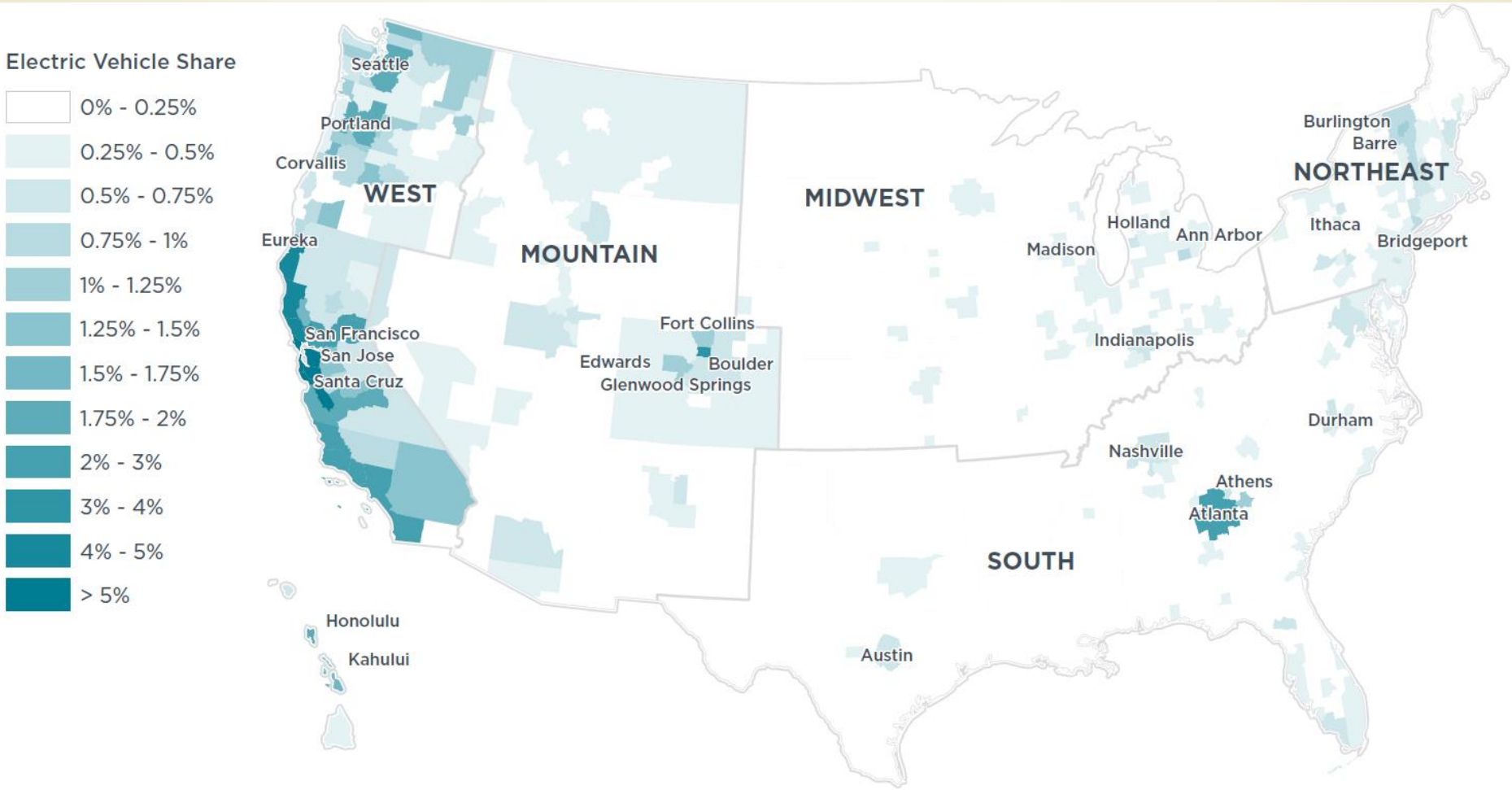
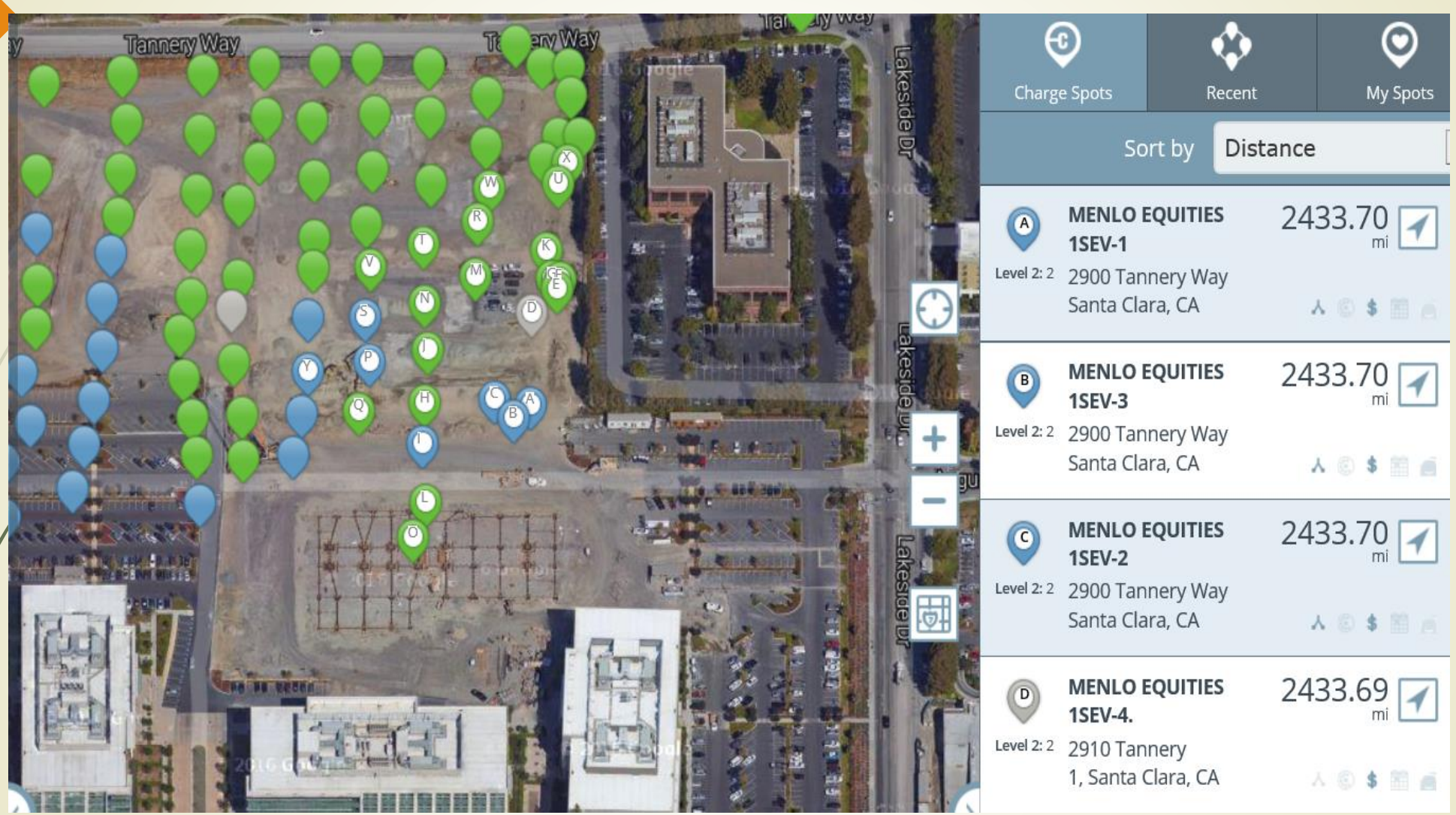


Figure 1. Electric vehicle share of new vehicle registrations in 2015, highlighting leading metropolitan areas in each region (new vehicle registration data from IHS Automotive)

My observations from the prior graph

- **#1 – The East Coast is behind the West Coast with EV adoption.**
- **#2 – Incentives work, as shown by the dark spot over Atlanta, GA.**
- **#3 – This graph is showing 2015 EV new sales share – by 2016 many of the California cities were over 10+ market share for EV sales.**


Tannery Way
Tannery Way
Lakeside Dr
Lakeside Dr
Lakeside Dr
Charge Spots
Recent
My Spots
Sort by
Distance
A
MENLO EQUITIES
1SEV-1
2433.70
mi
Level 2: 2
2900 Tannery Way
Santa Clara, CA
B
MENLO EQUITIES
1SEV-3
2433.70
mi
Level 2: 2
2900 Tannery Way
Santa Clara, CA
C
MENLO EQUITIES
1SEV-2
2433.70
mi
Level 2: 2
2900 Tannery Way
Santa Clara, CA
D
MENLO EQUITIES
1SEV-4.
2433.69
mi
Level 2: 2
2910 Tannery
1, Santa Clara, CA

Work Place Charging – Installing the right EV charger at the right location

- Is the area open to the public or private (employee only) ?

  Understanding your need for basic charging or smart charging

- How long will the vehicle be parked ?

  Understanding type of charger Level – 1 (slow), 2 (med.), DC (fast)

- Where is the existing power? and what's the voltage & available power?

  This is the big part of a "site survey".

- Do you expect to every charge a fee for charging ?

  Understanding your need for payment system.

- Do you need to be concerned with ADA Requirements?

  MD has not officially adopted ADA requirements for EV parking, but we should use best install practices at a minimum.

What are we looking for with a site survey?

- #1) The closer the EV station is to the main power, the lower the install cost.
- #2) Parking garages typically are much easier installs than level lots.
- #3) Available Power: Do we have the required power? "Amperage."
  Do we have the required Voltage? (separate issue).
- #4) Is power sharing an option?
- #5) Should we provide future proofing? How much?
- #6) How are we addressing ADA concerns? (See Energy.gov for details.)
- #7) Should be #1 – what's the budget for investment?

QUESTIONS?