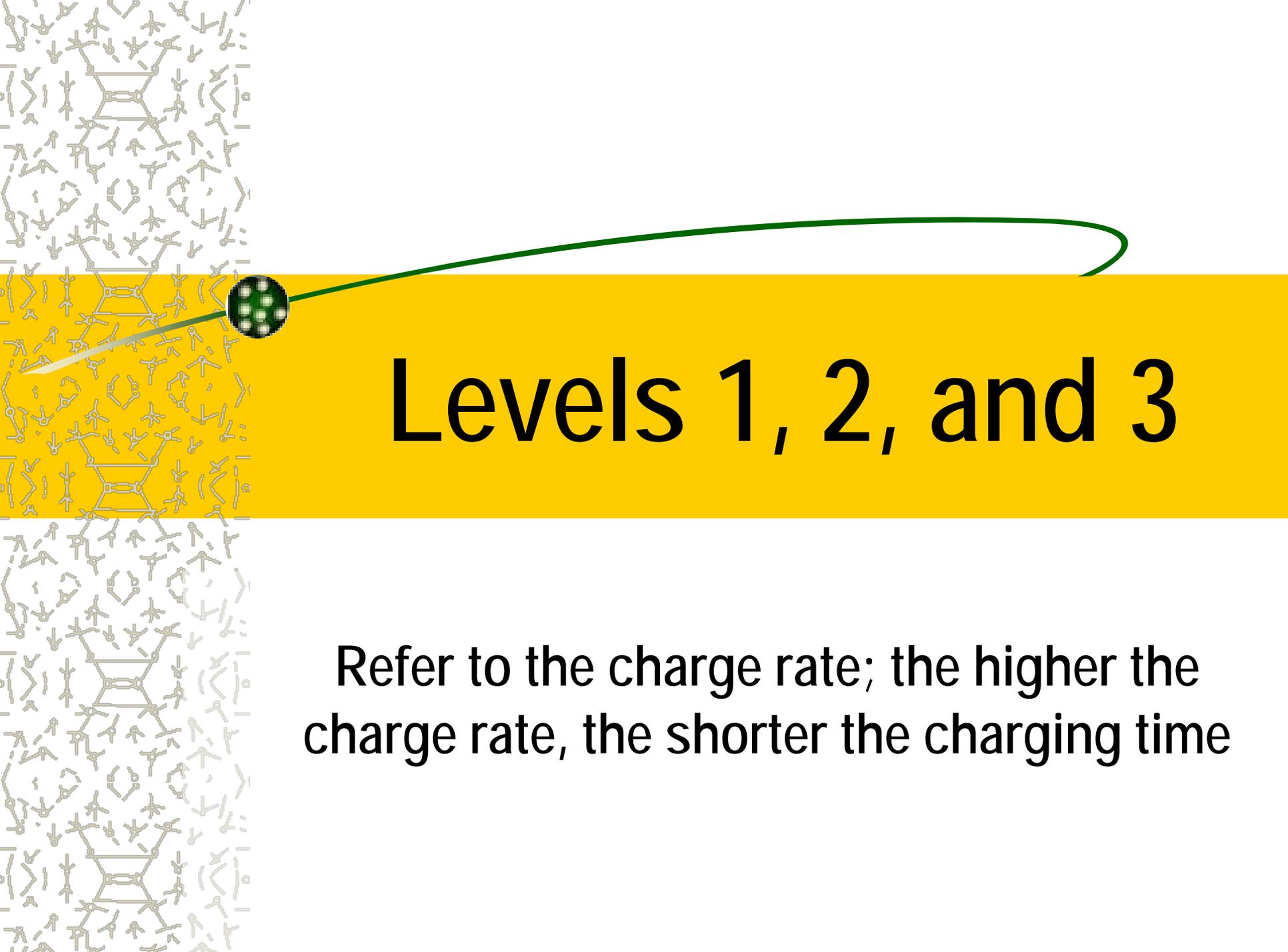


Electric Vehicle Charging Basics

- National Fire Protection Association publication 70 is the National Electrical Code
- The state of Oregon adopted the 2008 NEC on April 1st, 2008
- Article 625, Electric Vehicle Charging Systems, became a part of the NEC in 1996, and EVSE has always been considered a continuous load

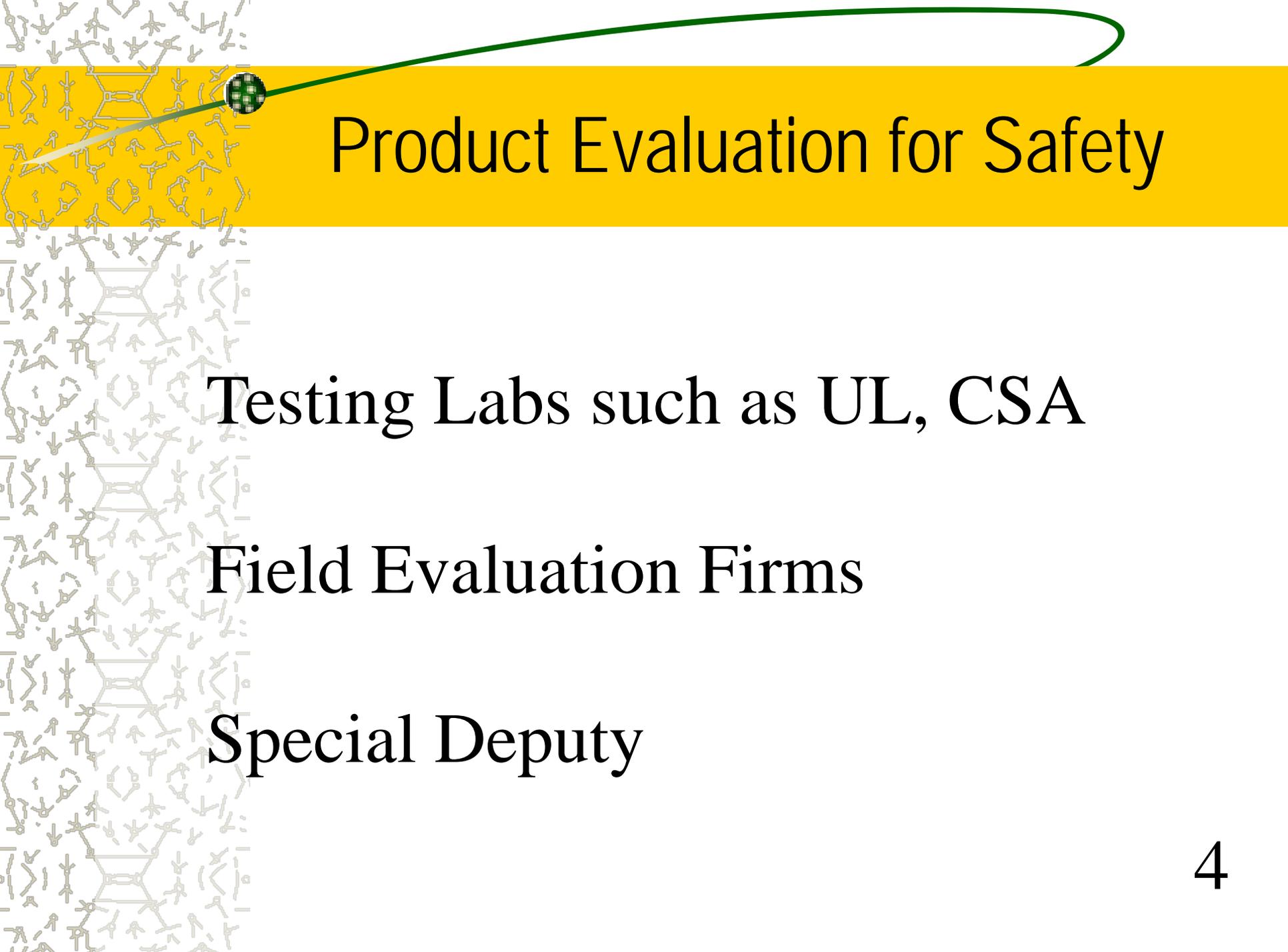


Levels 1, 2, and 3

Refer to the charge rate; the higher the charge rate, the shorter the charging time

Power Transfer

- Level 1 is limited to 1920 watts, the equivalent of a small appliance (20 amp 120 volt circuit)
- Level 1 charging of a fully depleted battery pack may take from 8 to 14 hours
- Level 2 SAE standard J1772
- This standard has not yet been released, but may go as high as 13,440 watts (70 a 240 v circuit)



Product Evaluation for Safety

Testing Labs such as UL, CSA

Field Evaluation Firms

Special Deputy

Shock Hazard

- Make and break contacts can arc if connected or disconnected under load
- Level 2 power delivery rate triggers a requirement to ensure that cord and plug contacts cannot be made or broken under load
- This “check and balance” will be achieved through software communication between the on board charger and the EV Supply Equipment

SAE Standard J1772



Speculation

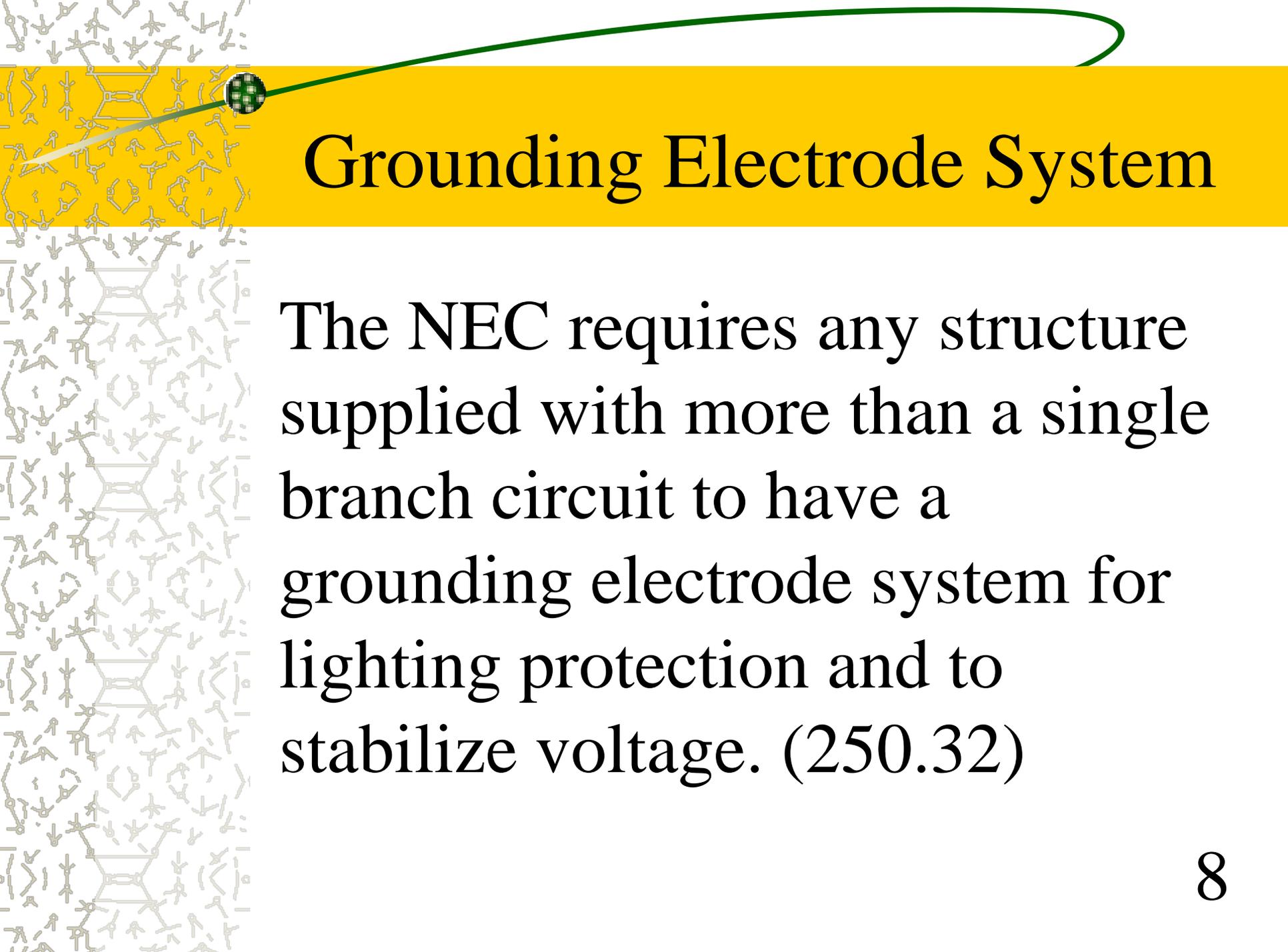
If the connector had another pin to allow delivery of three phase power to the vehicle, here are the power comparisons;

30 amp 240 volt single phase = 5760 watts

30 amp 208 volt three phase = 8646 watts

30 amp 240 volt three phase = 9976 watts

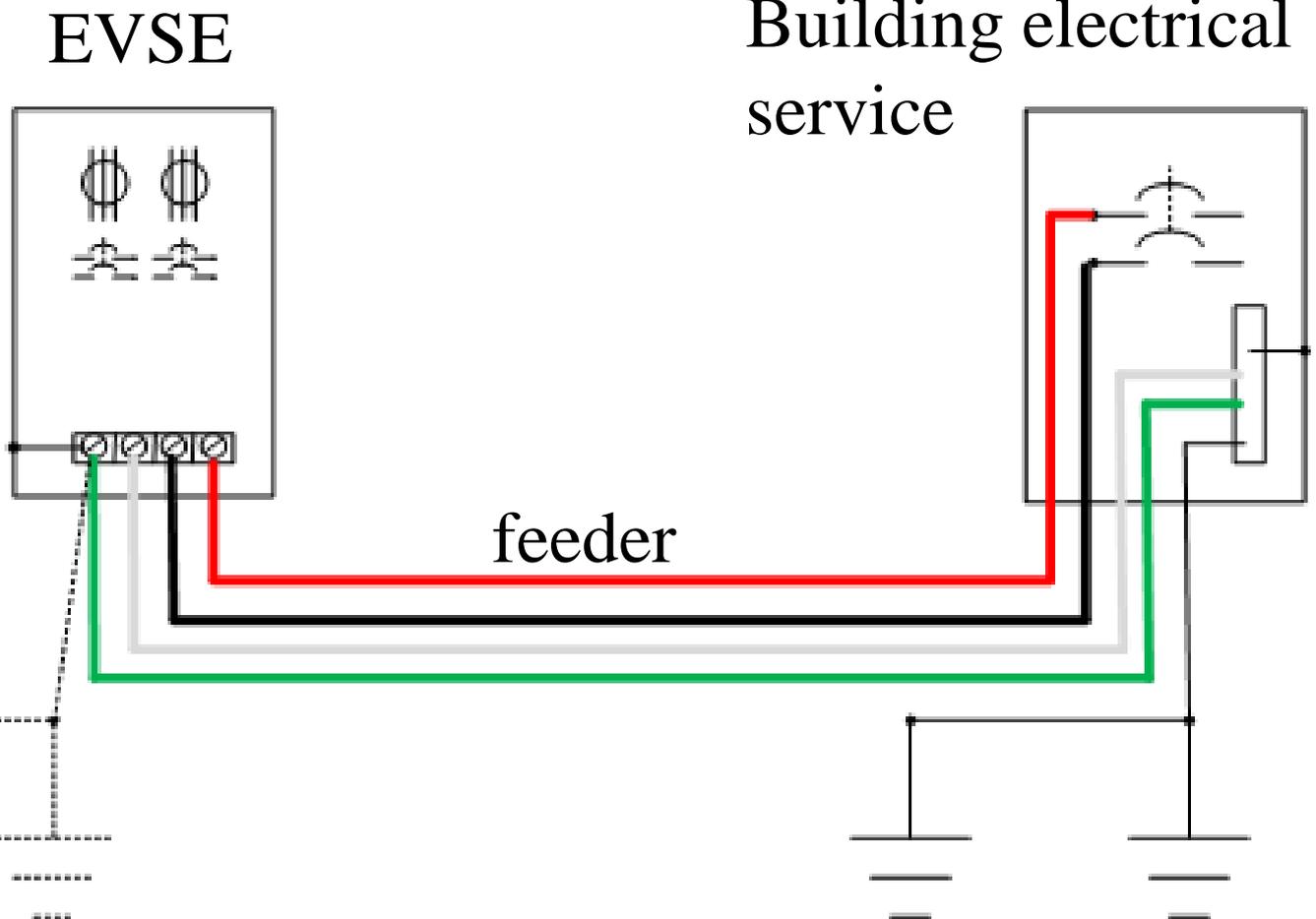
(a 70 a 240 v three phase circuit could deliver power at 23,278 watts)



Grounding Electrode System

The NEC requires any structure supplied with more than a single branch circuit to have a grounding electrode system for lightning protection and to stabilize voltage. (250.32)

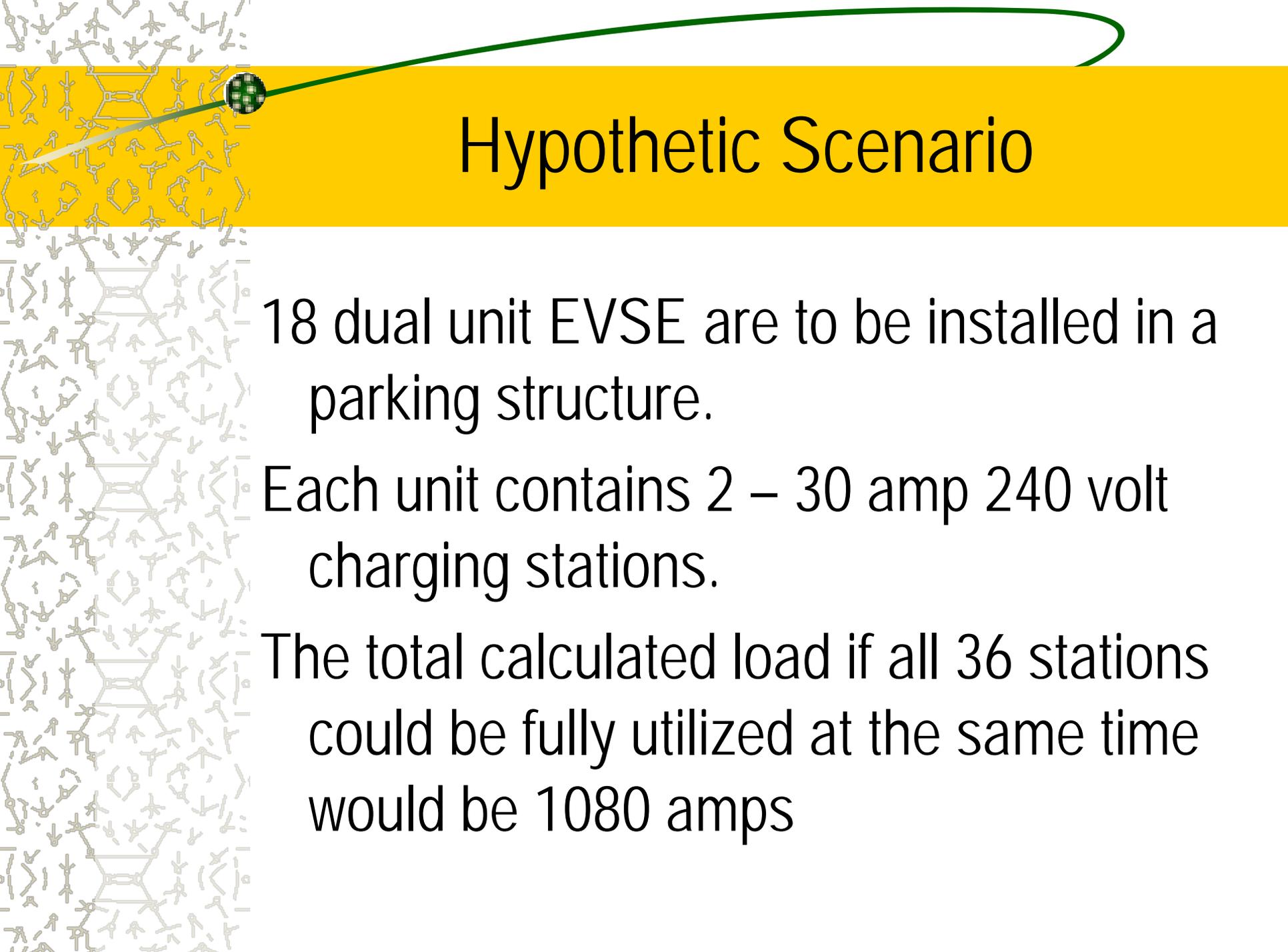
Grounding Electrode





Service and Feeder Calculations

- EVSE identified as Continuous Load
- Demand Factor for Load Diversity
- Statewide Alternate Method Ruling
- Sample Calculation



Hypothetic Scenario

18 dual unit EVSE are to be installed in a parking structure.

Each unit contains 2 – 30 amp 240 volt charging stations.

The total calculated load if all 36 stations could be fully utilized at the same time would be 1080 amps

Service / feeder illustration

