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# IMPACT OF SMART EV CHARGERS ON THE GRID AND CUSTOMER BEHAVIOR

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# WHAT IS SMART CHARGING?

Electric vehicle (EV) charging, in which

1. The charger communicates with the vehicle(s), charging operator, and/or the grid;
2. The charging operator monitors, manages, and/or adjusts the energy consumption of the vehicle(s);
3. The charging meets the needs of the EV driver(s).

# SMART CHARGING METHODS

1. EV Time-of-Use (TOU) Rate Structure
2. Demand Response (DR)
3. Direct Load Control (DLC)
4. Vehicle-to-Grid (V2G)



## EV TIME-OF-USE

- Cheapest method
- Viable for all charging locations
- Customer-focused
- May extend peak period

## DEMAND RESPONSE

- Easiest to understand
- Expands market
- Customer-focused
- Daily customer interaction
- May extend peak period

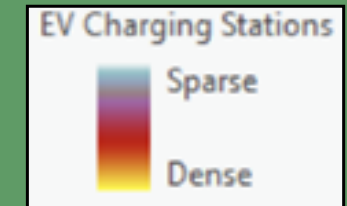
## DIRECT LOAD CONTROL

- Little to no customer interaction
- Plug and go
- Expands market
- Ideal for fleet management
- Customer has no control
- Requires trust and predictability
- Ongoing optimization cost

## VEHICLE-TO-GRID

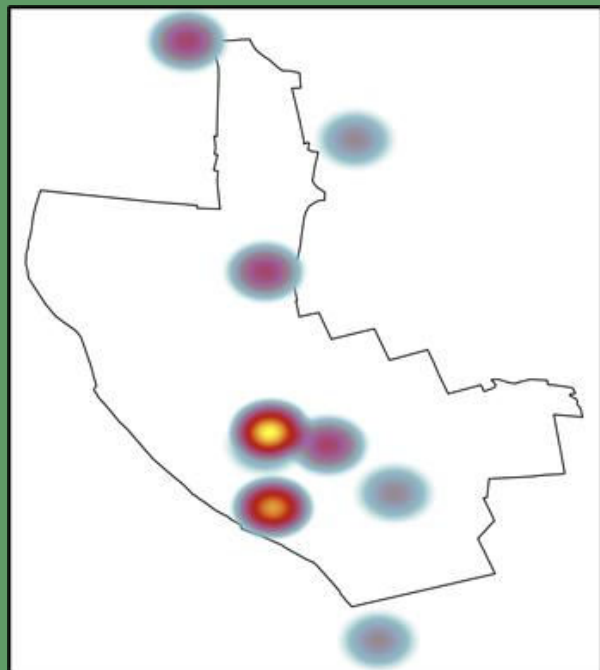
- Provides energy while managing demand
- Customer is typically most incentivized
- Most complex
- High technology investment
- Initial hesitation

# EV CHARGING STATIONS HEAT MAPS OF MAJOR CITIES IN PENNSYLVANIA



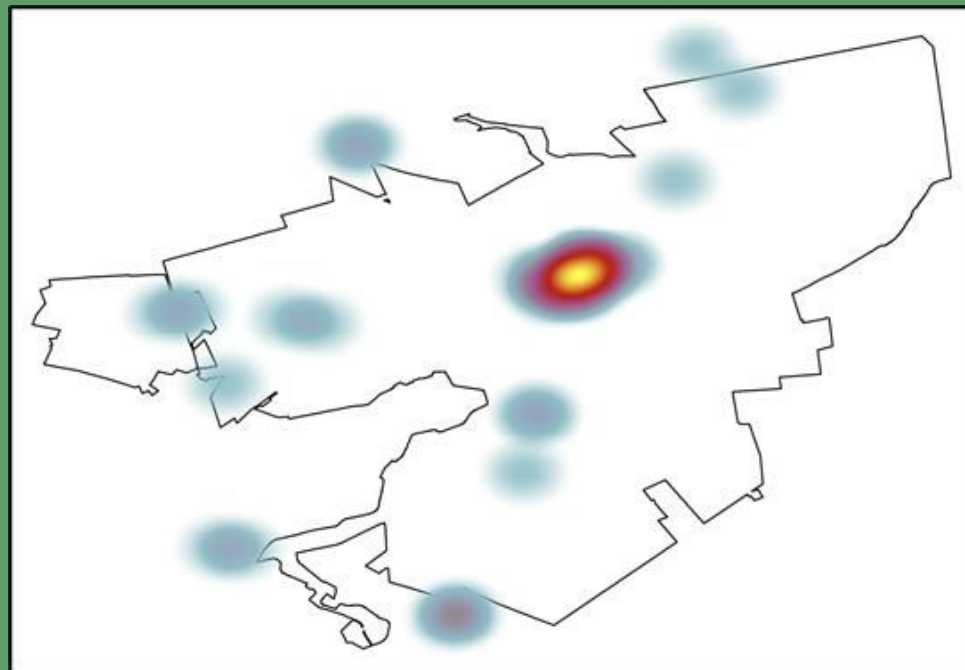
## Harrisburg

(19 Stations;  
37 Chargers)



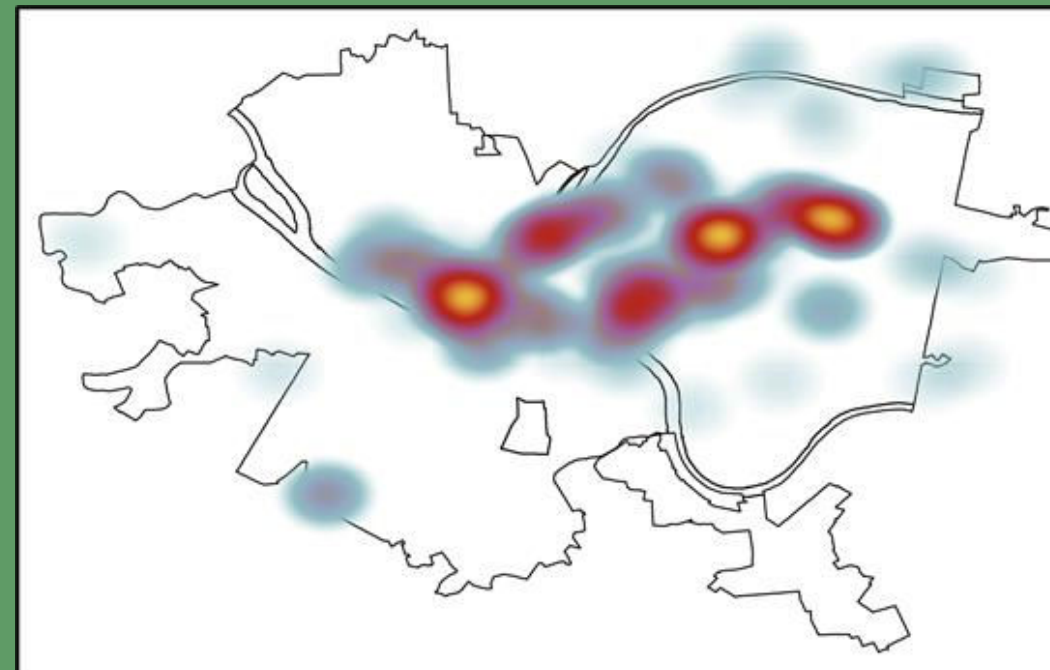
## Allentown

(40 Stations;  
90 Chargers)



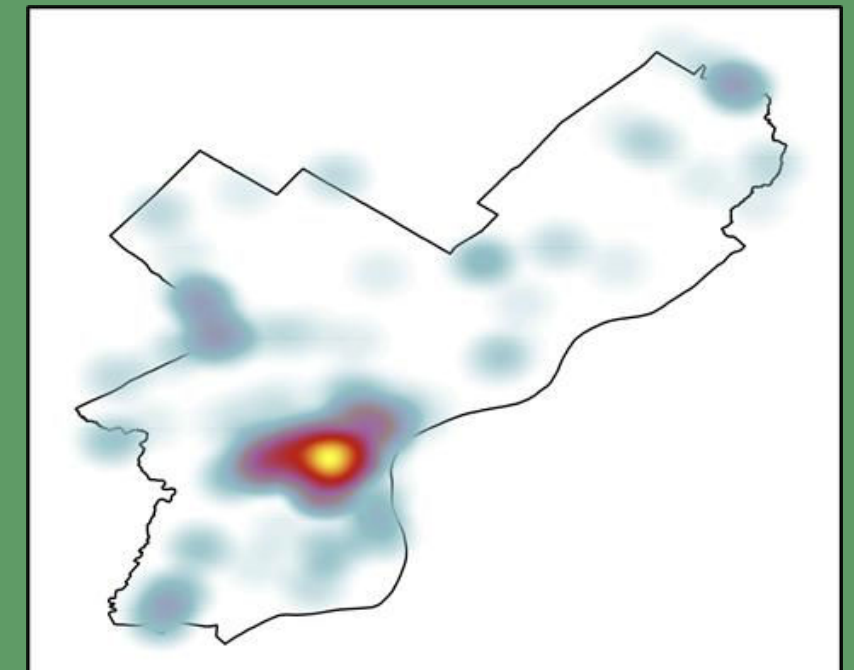
## Pittsburgh

(279 Stations;  
665 Chargers)



## Philadelphia

(209 Stations;  
562 Chargers)



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# THANK YOU!

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# GET IN TOUCH:



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